Profiles of Dispositional Expectancies and Affectivity Predict Later Psychosocial Functioning in Children and Adolescents With Cancer

Yuko Okado,1,2 PhD, Katianne M. Howard Sharp,2,3,4 MS, Rachel Tillery,2,3 MS, Alanna M. Long,2 BA, and Sean Phipps,2 PhD

1Department of Psychology, California State University, Fullerton, 2Department of Psychology, St. Jude Children's Research Hospital, 3Department of Psychology, University of Memphis, and 4Department of Psychiatry, University of Mississippi Medical Center

All correspondence concerning this article should be addressed to Sean Phipps, PhD, Department of Psychology, St. Jude Children's Research Hospital, Memphis, TN 38105-3678, USA. E-mail: sean.phipps@stjude.org

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Abstract

Objective Examined how individual differences in disposition among pediatric cancer patients predict their later psychosocial functioning. Methods Patients aged 8–17 years (N = 223) reported on their disposition at baseline. One and three years later, self-reports and parent reports of patient psychosocial functioning were obtained. Latent profile analysis was used to identify subgroups that differed on baseline disposition and to compare them on later outcomes. Results Three groups were identified: The “Positive” group (59%) had high optimism and positive affectivity and low pessimism and negative affectivity; the “Moderate” group (39%) had a similar profile, with less exaggerated scores; a small, “Negative” group (2%) had the opposite profile (low optimism/positive affectivity; high pessimism/negative affectivity). These groups differed in psychosocial functioning at follow-up, generally in expected directions. Conclusions Most patients have a disposition that may be protective. A small minority at high risk for maladjustment is distinguished by their disposition.

Key words: cancer; disposition; distress; pediatric; social-emotional.

The diagnosis and treatment of pediatric cancer pose significant challenges for coping and adaptation in diagnosed children and their families (Aldridge & Roesch, 2007; Wechsler & Sánchez-Iglesias, 2013). However, despite the potentially life-threatening nature of their illness, the stressful nature of treatment, and sudden changes in routine and demands that are often brought on by treatment, children with cancer generally report comparable levels of psychological adjustment as healthy peers during the period several years after diagnosis (Eiser, Hill, & Vance, 2000; Robinson, Gerhardt, Vannatta, & Noll, 2009; Stam, Grootenhuis, & Last, 2001).

However, there are individual differences in children’s adaptation to their cancer experience. For example, survivors’ relative risk for various types of maladjustment (e.g., depression/anxiety, attention deficit, social problems) appears to differ by the type of their cancer diagnosis (Schultz et al., 2007), and one study has found that leukemia survivors are more likely to evidence internalizing difficulties than survivors of other types of childhood cancer (Buizer, de Sonneville, Buizer, de Sonneville,
van den Heuvel-Eibrink, & Veerman, 2006). Moreover, the type of treatment can differentiate youth with maladjustment difficulties over time (Schultz et al., 2007). For example, a number of adolescent survivors of cancer evidence behavioral, social, and cognitive sequelae consistent with late effects of central nervous system-directed therapies (Kahalley et al., 2013; Schultz et al., 2007), and variation in treatment-related leave from school may decrease social connectedness (Svavarsdottir, 2008). Thus, not all survivors of pediatric cancer can be expected to have similar levels of psychosocial adjustment over time.

In addition to medical factors, individual differences in disposition may also predict the adjustment of pediatric cancer patients. Prior studies have examined how such dispositional factors as temperament, affective functioning, and adaptive style affect their adjustment (e.g., Compas, Jaser, Dunn, & Rodriguez, 2012; Harper et al., 2014; Howard Sharp, Rowe, Russell, Long, & Phipps, 2014; Phipps, Jurbergs, & Long, 2009). Much of this research suggests that such factors as low optimism, high neuroticism, low extraversion, and high trait anxiety are strongly predictive of and may help differentiate children who are at risk for long-term maladjustment from those who are likely to adapt well.

