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The Effect of Optimism and Connectedness on Psychological Adjustment of Children with Cancer and Comparison Peers

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Abstract

Objective: The present study aimed to examine the relationship of optimism and connectedness to psychological adjustment outcomes in children with cancer and determine whether these relations differ for children with cancer and comparison peers.

Methods: Participants were 155 children with cancer and 143 comparison youth without a history of cancer, aged 8 to 17 years at study entry who were followed longitudinally over a 3-year period. Participants completed self-report measures at 3 time points: baseline optimism at study entry (T1), connectedness at 1 year post baseline (T2), and emotional symptoms at 3 years post baseline (T3). A series of regression analyses were conducted using conditional process analysis to examine whether connectedness mediated the relationship between optimism and psychological adjustment and whether this was moderated by health status (i.e., history of childhood cancer vs no history of cancer or other serious or chronic illness).

Results: Connectedness to parents, peers, and friends significantly mediated the relationship between optimism and psychological adjustment ($b_{\text{parents}} = -.1387$, 95% CI $[-.2341, -.0515]$; $b_{\text{peers}} = -.2021$, 95% CI $[-.3575, -.0818]$; $b_{\text{friends}} = -.0703$, 95% CI $[-.1640, -.0050]$). However, this mediation was not significantly moderated by having a history of cancer. Cancer history did moderate the direct relationship between optimism and psychological adjustment and between connectedness to parents and psychological adjustment.

Conclusions: Findings suggest that cancer patients are doing remarkably well with regards to adjustment. Connectedness with parents and peers mediates the relationship between optimism and psychological adjustment. As such, children with cancer who are identified as experiencing poor adjustment may benefit from interventions to foster connectedness.

Keywords

Pediatric; Cancer; Optimism; Psychological Adjustment; Connectedness

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DISCLOSURE OF CONFLICT OF INTEREST STATEMENT
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INTRODUCTION

Childhood cancer involves numerous challenges and stressful experiences and is considered by many to be a traumatic event by many. (1–4) However, children often demonstrate remarkable adjustment in the face of such challenges. (5, 6) Indeed, most children with cancer exhibit a pattern of resilience. (1, 4, 7–10) Although some individuals report greater psychological distress, (2) most studies have shown that the prevalence of psychological symptoms or reported distress is not different between childhood cancer survivors and their matched peers. (1, 3) Furthermore, recent studies have found that a diagnosis of childhood cancer has, for some, been associated with lower rates of negative psychological outcomes and increased post traumatic growth. (9, 11) While some of these studies sampled participants from the same pool of longitudinal data as the present study (5, 8, 9) these results appear to be supported by reviews of other research utilizing different samples. (9, 10, 12, 13) A review conducted by Noll and Kupst (10) concluded that, overall, hardiness and resilience are the two most common psychological outcomes for survivors of childhood cancer. Similar findings have been reported in more recent reviews such as those conducted by Van Schoors and colleagues. (12)

Many predictive factors, including disposition, parental support, and peer relations, have been examined to better understand the basis for such psychological outcomes. In both healthy children and healthy adults, psychological adjustment and resilience has been linked to such dispositional traits as extraversion and optimism. (13–16) In contrast, dispositional tendencies towards pessimism and neuroticism have been linked with increased psychological distress in healthy individuals. (14, 15) Specifically for survivors of childhood cancer, optimism has been found to be related to lower anxiety, posttraumatic stress symptoms, depression, general psychological distress, and lower self-reported pain. (8, 17–19) Higher optimism is also associated with better psychological adjustment, a greater sense of self-efficacy, and improved behavior in youth with cancer. (18) Conversely, patients endorsing higher pessimism demonstrate greater psychological distress and poorer behavior, than patients expressing low pessimism. (8, 18)

Although the association of optimism with psychological adjustment is well established in both cancer and healthy populations, little is known about the mechanisms underlying this relationship. (20) One factor which may contribute to the effect of optimism on adjustment is connectedness. In addition to disposition, one's sense of connectedness appears to play a role in psychological adjustment, both broadly (20, 21) and specifically for survivors of childhood cancer. (22) Connectedness is defined as one's subjective sense of how one relates to others, including such facets as attachment, loneliness, companionship, dependence or interdependence, and belonging or engagement. (22) Although connectedness has been associated with positive psychological outcomes, self-reported feelings of disconnectedness have been associated with increased psychological distress, loneliness, and avoidance of social interaction in healthy populations. (20, 22) The role of connectedness appears to be particularly important for the psychological adjustment of children and adolescents, with greater connectedness to parents and friends being associated with lower scores on measures of anxiety and depression, better quality of life, increased psychological adjustment, and fewer symptoms of posttraumatic stress. (6, 17, 21, 22) Conversely, healthy children and

adolescents who report lower levels of connectedness also report higher levels of posttraumatic stress symptoms. (6)

