Influence of Gender and Self-Perceived Competence on Psychological Well-Being in Adolescent and Young Adult Cancer Survivors

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Abstract

Elucidating factors associated with mental health and well-being among Adolescent and Young Adult cancer survivors (AYAs) is increasingly important as this population continues to grow. Adolescence and young adulthood are critical times for developing self-perceived competencies, which may be shaped by the cancer experience and may have different consequences based on the person's gender. We assessed whether gender moderated the association between perceived competencies and mental health in 61 AYAs (51% males; 11-20 years old; diagnosed between 0.33-17.33 years old). Gender moderated the association of self-perceived competence in close friendship, job, and scholastic domains with depression, anxiety and optimism.

Introduction

Cancer survival rates have increased over the past several decades, and the population of adolescent and young adult cancer survivors (AYAs) is steadily growing.[1] Despite improved treatments and increased survival rates, the experience of cancer continues to represent a major disruption to numerous domains of AYA life, including psychosocial functioning and mental health. Adolescents and young adults are vulnerable to mental health concerns,[2] and the cancer experience exacerbates risk.[3,4,5] In particular, AYA often experience significant cognitive and physical difficulties[3,5,6,7] that interfere with developmental and personal milestones[6,7] and increase risk for depression and anxiety.[4,5,6] However, results have been somewhat inconsistent, with researchers documenting positive outcomes (e.g., lower anxiety, fewer cognitive problems, greater hope) among AYAs despite worse life satisfaction.[8] Thus, identifying factors associated with both positive and negative mental health outcomes in this population is critical.

One factor that may contribute to AYAs' mental health is alterations in self-perceived competencies (SPC). SPC refer to one's perceived ability to achieve goals in various domains of life, including, for example, the ability to develop close friendships or excel academically.[3,5,9] Self-perceptions emerge in preadolescence and are continually refined into young adulthood.[2] The healthy development of SPC is associated with well-being,[2] whereas disruptions, such as those caused by the cancer experience, are associated with psychological distress.[2,3] Consistent with this idea, researchers have documented that at post-treatment, AYA report that the cancer experience altered their self-perceptions.[3] For example, perceptions of social competence and physical

appearance are lower in AYA compared to on-treatment peers, whereas perceptions of athletic competence are lower than healthy peers.[10] Additionally, cognitive sequelae of various cancer treatments are associated with perceptions of lower scholastic competence,[5] and researchers examining self-concept – a related construct – have found that pediatric and adolescent cancer patients and survivors report negative perceptions of their behaviour, physical appearance, and academic performance compared to healthy controls.[11] However, alterations in SPC are not exclusively negative, and positive changes in AYAs' self-perceptions of close relationships and appearance have been observed.[3,10]

AYAs' goals, as shaped by the cancer experience, may increase the salience of interpersonal and achievement-related SPC for wellbeing. Cancer survivors report a preference for close social partners, who are most likely to offer meaningful interactions, consistent with the socioemotional selectivity theory.[12,13] Moreover, AYAs report increased drive to achieve academic and personal goals.[14] Together, these goals may enhance the relevance of social- and achievement-related competencies to mental health outcomes. However, despite theoretical and empirical evidence suggesting SPC play a role in AYAs' wellbeing, researchers have not yet examined whether specific domains of SPC are differentially associated with negative and positive mental health outcomes among AYAs. This is critical for identifying potential vulnerabilities and protective factors in this at-risk group, as well as for highlighting potential targets for assessment and interventions.

Importantly, extant research has documented gender differences in self-perceptions, and in SPC in particular, as well as in levels of distress and well-being.[2,5,6]

For example, female AYAs report worse perceptions of their current life than do males.[8] Moreover, male AYAs report higher levels of physical, athletic, and scholastic SPC, as well as less anxiety, than female AYAs.[5] The outcomes of specific SPCs may also differ by gender. Among healthy adolescents, for example, females' mental health outcomes are associated with SPC in relationships, whereas males' mental health outcomes are associated with SPC in areas related to achievement.[2] However, research has yet to assess whether these gender-specific associations are found among AYAs, which is critical for understanding the unique needs of male and female AYAs in the clinical context.

The aim of this study was to examine whether gender moderates the association of various SPC with depression, anxiety and optimism among AYA-aged survivors. We predicted that, for females,[*] lower SPC in interpersonal domains (close friendship and social) would be associated with greater depression and anxiety and lower optimism. In contrast, we predicted that, for males, lower SPC in achievement domains (athletic, scholastic, job) would be associated with greater depression and anxiety and lower optimism. Finally, we assessed the association of behavioural and physical SPC with mental health outcomes in an exploratory manner.