In the present study, we focus on the impact of generalized expectancies and affectivity as aspects of disposition that are relatively global and stable, could strongly impact children’s adaptation to stressors, and could be measured reliably (Carver & Connor-Smith, 2010). With regard to expectancies, optimism and pessimism have been studied as dispositional predictors of one’s psychosocial functioning, adaptation to stress, and choice of coping strategy (Hart & Hittner, 1995; Scheier & Carver, 1993). High levels of optimism protect against such outcomes as depression (Chang & Sanna, 2003) and suicidal ideation (Hirsch, Wolford, LaLonde, Brunk, & Morris, 2007), whereas pessimism increases risk (Grant et al., 2006). In pediatric cancer patients, optimism has been linked to fewer difficulties with pain, higher quality of life, and stronger mental health functioning (Mannix, Feldman, & Moody, 2009; Williams, Davis, Hancock, & Phipps, 2010). In contrast, pessimism has been associated with poorer outcomes in behavioral functioning (Williams et al., 2010) as well as in physical and emotional functioning (Sulkers et al., 2013). Moreover, both optimism and pessimism have been linked to perceived psychosocial benefit and burden associated with cancer, in expected directions (e.g., higher optimism is related to greater perceived benefit and lower perceived burden; Currier, Hermes, & Phipps, 2009a), though some studies did not find associations between pessimism and benefit (e.g., Michel, Taylor, Absolom, & Eiser, 2010).

In addition to optimism and pessimism, positive and negative affectivity are two separate but possibly interdependent aspects of disposition that predict psychosocial functioning in children (Lonigan, Phillips, & Hooe, 2003). Although their influence on pediatric cancer patients’ psychosocial functioning has not yet been widely studied, negative affectivity has been associated with anxiety and depression based on maternal report (Miller et al., 2009). In addition, when patient self-reports are obtained, positive affectivity has been associated with higher perceived benefit and lower perceived burden resulting from the cancer experience (Schwartz & Parisi, 2013), whereas negative affectivity has been associated with an increased sense of burden (Currier et al., 2009a). Another study has found that negative affectivity, as assessed by state and trait anxiety and depression symptoms, predicts patients’ perceived life stress (Varni & Katz, 1997). Related constructs such as neuroticism have also been linked to depression, anxiety, posttraumatic stress symptoms (PTSS), and quality of life, in expected directions (De Clercq, De Fruyt, Koot, & Benoit, 2004; Howard Sharp et al., 2014).

Although expectancies and affectivity have both been studied as predictors of children and adolescents’ adaptation to stressful experiences, they are rarely studied simultaneously despite both being facets of an individual’s personality (Carver & Connor-Smith, 2010). Moreover, research examining their impact on the adjustment of pediatric cancer patients is still limited, possibly because child-oriented measures for these constructs were developed relatively recently, and greater attention has been paid to studying negative affectivity, pessimism, and maladjustment than on positive or adaptive predictors and outcomes (Phipps, 2007). The impact of disposition on social connectedness among the patients has also not been widely studied, despite the likelihood that disposition would influence patients’ social functioning and thereby overall adjustment to diagnosis and treatment (Howard Sharp et al., 2015). Furthermore, many studies reviewed above are cross-sectional and use a variable-oriented approach, which shows how constructs are related when aggregated across individuals but does not account for individual differences in those relationships. Thus, how disposition predicts later outcomes, and how those predictions vary among pediatric cancer patients, are as of yet unclear.

The present study sought to fill these gaps by examining how individual differences in profiles of disposition based on expectancies (optimism and pessimism) and affectivity (positive affectivity and negative affectivity) among children and adolescents with cancer predict their later psychosocial functioning (psychological symptoms, reactions to the cancer experience, and social-emotional functioning). Given existing literature, we hypothesized that (1) multiple, distinct profiles of disposition would be identified among
pediatric cancer patients and that (2) these profiles of disposition would predict differences in psychosocial functioning 1 and 3 years later. Although the existing literature did not allow us to hypothesize about the exact number of disposition profiles that would be identified, we anticipated that participants with disposition characterized by higher levels of optimism and positive affectivity and lower levels of pessimism and negative affectivity would exhibit better psychosocial functioning at follow-up assessments compared with those with disposition characterized by higher levels of pessimism and negative affectivity and lower levels of optimism and positive affectivity.