Several studies have demonstrated that connectedness mediates the relationship between extraversion and adjustment in non-cancer populations. (23, 24) However, connectedness has not yet been examined as a mediator between dispositional variables, such as optimism, and psychological adjustment among children with cancer. Understanding the role of connectedness in this context is especially necessary, given that side effects of therapy for childhood cancer can interfere with the socialization process, such as when children are removed from school for therapy, separated from family, or must limit social encounters due to immunosuppression, thereby potentially interfering with their feelings of connectedness. Moreover, given that little scholarly study has been done to examine the potential interactions between dispositional factors which have a demonstrated impact on psychological wellbeing, such as optimism, and connectedness in this population, this is an especially important domain to examine.

Because dispositional traits such as optimism may affect one's ability to connect or feel connected with others, we hypothesize that connectedness may serve as a mediator of the effects of optimism on psychological adjustment. The present study therefore aimed to (a) examine whether connectedness mediates the relationship between dispositional optimism and psychological adjustment, and (b) explore potential differences between children with cancer and comparison peers. We hypothesized that greater optimism would be associated with greater connectedness, which in turn would be associated with higher levels of psychological adjustment. Understanding the nuances of these relationships may facilitate the design of targeted interventions that could potentially enhance psychological adjustment.

METHODS

Participants

Participants were children with a diagnosis of cancer who had been treated at a large children's hospital in the mid-south and locally recruited comparison children. Participants were assessed at 3 time points: at baseline (T1), 1 year later (T2), and 3 years later (T3). To be eligible for the study, participants were required to speak and understand English sufficiently well to complete questionnaires, be between the ages of 8 and 17 years at T1, and have no known cognitive deficits that would inhibit their ability to complete measures. Additionally, participants in the children with cancer group had to be at least 1 month from diagnosis at baseline and have received a primary diagnosis of a malignancy. Children with cancer were stratified by time since their diagnoses, with children with cancer evenly distributed across 4 strata (1–6 months, 6 months–2 years, 2–5 years, and 5+ years). Of 378 patients approached, 258 (68%) agreed to participate. Participants and non-participants did not differ by age, gender, race/ethnicity, study strata, or cancer diagnostic category. Comparison peer participants were recruited from schools in the local community. Individuals whose parents completed a permission slip were placed in a pool of potential participants and were subsequently matched to individuals in the cancer group based on sex, age, race/ethnicity, and socioeconomic status (based on parental education and occupation using the Barratt Simplified Measure of Social Status) via frequency matching. (25)

Eligibility for comparison peers included the following criteria: aged 8 to 17 years at T1, English speaking, and no history of serious or chronic illness by parent report. The present study only reports on the data only from the 298 individuals for whom data were available at all 3 time points (Children with cancer, $N = 155$; Comparison peers, $N = 143$).

Procedure

The present study was approved by the hospital's Institutional Review Board (IRB) as part of a larger longitudinal study collecting data on psychosocial outcomes and cancer-related growth in children and their parents. However, it should be noted that the present study only utilized youth's reports. Following IRB approval, informed consent/assent was obtained for all participants and parents, and identical descriptions of the study were provided to the children and their parents in both the children with cancer and comparison peer groups. The children with cancer completed the questionnaires during their regularly scheduled appointments at the hospital, and the comparison peer participants completed the questionnaires during an individual appointment at the hospital. All participants completed questionnaires in a separate room from their parent, and research assistants were available during data collection to answer questions, assist, and read questions aloud to participants, if needed. Demographic data for all participants, as well as cancer specific data (e.g. diagnosis, relapse or no relapse, etc.) were collected by parent report. All participants were compensated with a \$25 gift card at each time point upon completion of the surveys.