Method

Participants

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[*]As recommended by the American Psychological Association for studies with age ranges spanning multiple developmental periods, we use the terms 'male' and 'female' when referring to gender.

Our final sample consisted of 61 AYA-aged individuals successfully treated for any form of cancer (31 males, 51%; 11-20 years old[†]; diagnosed between 0.33-17.33 years old; Table 1). An a priori power analysis indicated that with power=.80 and α=.05, our sample was adequately powered to detect moderate effects (d=.5). Potential participants were identified through the Children's and Women's Health Centre in British Columbia and the Stollery Children's Hospital in Alberta (see online supplement).

Procedure

Ethics approval was received from all institutions. Caregivers of participants were mailed consent forms and questionnaires; participants completed questionnaires independently and returned them by mail.

Measures

Alpha reliabilities are reported in Table 1. All measures demonstrated acceptable internal consistency.

Self-Perception Profile for Adolescents (SPPA): The SPPA[15] is a 45-item measure of SPC. Scholastic, social, athletic, physical, job, behavioural, and close friendship subscales were included in analyses because they were central to our hypotheses and have shown good psychometric properties in AYA samples.[5,16]

Beck Depression Inventory-II (BDI-II): The BDI-II[17] is a 21-item questionnaire assessing the severity of depressive symptoms in the past two weeks. It has well-established psychometric properties in AYA samples.[18]

[†]Consistent with Patterson (2011), Manchester (2011) and the World Health Organization definition of adolescents as individuals between 10-19 years old, we classified our sample as AYAs.

Life Orientation Test-Revised (LOT-R): The LOT-R[19] is a 10-item measure of optimism. It has demonstrated good psychometric properties in AYA samples.[20]

Revised Child Manifest Anxiety Scale (RCMAS): The RCMAS[21] is a 37-item measure of anxiety. The total anxiety score was used in the current analyses. It has demonstrated good psychometric properties in AYA samples.[10]

Intensity of Treatment-3 (ITR-3): The ITR-3[22] assesses intensity of cancer treatment based on diagnosis, stage, risk level, and type and number of treatment modalities. Two trained researchers made independent ITR-3 ratings (inter-rater agreement=88.0%; discrepancies were resolved by KR and a consulting physician).

Statistical Analyses

Analyses were conducted using SPSS 24. Pearson correlations of ITR-3, age at diagnosis, duration of treatment, and time off treatment with depression, anxiety, and optimism were conducted to identify covariates.

Next, we conducted a series of hierarchical linear regressions to assess whether gender moderated associations of domains of SPC with depression, anxiety, and optimism (R^2 statistics are in Table 2). Gender was dummy coded; continuous variables were mean-centered. Significant covariates were entered in Block 1, SPC variables and gender in Block 2, and interaction terms in Block 3. Significant interactions were followed up with simple slopes analyses. Region of significance analyses[23] (shown in Figure 1) indicate the values of SPC for which there was a significant difference in mental health outcomes between males and females.

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Results

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Preliminary Analyses

Demographic and descriptive statistics are in Table 1. Mean depression scores were in the minimal range, but across the sample ranged from minimal to moderate. Mean anxiety scores were in the non-clinically significant range, but across the sample ranged from below to above the cut-off for clinical significance. Age, treatment duration, and ITR-3 scores were not associated with depression, anxiety, or optimism, $ps>.089$. Age at diagnosis was associated with depression ($r=.30$, $p=.018$), and time off treatment with anxiety ($r=-.28$, $p=.045$); thus, they were entered as covariates in analyses predicting depression and anxiety, respectively.

Main Analyses

Depression. Older age at diagnosis was associated with higher depressive symptoms, $β=.30$, $t(60)=2.42$, $p=.018$. Gender significantly predicted depressive symptoms; females had higher depressive symptoms than males, $β=.26$, $t(60)=2.04$, $p =.047$. The interaction of gender with SPC in establishing close friendships on depression was significant, $β=-0.69$, $t(60)=-3.07$, $p=.004$. Simple-slope analyses indicated lower SPC in establishing close friendships was associated with higher levels of depression for females, $B=-4.83$, $t(44)=-3.04$, $p=.004$, but not males, $B=2.85$, $t(44)=1.48$, $p=.147$ (Figure 1A). No other interactions were significant, $ps>.243$.