**Method**

**Participants**

Participants for the present study \((n = 223)\) were children and adolescents with cancer who were recruited for a longitudinal study on coping and adjustment in pediatric cancer patients. Their primary caregiver (“parent”: 83.1% mothers, 12.2% fathers, 4.7% other) also participated in the study and provided ratings of his/her child’s functioning. Participants were selected at random and approached during routine medical appointments by trained research assistants. Eligibility criteria included being of age 8–17 years, at least 1 month past their diagnosis of malignancy, able to speak and read English, and without significant cognitive or sensory deficits that would preclude participation. To obtain a heterogeneous yet balanced sample, participants were recruited into one of four strata based on the time elapsed since diagnosis: 1–6 months \((n = 64; 25.1\%)\); 6 months–2 years \((n = 63; 24.7\%)\); 2–5 years \((n = 65; 25.5\%)\); and ≥ 5 years \((n = 63; 24.7\%)\). Of the approached dyads, 68% agreed to participate, resulting in the full sample of 255 parent–child dyads in the overall study. Common reasons for declining to participate included lack of interest, time constraints, and participation in too many other studies.

As data collection is still ongoing, a subsample of 223 dyads (87.5%) with longitudinal data was included in the present study. They were assessed 1

| Table I. Demographic Characteristics of the Sample |
|-------------------------------------|--------|--------|--------|--------|
| Present sample \((n = 223)\) | Excluded participants \((n = 32)\) | \(F\) | \(\eta^2\) | \(p\) |
| **M (SD)** | | | | |
| Age | 12.56 (2.82) | 12.94 (3.29) | .48 | .002 | .49 |
| Time since diagnosis (in months) | 47.55 (52.50) | 30.50 (41.74) | 3.09 | .01 | .08 |
| **n (%)** | \(\chi^2\) | \(p\) |
| Gender | | | | |
| Male | 113 (50.7%) | 19 (59.4%) | | |
| Female | 110 (49.3%) | 13 (40.6%) | | |
| Race | | | | |
| White | 166 (74.4%) | 19 (59.4%) | 3.24 | .20 | |
| Black | 47 (21.1%) | 11 (34.4%) | | |
| Other | 10 (4.5%) | 2 (6.3%) | | |
| Socioeconomic strata | | | | |
| I | 29 (13.0%) | 2 (6.3%) | 4.35 | .36 | |
| II | 31 (13.9%) | 7 (21.9%) | | |
| III | 75 (33.6%) | 7 (21.9%) | | |
| IV | 51 (22.9%) | 10 (31.3%) | | |
| V | 37 (16.6%) | 6 (18.8%) | | |
| Diagnosis | | | 1.27 | .87 |
| ALL | 52 (23.3%) | 9 (28.1%) | | |
| AML | 16 (7.2%) | 2 (6.3%) | | |
| Lymphoma | 30 (13.5%) | 4 (12.5%) | | |
| Solid tumor | 88 (39.5%) | 10 (31.3%) | | |
| Brain tumor | 37 (16.6%) | 7 (21.9%) | | |
| Treatment intensity | | | .63 | .89 |
| I | 12 (5.8%) | 2 (6.5%) | | |
| II | 74 (33.6%) | 9 (29.0%) | | |
| III | 72 (34.6%) | 11 (35.5%) | | |
| IV | 50 (24.0%) | 9 (29.0%) | | |
| Relapse history | | | 7.49 | .01 |
| Yes | 24 (10.8%) | 23 (71.9%) | | |
| No | 199 (89.2%) | 9 (28.1%) | | |

*Note. To test for group differences, ANOVA (for continuous variables) and the chi-square test (for discrete variables) were used. Results for those tests are reported in the right columns. ALL = Acute Lymphoblastic Leukemia; AML = Acute Myeloid Leukemia.
year past the baseline assessment (Time 2) and 3 years past the baseline (Time 3). For each follow-up assessment (Times 2 and 3), 98% of eligible participants agreed to participate. At baseline, 45.3% (n = 101) of participating patients were on active treatment. By Time 3, 11.2% (n = 25) were on active treatment. Exploratory analyses indicated that the pattern of participation in the study did not affect any of the results reported below.

The demographic characteristics of the present subsample and the full sample with baseline data are summarized in Table 1. Participants who were included did not differ significantly from those who were excluded in their demographic characteristics, most medical characteristics, or any of the study variables. However, at baseline, a lower proportion of the present sample reported a history of cancer relapse. This difference may be related to attrition owing to death, which had occurred for 11 participants (4.3%) with baseline data (34.4% of the 32 participants excluded from the present sample).