Measures

Youth Life Orientation Test (Y-LOT): At T1, the participants were administered the Youth Life Orientation Test (26), a measure of dispositional optimism and pessimism. This measure contains 16 items, including a 7-item global optimism subscale, a 7-item global pessimism subscale, and 2 filler items. The items are rated on a 4-point Likert-type scale, ranging from 1 (true for me) to 4 (not true for me). Sum total global optimism scores can be calculated by subtracting participants' pessimism scores from matched optimism scores, or subscale sum totals can be individually analyzed. Prior research with this scale has demonstrated adequate reliability (17). The present study utilized the global optimism score as its measure of dispositional optimism (Cronbach's α full sample = .82).

Hemmingway Measure of Adolescent Connectedness (HMAC): At T2, the participants were administered the Hemmingway Measure of Adolescent Connectedness (27), a 57-item self-report measure assessing a child's connections to various aspects of his or her social environment. The measure consists of 10 subscales, which assess 5 larger domains of social connectedness: self (present self, future self, and reading), family (parents and siblings), peers (friends and peers), school (teacher and school), and neighborhood. Participants answer questions about their "caring for, and involvement in specific relationships, contexts and activities" in each of these domains on a 5-point Likert-type scale (1 = not at all true to 5 = very true). This measure has been administered to individuals ranging between ages ten and seventeen in previous research, and given the mean age of all participants at T2 was 13, this measure was considered to be appropriate for our sample. (6) Previous studies have demonstrated reliabilities between .77 and .86 across subscales. (6) The present study examined the mediating effects of connectedness using the following

subscales: parents, peers, and friends. These particular subscales were selected a priori for examination based on the fact that connectedness to these three groups has been demonstrated to have a positive impact on adolescents psychosocial functioning. (6, 21) Internal consistency for the current study was acceptable to good for the scales of connectedness to parents across the full sample ($\alpha = .81$), peers ($\alpha = .76$), and friends ($\alpha = .79$).

Behavior Assessment System for Children, Second Edition (BASC-2)(28): At T3, participants were administered the Behavior Assessment System for Children, Second Edition (BASC-2). The BASC-2 is a widely used questionnaire designed to assess behavior and self-perceptions of children and adolescents. The self-report version of this measure consists of 18 clinical and adaptive subscales designed to detect a variety of difficulties which broadly fit into 1 of 5 composite categories: Emotional Symptoms, Inattention/Hyperactivity, Internalizing Problems, Personal Adjustment, and School Problems. For the purpose of the present study, the T score of the Emotional Symptoms composite scale was used as the measure of psychological adjustment, with higher scores representing greater distress and thus poorer adjustment. This composite scale consists of the following six subscales: Social Stress, Anxiety, Depression, Sense of Inadequacy, Self-Esteem, and Self-Reliance. The Emotional Symptoms composite scale has demonstrated reliabilities between .80 and .88, depending on the age/version of the self-report administered. (28)

Statistical analyses

Basic descriptive statistics (e.g. means, standard deviations, and frequencies) were calculated for all variables of interest. A correlation matrix was then run for the primary variables of interest (Table 1). These correlations were run separately for children with cancer and comparison peers. Independent sample *t* tests were conducted to determine whether children with cancer and comparison peers differed in their mean scores of the primary variables of interest. T-tests and chi-square tests were conducted to determine whether childhood cancer survivors and healthy peers differed on demographic variables. In addition, independent sample *t* tests were conducted to determine whether children with cancer differed in their mean scores on outcome variables based on their relapse status. Finally, two ANOVA's were conducted to determine whether there were differences in outcome variables across diagnostic categories and time since diagnosis strata.

A moderated mediation analysis was conducted on the whole sample with multiple mediators in parallel (i.e. connectedness to parents, peers, and friends) using the PROCESS macro for SPSS developed by Hayes (29) with 20,000 percentile-corrected bootstrap confidence intervals (95%). This was done to ascertain whether connectedness mediated the relationship between optimism and psychological adjustment, conditional process modeling was used to detect direct and indirect effects, as well as to determine whether the aforementioned direct and indirect paths differed according to whether or not an individual was a child with cancer or a comparison peer with no history of cancer or other serious illness. The following variables were controlled for as covariates within both models: age, socioeconomic status, and sex. With regards to power, conducting power analyses on models of this complexity is "made more complicated by the fact that an indirect effect is formed as

a product of two effects with no agreed upon way of quantifying the magnitude of those effects or their product (something you need to do to assess the power or detect an effect of a given size)” and as such, is often not done. (29)