Anxiety. Greater time off treatment was associated with lower anxiety, $β=-.28$, $t(50)=-2.06$, $p=.045$. There were main effects of gender and SPC at establishing close friendships on anxiety; females had higher anxiety symptoms than males, $β=.31$, $t(50)=2.40$, $p=.021$, and higher SPC at establishing close friendships predicted lower anxiety, $β=-.34$, $t(50)=-2.58$, $p=.013$. No other main effects were significant, $ps>.088$. Two significant interactions emerged. First, the interaction of gender and SPC at

establishing close friendships was associated with anxiety, β=-0.52, $t(50)$=-2.86, p=.007. Simple-slope analyses indicated that lower competence in establishing close friendships was associated with greater anxiety in females, B=-5.00, $t(34)$=-3.76, p= .001, but not males, B=.87, $t(34)$=.55, p=.586. Second, the interaction of gender and job competence was associated with anxiety, β=0.56, $t(50)$=2.35, p=.025. Simple-slope analyses indicated greater job competence was associated with higher levels of anxiety for females, B=5.30, $t(34)$=2.29, p=.028, but not males, B=-4.09, $t(34)$=-1.26, p=.218 (Figure 1B-1C). No other interactions were significant, ps>.292.

Optimism. There were no main effects for gender or self-perceived competencies on optimism, ps>.051. There was a significant interaction between gender and scholastic competence on optimism, β=-0.64, $t(59)$=-2.33, p=.025. Simple-slope analyses indicated that greater scholastic competence was associated with greater optimism for males, B= 5.18, $t(45)$=3.15, p=.003, but not females, B=0.11, $t(45)$=.08, p=.937 (Figure 1D). No other interactions were significant, ps>.079.

Discussion

We assessed whether associations between domains of SPC and markers of mental health and well-being differ between male and female AYAs. Particular domains of SPC were differentially related to AYAs' mental health based on gender. Consistent with hypotheses, greater levels of an interpersonal-related competency (i.e., SPC at establishing close friendships) was associated with decreased depression and anxiety among females. Additionally, greater levels of an achievement-related competency (i.e., scholastic competence) was associated with greater optimism for males. In contrast, greater job competence was associated with increased levels of anxiety for females.

In addition to identifying SPC domains implicated in AYA's mental health outcomes, findings illustrate how these domains differentially predict mental health outcomes depending on gender. To this end, the social disruptions experienced by AYAs during cancer and into survivorship may be particularly harmful for females as *lower* perceived ability to establish close friendships may increase risk for depression and anxiety. Given the development of social skills and close relationships that occurs during adolescence,[24] late-effects of cancer in AYA and recurring difficulties such as fear of cancer recurrence[25] may disrupt these interpersonal developmental milestones. This may explain continued challenges experienced by some AYAs, especially given the emphasis placed on close relationships that has been observed in cancer patients.[12] In contrast, disruptions in school attendance and cognition may impact scholastic SPC, particularly in the context of greater drive for achievement goals in AYAs.[14] However, *increased* scholastic competence may protect against mental-health difficulties for males by increasing optimism. Finally, we found that among females, but not males, greater job SPC was associated with *higher* levels of anxiety. While unexpected, it is possible that females with greater job SPC experience greater pressure to perform and thus, greater anxiety. Overall, our findings highlight targets for assessment and intervention. Routinely assessing SPCs may help identify AYA at risk for poor mental health outcomes. Furthermore, educational supports and peer interactions promoting greater SPC should be tailored for males and females and integrated into programs for AYA during treatment and into survivorship.

Our study should be interpreted in the context of its limitations. Our sample age range was broad; while this increases generalizability, future research should examine

differences between adolescents and young adults. Additionally, this study was cross-sectional; thus, the impact of the cancer experience on SPC and the temporal precedence of competencies versus mental health symptoms is unclear. Future research should explore the longitudinal implications of a cancer diagnosis on SPC and mental health and well-being.

The results of our study indicate that AYAs' psychological distress and well-being are associated with specific SPC that vary by gender. Interpersonal SPC are particularly relevant for females, whereas achievement-related competencies are particularly relevant for males. Importantly, the current findings signal the potential benefit of integrating gender- and domain-specific SPC into psychological assessments and interventions to better support the long-term wellbeing of AYA cancer survivors.