Procedures
At all three time points (baseline; 1 year after baseline, 3 years after baseline), participants were assessed in the outpatient Psychology Clinic of the hospital. Informed consent/assent was obtained from patients and their parents, and they completed questionnaires in separate rooms. Trained research assistants were available to assist and read items aloud if needed. At each assessment, the patient and the parent each received a $25.00 gift card as compensation for their time, effort, and travel. Procedures were approved by the institutional review board at the hospital.

Measures
At baseline, patients reported on their disposition. At follow-up assessments, they reported on their psychological distress (anxiety, depression, PTSS), perceived benefit and burden arising from the most stressful life event in their lives, and social–emotional functioning. Parents also completed parent-report measures on their children’s functioning where available (Behavior Assessment System for Children, 2nd Edition [BASC-2], Social-Emotional Assets and Resilience Scales [SEARS]). Unless otherwise indicated, measures were scored so that higher scores indicate greater amount of the assessed construct.

Baseline Child Disposition
Youth Life Orientation Test (Ey et al., 2005) is a 14-item measure of optimism and pessimism based on the Life Orientation Test–Revised (Scheier, Carver, & Bridges, 1994). Children rated seven items each for optimism and pessimism subscales (e.g., “I usually expect to have a good day”; “Things usually go wrong for me”) on a 4-point Likert scale ranging from 1 = not true for me to 4 = true for me. Items were summed to obtain subscale scores. The measure has good internal consistency, test–retest reliability, and convergent, discriminant, and predictive validity (Ey et al., 2005). Internal consistency was acceptable in the present sample (optimism $\alpha = .76$; pessimism $\alpha = .73$).

Positive and Negative Affect Scale for Children (Laurent et al., 1999) is a 20-item measure, adapted for children from the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Children rated how often they have recently felt the emotion described by the item (e.g., happy; joyful; sad; afraid) on a 5-point Likert scale (1 = very slightly or not at all; 5 = extremely). The measure has excellent internal consistency and good convergent and divergent validity (Laurent et al., 1999). Cronbach’s $\alpha$ in the present sample was .90 for positive affectivity and .86 for negative affectivity.

Later Child Outcomes
Symptoms of depression and anxiety were assessed using the self- and parent-report versions of the BASC-2 (Reynolds & Kamphaus, 2004). Gender-normed $T$-scores for anxiety and depression subscales were obtained. Items were rated on a True/False scale or a 4-point Likert scale ranging from N = Never to A = Almost Always. The BASC-2 has excellent psychometric properties, with internal consistencies of .86 for adolescent reports of both depression and anxiety and .86 and .83 for parent reports of adolescent depression and anxiety, respectively (Reynolds & Kamphaus, 2004).

UCLA PTSD Reaction Index for DSM-IV (PTSDI; Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998) is a 22-item self-report measure assessing PTSS based on the most traumatic, stressful event identified by the patient, regardless of whether it met the DSM-IV A1 criterion for PTSD. Slightly below half of the patients identified a cancer-related event as their most stressful (44.4% at Time 2, 45.7% at Time 3). Patients rated the frequency of each symptom (e.g., “I watch out for danger or things that I am afraid of”) occurring within the past month on a 5-point Likert scale ranging from 0 = None to 4 = Most, and ratings were summed. The PTSDI has excellent internal and test–retest reliability (Steinberg, Brymer, Decker, & Pynoos, 2004), with an internal consistency of .88 in the present sample.

Reactions to the Identified Stressful Event
Benefit Finding/Burden Scale for Children (BBSC; Currier et al., 2009a; Phipps, Long, & Ogden, 2007) is a 20-item self-report measure that assesses perceived benefits or burdens arising from the most traumatic or
was found in our study (Prince-Embury, 2008), and good reliability and gender were used in the present study. Good internal consistency was found for both benefit (10 items; $\alpha = .86$) and burden (10 items; $\alpha = .90$) subscales.

Social–Emotional Functioning

Hemmingway Measure of Adolescent Connectedness (HMAC; Karcher, 2012) is a 57-item self-report measure administered at Time 2 that assesses respondents’ positive connections to their social environment and to themselves. Items (e.g., “I usually like my teachers”; “enjoy spending time with my parents”; “really like who I am”) are rated on a 5-point Likert scale ranging from 1 = Not at all to 5 = Very much, and summed. The BBSC has good convergent and divergent validity (Curriier, Jobe-Shields, & Phipps, 2009b). Internal consistency was good for the 10 subscales assessing five broader domains: (1) school (school and teacher), (2) family (parents and siblings), (3) peers (friends and peers), (4) neighborhood, and (5) self (present self, future self, reading). Connectedness to the present self refers to stable, positive sense of self and of ability to relate to others, whereas connectedness to the future self refers to sense of one’s assets that will help in the future. In the present study, Cronbach’s alphas were: School = .75; Teacher = .73; Parents = .82; Siblings = .88; Friends = .80; Peers = .78; Neighborhood/Community = .82; Present Self = .71; Future Self = .69; Reading = .90.