RESULTS

Survivor-Healthy Peer comparisons and correlations

As presented in Table 2, there were no significant differences between children with cancer and comparison peers on their scores on the primary measures of interest. Table 3 demonstrates that children with cancer and comparison peers did not significantly differ on demographic characteristics based on these analyses. With regards to cancer specific variables, there were no significant differences between cancer patients in relapse status, diagnostic categories, or diagnostic strata (Table 3). On average, children with cancer and comparison peers endorsed similar levels of optimism ($P=.829$; $M_{\text{Cancer}}=44.77$, $M_{\text{Peers}}=44.68$), connectedness to parents ($P=.189$; $M_{\text{Cancer}}=4.08$, $M_{\text{Peers}}=4.20$), peers ($P=.280$; $M_{\text{Cancer}}=3.80$, $M_{\text{Peers}}=3.75$), and psychological adjustment ($P=.451$; $M_{\text{Cancer}}=46.66$, $M_{\text{Peers}}=47.95$) (Table 2). There was a significant difference in reported connectedness to friends ($P=.030$; $M_{\text{Cancer}}=3.95$, $M_{\text{Peers}}=4.06$) with comparison peers reporting greater connectedness to friends than children with cancer. All correlations were consistent with study hypotheses and occurred in the expected directions. It should be noted that only a little more than 10% of participants scored in the At-Risk range on the BASC-2 Emotional Symptoms Subscale ($n=32$), and that only 4% scored in the Clinically Significant range ($n=12$). Moreover, there were no statistically significant differences by health status (e.g., child with cancer or comparison child) on these outcomes.

Predicting Psychological Adjustment

The model (see Figure 1) examined the how the relationship between optimism and psychological adjustment was mediated through connectedness to parents, peers, and friends, as well as whether this mediation was moderated by a participant's health status (i.e. child with cancer vs. comparison peer). Neither the T1 age nor socioeconomic status covariates demonstrated significant relationships to any of the variables of interest in the model. However, sex was a statistically significant covariate, with females reporting a greater degree of connectedness to friends ($b=.2770$, $P=.0021$, 95% CI [.1017, .4523]). The overall model significantly predicted psychological adjustment ($R^2=.46$, $F(12,274)=19.7262$, $P<.0001$). Global optimism demonstrated a significant direct association with all forms of connectedness ($b_{\text{parents}}=.0356$, $P=.0001$, 95% CI [.0183, .0529]; $b_{\text{peers}}=.0494$, $P<.0001$, 95% CI [.0317, .0672]; $b_{\text{friends}}=.0251$, $P=.0137$, 95% CI [.0052, .0450]), indicating that greater global optimism was associated with greater reported connectedness. Moreover, connectedness to parents and peers demonstrated a significant direct inverse relationship with psychological distress ($b_{\text{parents}}=-3.8957$, $P=.0001$, 95% CI [-5.8565, -1.9349]; $b_{\text{peers}}=-4.0863$, $P<.0001$, 95% CI [-6.0291, -2.1435]). Finally, optimism indirectly influenced psychological adjustment through connectedness to parents, peers, and friends indicating mediation ($b_{\text{parents}}=-.1387$, 95% CI [-.2341, -.0515]; $b_{\text{peers}}=-.2021$, 95% CI [-.3575, -.0818]; $b_{\text{friends}}=-.0703$, 95% CI [-.1640, -.0050]). These indirect paths of connectedness to parents, peers, and friends were significantly

different from 0 by percentile-corrected bootstrap confidence intervals based on 20,000 bootstrap samples ($P < .05$). It should be noted that in the overall model global optimism was not significantly associated with emotional psychological distress; however this direct relationship is not necessary for mediation to be present.