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Author Disclosure Statement

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Table 1. Demographic, Treatment, and Mental Health Characteristics

	Overall M (SD)	Males M (SD) n= 31	Females M (SD) n=30	
Age	15.43 (2.64)	14.97 (2.54)	15.90 (2.70)	
Age at Diagnosis	7.77 (4.92)	7.64 (4.81)	7.90 (5.12)	
Cultural Background	Overall n (%)	Males n (%)	Females n (%)	
East Asian	1 (2)	0 (0)	1 (3)	
European	13 (21)	6 (19)	7 (23)	
Indigenous	3 (5)	2 (6)	1 (3)	
North American	37 (61)	18 (58)	19 (63)	
South American	1 (2)	0 (0)	1 (3)	
South Asian	2 (3)	0 (0)	2 (7)	
West Asian	1 (2)	0 (0)	1 (3)	
Treatment Characteristics				
Treatment Duration	2.33 (2.59)	1.81 (1.58)	2.96 (3.38)	
Time off treatment	5.83 (4.22)	5.96 (4.36)	5.66 (4.12)	
Treatment Modalities				.86
Chemotherapy	56 (92)	29 (94)	27 (90)	.87
Radiation	31 (51)	15 (48)	16 (53)	.64
Surgery	29 (48)	13 (42)	16 (53)	.89
Bone Marrow Transplant	6 (10)	3 (10)	3 (10)	.60
ITR-3				
Least Intensive	1 (2)	1 (3)	0 (0)	
Moderately Intensive	22 (36)	12 (39)	10 (33)	
Very Intensive	27 (44)	13 (42)	14 (47)	
Most Intensive	11 (18)	5 (16)	6 (20)	
Cancer Type				
Solid	16 (26)	9 (29)	7 (23)	

Liquid	34 (56)	18 (58)	16 (53)
Brain Tumor Types			
Astrocytoma	4 (7)	1 (3)	3 (10)
Medullablastoma	3 (5)	2 (6)	1 (3)
Brain Tumor	2 (3)	1 (3)	1 (3)
Glioma	2 (3)	0 (0)	2 (7)
PNET[A]	1 (2)	1 (3)	0 (0)

Mental Health Characteristics	Overall M (SD)	Males M (SD) n= 31	Females M (SD) n=30	α
BDI	7.63 (6.44)	6.20 (6.32)	9.10 (6.32)	.86
RCMAS Total	8.92 (6.00)	7.45 (5.97)	10.44 (5.75)	.87
LOT-R	14.63 (3.39)	15.39 (3.12)	13.81 (3.53)	.64
Self-Perceived Competencies				
Scholastic Competence	2.97 (.60)	2.93 (.55)	3.01 (.64)	.74
Social Competence	3.01 (.65)	3.01 (.60)	3.00 (.70)	.84
Athletic Competence	2.29 (.83)	2.52 (.80)	2.04 (.80)	.89
Physical Appearance	2.64 (.55)	2.68 (.57)	2.59 (.53)	.80
Job Competence	3.02 (.50)	2.95 (.46)	3.10 (.53)	.60
Behavioural Conduct	3.00 (.51)	2.87 (.49)	3.13 (.51)	.69
Close Friendships	3.07 (.73)	3.05 (.64)	3.09 (.83)	.85

Note. One participant had two types of cancer. Participants could select multiple cultural backgrounds, and 10 participants did not specify their cultural background.
[A]Primitive Neuroectodermal Tumor

Table 2. Model Summaries for Depression, Anxiety and Optimism

	R^2	F	p
Depression			
Block 1	.09	5.87	.018
Block 2	.33	2.73	.011
Block 3	.46	2.37	.012
Anxiety			
Block 1	.08	4.25	.045
Block 2	.44	3.54	.003
Block 3	.62	3.53	.001
Optimism			
Block 1	.29	2.56	.020
Block 2	.41	2.05	.033

Figure 1. Simple Slopes and Regions of Significance for Self-Perceived Competencies and Mental Health OutcomesFig.1 Note. Simple slopes depicting the association of mean-centered self-perceived competencies on mental health outcomes by gender. Shaded regions of the graphs indicate the regions of significance. Figure 1A shows simple slopes for close friendship competence and depression, and were significant below 0.01. Figure 1B shows simple slopes for close friendship competence and anxiety, which were significant below of 0.21. Figure 1C shows simple slopes for job competence and anxiety, and were significant above - 0.13. Finally, Figure 1D shows simple slopes for scholastic competence and optimism, which were significant above 0.00.