The Sense of Relatedness scale from the Resiliency Scales for Children and Adolescents (RSCA; Prince-Embury, 2007) is a 24-item measure of the respondent’s self-reported social functioning, including comfort with and trust in others, perceived availability of social support, and ability to generate differences with others. Items (e.g., “I can trust others”; “I can depend on people to treat me fairly”) are rated on a 5-point Likert scale ranging from 0 = Never to 4 = Almost Always, and T-scores normed by age and gender were used in the present study. Good internal consistency and test–retest reliability have been reported (Prince-Embury, 2008), and good reliability was found in our study ($\alpha = .93$ at both time points).

SEARS (Merrell, Felver-Gant, & Tom, 2011) is a measure of the child’s social and emotional strengths (e.g., “make friends easily”; “think before [acting]”) administered at Time 3. Items are rated on a 4-point scale (Never; Sometimes; Often; Almost Always), and subscale T-scores were obtained. The measure has good reliability and convergent validity (Merrell et al., 2011), and good reliability was found in the present study for both patient report (49 items total; Self-Regulation $= .84$; Social Competence $= .87$; Empathy $= .88$; Responsibility $= .82$) and parent report (39 items total; Self-Regulation/Responsibility $= .97$; Social Competence $= .94$; Empathy $= .88$).

Analytic Plan

To examine individual differences in disposition, latent profile analysis (LPA) was applied. LPA is a person-centered analytic method that allows identification of homogenous subgroups, or latent classes, based on individuals’ responses on continuous variables (Berlin, Williams, & Parra, 2014). In the present study, those variables were optimism, pessimism, positive affectivity, and negative affectivity. LPA requires the number of classes to be fitted to the data to be specified a priori, and the best fitting model is chosen by comparing models with different number of classes on indices of model fit as well as on interpretability. In the present study, model fit was compared using the Bayesian Information Criterion (BIC), entropy, the Lo-Mendell-Rubin likelihood ratio test of model fit (LMR; Lo, Mendell, & Rubin, 2001) and the Bootstrapped Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000). LPA was used in the present study in an exploratory manner, to identify the number of distinct profiles of disposition that exist in the pediatric oncology population based on model fit to the data. To identify potential covariates, the three-step approach for testing the predictors of latent classes (Vermunt, 2010) was used. To examine the prediction of later psychosocial outcomes by the identified classes, the three-step approach testing the equality of means in distal outcomes (Asparouhov & Muthén, 2014a) was used. To best address missing data and potential nonnormality, analyses were run using full information maximum likelihood, with standard errors that are robust to nonnormal data. Bonferroni correction was applied to control for familywise error, and analyses were run in Mplus 7.0.

Results

The baseline disposition variables were all significantly intercorrelated, in expected directions (Table II). The model fit indicators for the LPA models are summarized in Table III. The three-class model emerged as the best-fitting model, based on relatively low BIC, a large drop in BIC compared with the model with two classes, highest entropy, and significant results for both the LRT and the BLRT. This model also had an interpretable, meaningful solution and was thus selected. Most demographic and medical factors (e.g., child age, race, and gender; time since diagnosis; diagnostic category; intensity of treatment; being on/off treatment) were not significant covariates, except socioeconomic status (SES) and relapse history. These two factors were controlled for in the remaining analyses.
The finalized three-class model, controlling for the two covariates, is illustrated in Figure 1. The largest, “Positive” class (59.3% of the sample) was characterized by the highest levels of optimism and positive affectivity and the lowest levels of pessimism and negative affectivity. The next largest, “Moderate” class (38.9%) was characterized by a similarly shaped profile but with more moderate levels of all traits. Finally, the smallest, “Negative” class (1.8%) was characterized by the lowest levels of optimism and positive affectivity and the highest levels of pessimism and negative affectivity. Although this class size is considered very small in LPA (Berlin et al., 2014), the class was retained because it was meaningful and significantly improved model fit from unacceptable to acceptable levels. The three classes significantly differed in the mean score of all four traits. Overall, support was found for the first hypothesis, that distinct profiles of disposition would be identified among pediatric cancer patients.