The aforementioned analysis also included an examination of the possible moderating effect of health status (i.e. child with cancer versus matched peer) on the previously discussed relationships. This analysis demonstrated that health status did not significantly moderate the indirect effect of connectedness on adjustment outcomes (Index of Moderated Mediation = $-.0671$, 95% CI $[-.1741, .0223]$). As such, the mediation of connectedness on the relationship between optimism and psychological adjustment did not differ based upon health status. However, health status moderated the direct relationship between optimism and psychological adjustment ($b = -.6293$, $P = <.0001$, 95% CI $[-.8516, -.4069]$), as well as the direct relationship between connectedness to parents and psychological adjustment ($b = -3.8957$, $P = .0001$, 95% CI $[-5.8565, -1.9349]$). The direct negative relationship between optimism and psychological adjustment (i.e. fewer emotional symptoms) was not significant for children with cancer ($b = -.1850$, $P = .1069$, 95% CI $[-.4102, .0402]$), although it was significant for comparison peers ($b = -.6293$, $P < .0001$, 95% CI $[-.8516, -.4069]$). In addition, connectedness to parents demonstrated a significant negative relationship to psychological adjustment (i.e. fewer emotional symptoms) for children with cancer ($b = -3.8957$, $P = .0001$, 95% CI $[-5.8565, -1.9349]$), whereas this relationship was not significant for comparison peers (b parents healthy peers = $-.3170$, $P = .7957$, 95% CI $[-2.7249, 2.0908]$). In short, connectedness to parents improved psychological adjustment for children with cancer, whereas optimism improved psychological adjustment in comparison peers.

DISCUSSION

The present findings support the hypothesis that connectedness, specifically connectedness to parents and peers, mediates the relationship between dispositional optimism and psychological adjustment. These findings are consistent with and extend those of previous studies demonstrating the importance of dispositional optimism on psychological adjustment in healthy populations and in those struggling with medical issues such as cancer. (18, 19) Moreover, the findings of the present study provide support for the importance of connectedness more broadly in fostering psychological adjustment in adolescents, which has not been extensively studied, particularly among those with childhood cancer. (6, 21, 22) Given that the cancer experience can often interfere with the socialization process, one might expect cancer patients to demonstrate poorer connectedness (Svavarsdottir, 2008). However, the present findings appear to indicate that connectedness may not be impaired to the degree otherwise assumed. The strengths of the present research include the longitudinal nature of data collection which further strengthens the potential to make causal claims from the results of the mediation analyses. The relatively large sample and the close demographic match between the children with cancer and comparison groups was another strength of the study.

It should be noted that being of a female sex was associated with having a greater reported degree of connectedness to friends, as well as to having greater reported levels of psychological distress. This is consistent with previous studies of connectedness, which indicate that females typically report greater connectedness to others, including friends, than do males. Women also typically report greater levels of depression and psychological distress than do men (30). However, this distinction has largely been studied in healthy adult populations, and limited research has been conducted examining these differences among children with cancer. It should also be noted that the participants in our study, both the children with cancer and comparison peers, appeared to be well adjusted with low levels of emotional symptoms. Only about 10% of our sample scored in the At-Risk Range for on the Emotional Symptoms scale of the BASC-2 and only 4% scored in the Clinically Significant Range. Given this, it may be beneficial to see if the present findings can be replicated in future work which samples greater numbers of children in the At-Risk, or Clinically Significant Range for the Emotional Symptoms scale of the BASC-2. Additionally, in spite of the present finding, there is a wide body of research which demonstrates that survivors are at increased risk for some forms of psychological distress. (31) As such, future research would benefit from screening specifically for youth who are in these ranges and specifically examining the impact of interventions targeting connectedness to maximize the effectiveness of the intervention.

Health status did not moderate the mediation effect of connectedness on the relationship between optimism and psychological adjustment, suggesting that the mechanisms whereby connectedness mediates the relationship between dispositional optimism and adjustment outcomes are similar in both comparison children and those with a history of cancer. Although health status did not moderate the mediation effect, it did play a role in moderating the direct effect of connectedness to parents on psychological adjustment in children with cancer. This finding is in line with previous research which has demonstrated that many children with cancer report growth-related outcomes of the cancer experience, such as increased closeness with family or increased positive relationships with others. (32) It is possible that the cancer experience (e.g. intense treatment which requires increased parental involvement and time spent together as a family) may enable children to gain greater benefit from an existing sense of connectedness than their comparison peers. This connectedness then serves to promote psychological adjustment during this challenging time, and therefore may account, in part, for the remarkable resilience often demonstrated among children with cancer. (5) Additionally, health status moderated the direct effect of optimism and psychological adjustment for comparison peers, whereas this relationship was not significant in children with cancer. Therefore, it appears that the effect of optimism on psychological adjustment is more evident among comparison children than among those with cancer. Future research should consider examining how these differences in the impact of connectedness to parents and peers may affect the trajectory of psychosocial development for children with and without a history of cancer.