To test the second hypothesis, the prediction of psychosocial outcomes based on class membership was examined (Table IV). Although the Negative class was very small, the distribution of data was sufficiently normal to permit comparison of means (Asparouhov & Muthén, 2014b). Reported distress (anxiety, depression, and PTSS) at 1 year (Time 2) and 3 years (Time 3) after baseline varied by class, in expected directions. Participants in the Positive class reported the lowest levels of distress, and those in the Negative class reported the highest levels. The classes differed

Table II. Descriptive Statistics and Correlations for Baseline Disposition

<table>
<thead>
<tr>
<th></th>
<th>M(SD)</th>
<th>Range</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. YLOT optimism</td>
<td>23.33 (3.85)</td>
<td>7–28</td>
<td>-.47***</td>
<td>.55***</td>
<td>-.41***</td>
</tr>
<tr>
<td>2. YLOT pessimism</td>
<td>13.89 (4.28)</td>
<td>7–28</td>
<td>-</td>
<td>-.35***</td>
<td>.31***</td>
</tr>
<tr>
<td>3. PANAS-C positive affectivity</td>
<td>36.66 (9.17)</td>
<td>10–50</td>
<td>-</td>
<td>-</td>
<td>-.24***</td>
</tr>
<tr>
<td>4. PANAS-C negative affectivity</td>
<td>17.79 (7.11)</td>
<td>10–44</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. YLOT = Youth Life Orientation Test; PANAS-C = Positive and Negative Affect Scale for Children. ***p < .001.

Table III. Model Fit Indicators for Latent Profile Analyses

<table>
<thead>
<tr>
<th>Number of classes</th>
<th>BIC</th>
<th>Entropy</th>
<th>Lo-Mendell-Rubin test p-value</th>
<th>Bootstrapped Likelihood Ratio test p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5507.86</td>
<td>.69</td>
<td>.02</td>
<td>.00</td>
</tr>
<tr>
<td>3</td>
<td>5450.95</td>
<td>.84</td>
<td>.01</td>
<td>.00</td>
</tr>
<tr>
<td>4</td>
<td>5441.16</td>
<td>.80</td>
<td>.27</td>
<td>.00</td>
</tr>
<tr>
<td>5</td>
<td>5440.72</td>
<td>.81</td>
<td>.55</td>
<td>.01</td>
</tr>
<tr>
<td>6</td>
<td>5448.64</td>
<td>.83</td>
<td>.46</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note. BIC = Bayesian Information Criterion. Lower BIC and higher entropy values indicate better model fit. Significant results for the Lo-Mendell-Rubin and the Bootstrapped Likelihood Ratio tests indicate superior model fit compared with the model with one fewer class. Bold numbers indicate information that was especially pertinent in the final model selection (3-class solution).

Figure 1. Latent profiles of dispositional expectancies and affectivity.

Mean scores for each class in generalized expectancies (optimism, pessimism) and affectivity (positive, negative) are depicted. The three classes differed significantly from each other in all scores at the .01 significance level.
Distress/adjustment