In addition to illustrating the important roles played by optimism and connectedness in fostering psychological adjustment, the current findings are consistent with a growing body of literature demonstrating no or marginal differences in adjustment are demonstrated between children with cancer and their peers without a history of childhood cancer. (1, 4, 8,

9) This suggests that a diagnosis of childhood cancer may be better construed as a challenging but manageable stressor rather than an overwhelming trauma, and further highlights the resilience of children to successfully cope with this challenge.

Limitations

Our reliance on a single informant for all measures is a notable limitation of the study; although self-reported measures are generally accepted as the gold standard for the outcomes examined. The single-site nature of the study also limited the generalizability of our findings. Therefore, additional studies at multiple sites are needed to confirm the reliability of the present findings. Another limitation of the present study is our inability to demonstrate whether differences in our proposed model exist for different groups of children with cancer (e.g. solid tumors, vs. brain tumors, vs. leukemia/lymphoma, etc.). Such an analysis would require a much larger sample than the present study possesses in order to assess for such nuanced differences.

Clinical Implications

The present study provides an important foundation for future research examining factors which may facilitate psychological adjustment for both children with cancer and their peers without a history of childhood cancer. Isolating such variables may prove invaluable to improving the adjustment of children with cancer and, possibly by extension, their families. The current findings suggest that improving connectedness is an appropriate intervention target for children demonstrating varying levels of adjustment, which would be particularly important for children with relatively low dispositional optimism. Brief family-based interventions could be targeted to increase connectedness to parents, among children and families demonstrating low levels of connectedness. Additionally, given that children with cancer report lower levels of connectedness to friends, and connectedness to peers and friends is developmentally important, cognitive-behavioral interventions targeting social skills could be used help reduce loneliness, and thereby possibly increase self-reported connectedness to peers. (33) Such interventions would likely be most beneficial for those individuals who report higher levels of distress initially. Or similarly, individuals who report lower connectedness may need to be monitored, as these individuals may be more “at risk” for reporting emotional distress later on. Additionally, it may be beneficial to explore technologically based methods to facilitate children with cancers’ connectedness to their peers. This may be done using tools such as FaceTime, Skype, or similar technologies used for distance learning. Such tools may decrease reentry issues for children with cancer at the completion of their treatment, thereby possibly increasing self-reported connectedness to friends, which was lower than was reported by healthy peers in the present study. It may also be beneficial to provide developmentally appropriate psychoeducation on the cancer experience to children who are peers of children with cancer. This could serve to increase their compassion for their peer who is a cancer survivor, thereby decreasing issues related to reentry, and likely increasing feelings of connectedness for children with cancer. Finally, given the present findings, facilitating connectedness with parents may be particularly beneficial for children with cancer who are adjusting poorly and thus likely should be a focus for clinicians and others working with this population. To date, there do not exist evidence based interventions targeting children’s connectedness to parents. As such, future

research might focus on the creation and validation of such interventions. Specific to children with cancer, it may also be beneficial to determine whether these relationships differ by diagnosis (e.g. solid tumor, brain tumor, leukemia/lymphoma, etc.) in order to optimize resource allocation and improve quality of care.

In conclusion, the present study supports previous research indicating the importance of optimism and connectedness in improving or maintaining psychological adjustment. These findings also add to a growing body of literature which points to childhood cancer as a challenging, but manageable event for youth, who typically demonstrate resilience to the challenge. Moreover the findings suggest that future research would benefit from examining the mechanism or mechanisms by which optimism and connectedness can be fostered among individuals with childhood cancer in order to facilitate psychological adjustment.

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Figure 1:

Conditional Indirect Effects: Connectedness to Parents ($-.1387^*$), Peers ($-.2021^*$), and Friends ($-.0703^*$)

Path model effect of trait optimism on psychological adjustment through connectedness with health status added as a moderator. The indirect effect of connectedness on the relationship between global optimism and psychological adjustment is not moderated by health status. Indirect effects are indicated with dashed lines and direct effects are indicated with solid lines. ns Not significant, $^*p < .05$.

TABLE 1

Correlations among Optimism, Connectedness, and Emotional Symptoms in Cancer Survivors and Comparison Peers^a

Variable	1	2	3	4	5
1 T1 YLOT Global Optimism	--	.30 **	.40 **	.19 *	-.28 **
2 T2 HMAC Connectedness to Parents	.34 **	--	.43 **	.20 *	-.45 **
3 T2 HMAC Connectedness to Peers	.48 **	.53 **	--	.28 **	-.51 **
4 T2 HMAC Connectedness to Friends	.25 **	.22 **	.43 **	--	-0.15
5 T3 BASC-2 SRP Emotional Symptoms T Score	-.60 **	-.39 **	-.64 **	-.42 **	--

^aCorrelations above the diagonal are from children with cancer; those below the diagonal are from the comparison peer group. M= Mean, SD= Standard Deviation. Measures are as follows: YLOT (Youth Life Orientation Test), HMAC (Hemmingway Measure of Adolescent Connectedness), and BASC-2 SRP (Behavioral Assessment Scale for Children, Self-Report Second Edition).

* $p < .05$;

** $p < .01$.

TABLE 2

Means and Standard Deviations on scores of Optimism, Connectedness and Emotional Symptoms in Cancer Survivors and Comparison Peers^a

Variable	Children with Cancer (M ±SD)	Comparison Peers (M ± SD)	p-value
T1 YLOT Global Optimism	44.77 ±6.21	44.68 ±6.60	.829
T2 HMAc Connectedness to Parents	4.08 ±.73	4.20 ±.64	.189
T2 HMAc Connectedness to Peers	3.80 ±.77	3.75 ±.71	.280
T2 HMAc Connectedness to Friends	3.95 ±.82	4.06 ±.72	.030*
T3 BASC-2 SRP Emotional Symptoms T Score	46.66 ±10.48	47.95 ±10.81	.451
T3 BASC-2 SRP Emotional Symptoms Subscales T Scores	Children with Cancer (M ±SD)	Comparison Peers (M ± SD)	p-value
Social Stress	46.78 ± 10.76	50.23 ± 10.28	.986
Anxiety	48.18 ± 11.71	52.28 ± 11.38	.348
Depression	47.08 ± 11.20	47.75 ± 9.29	.096
Sense of Inadequacy	48.69 ± 12.03	49.56 ± 10.86	.342
Self-Esteem	50.93 ± 10.70	49.87 ± 10.91	.865
Self-Reliance	52.60 ± 9.46	53.08 ± 9.87	.782

^a Measures are as follows: YLOT (Youth Life Orientation Test), HMAc (Hemmingway Measure of Adolescent Connectedness), and BASC-2 SRP (Behavioral Assessment Scale for Children, Self-Report Second Edition).

^b Abbreviations: M- Mean, SD- standard deviation.

TABLE 3

Background characteristics of children with cancer and comparison peers

Participant characteristics	Children with Cancer (<i>n</i> = 155)		Comparison Peers (<i>n</i> = 143)		p-value
Age	Years	SD	Years	SD	
Mean age	12.44	2.86	12.55	2.93	.563
	<i>n</i>	%	<i>n</i>	%	
Sex					.341
Male	79	51.0	65	45.5	
Female	76	49.0	78	54.5	
Race					.840
Black	35	22.6	30	21.0	
White	113	72.9	108	75.5	
Other	7	4.5	5	3.5	
SES strata^b					.382
High	54	34.8	42	29.6	
Medium	48	31.0	47	33.1	
Low	53	34.2	53	37.3	
Diagnosis					
Acute lymphoblastic leukemia	35	22.7	-	-	
Other leukemia ^a	11	7.1	-	-	
Hodgkin's and non-Hodgkin's lymphoma	20	13.0	-	-	
Solid tumor	63	40.6			
Brain tumor	25	16.1	-	-	
T1 Time Since Diagnosis^c	49	31.8	-	-	
Strata 1					
Strata 2	26	16.9	-	-	
Strata 3	32	20.8	-	-	
Strata 4	47	30.5	-	-	
T3 Therapy status					
On therapy	28	1	-	-	
Off therapy	127	81.9	-	-	
T3 Relapse					
No	184	86.0	-	-	
Yes	30	14.0	-	-	

Abbreviations: SD- standard deviation, SES- socioeconomic status.

^aOther leukemia category includes acute myeloid leukemia, acute biphenotypic leukemia, and acute promyelocytic leukemia.^bSES groups range from high (SES score = 51- <56) to medium (SES score = 41-50) to low (SES score = 8-40).^cStrata of time since diagnosis for children with cancer at T1 were categorized as follows: Strata 1 (1 month – 6 months from diagnosis), Strata 2(> 6 months – 2 years from diagnosis), Strata 3 (> 2 years < 5 years from diagnosis), Strata 4(5 years from diagnosis and in survivorship clinic)* $p < .05$