<table>
<thead>
<tr>
<th>Outcome</th>
<th>M (SD)</th>
<th>Negative (N)</th>
<th>Moderate (M)</th>
<th>Positive (P)</th>
<th>Significant comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Report T2</td>
<td>47.57 (11.26)</td>
<td>87.03 (0.09)</td>
<td>50.93 (2.06)</td>
<td>44.94 (1.51)</td>
<td>N &gt; M &gt; P</td>
</tr>
<tr>
<td>Self-Report T3</td>
<td>46.28 (10.63)</td>
<td>65.20 (8.08)</td>
<td>48.55 (1.75)</td>
<td>43.78 (1.19)</td>
<td>N &gt; M &gt; P</td>
</tr>
<tr>
<td>Parent-Report T2</td>
<td>50.02 (9.47)</td>
<td>71.00 (&lt;0.01)</td>
<td>52.00 (1.40)</td>
<td>48.49 (1.06)</td>
<td>N &gt; M &gt; P</td>
</tr>
<tr>
<td>Parent-Report T3</td>
<td>48.59 (9.34)</td>
<td>54.77 (5.19)</td>
<td>48.78 (1.53)</td>
<td>48.16 (1.06)</td>
<td>ns</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Report T2</td>
<td>46.65 (10.83)</td>
<td>64.00 (&lt;0.01)</td>
<td>49.72 (1.74)</td>
<td>44.46 (1.43)</td>
<td>N &gt; M &gt; P</td>
</tr>
<tr>
<td>Self-Report T3</td>
<td>47.17 (10.77)</td>
<td>56.28 (6.32)</td>
<td>49.64 (1.57)</td>
<td>45.00 (1.30)</td>
<td>M &gt; P</td>
</tr>
<tr>
<td>Parent-Report T2</td>
<td>48.89 (9.08)</td>
<td>66.00 (&lt;0.01)</td>
<td>49.21 (1.25)</td>
<td>48.49 (1.08)</td>
<td>N &gt; M, P</td>
</tr>
<tr>
<td>Parent-Report T3</td>
<td>48.53 (9.32)</td>
<td>55.26 (4.36)</td>
<td>48.93 (1.47)</td>
<td>47.94 (1.08)</td>
<td>ns</td>
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<tr>
<td>PTSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Report T2</td>
<td>17.20 (14.93)</td>
<td>55.02 (0.03)</td>
<td>18.13 (2.33)</td>
<td>16.18 (1.60)</td>
<td>N &gt; M, P</td>
</tr>
<tr>
<td>Self-Report T3</td>
<td>15.70 (14.21)</td>
<td>25.08 (8.48)</td>
<td>18.46 (2.25)</td>
<td>13.32 (1.64)</td>
<td>ns</td>
</tr>
<tr>
<td>Burden</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Self-Report T2</td>
<td>15.10 (6.30)</td>
<td>30.01 (0.02)</td>
<td>16.92 (1.17)</td>
<td>13.77 (0.69)</td>
<td>N &gt; M &gt; P</td>
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<tr>
<td>Self-Report T3</td>
<td>14.88 (6.78)</td>
<td>28.48 (6.51)</td>
<td>15.84 (0.97)</td>
<td>13.54 (0.79)</td>
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<td>Benefit Finding</td>
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<tr>
<td>Self-Report T2</td>
<td>30.62 (10.72)</td>
<td>22.00 (&lt;0.01)</td>
<td>29.58 (1.44)</td>
<td>31.39 (1.27)</td>
<td>N &lt; M, P</td>
</tr>
<tr>
<td>Self-Report T3</td>
<td>30.06 (10.61)</td>
<td>27.50 (4.49)</td>
<td>27.68 (1.50)</td>
<td>31.83 (1.29)</td>
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Social–emotional functioning

<table>
<thead>
<tr>
<th>Outcome</th>
<th>M (SD)</th>
<th>Negative (N)</th>
<th>Moderate (M)</th>
<th>Positive (P)</th>
<th>Significant comparisons</th>
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<tr>
<td>Connectedness</td>
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<td>Neighborhood</td>
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<td>2.17 (&lt;0.01)</td>
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<td>3.39 (0.12)</td>
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<tr>
<td>School</td>
<td>3.82 (.74)</td>
<td>3.83 (&lt;0.01)</td>
<td>3.41 (0.11)</td>
<td>4.08 (0.09)</td>
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<tr>
<td>Teacher</td>
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<td>3.50 (&lt;0.01)</td>
<td>3.80 (0.10)</td>
<td>4.21 (0.08)</td>
<td>N &lt; M</td>
</tr>
<tr>
<td>Parents</td>
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<td>3.33 (&lt;0.01)</td>
<td>3.77 (0.11)</td>
<td>4.34 (0.08)</td>
<td>N &lt; M</td>
</tr>
<tr>
<td>Siblings</td>
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<td>3.71 (0.15)</td>
<td>4.27 (0.11)</td>
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<tr>
<td>Friends</td>
<td>3.96 (.83)</td>
<td>3.00 (&lt;0.01)</td>
<td>3.73 (0.13)</td>
<td>4.12 (0.09)</td>
<td>N &lt; M</td>
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<tr>
<td>Peers</td>
<td>3.80 (.76)</td>
<td>2.17 (&lt;0.01)</td>
<td>3.42 (0.10)</td>
<td>4.07 (0.08)</td>
<td>N &lt; M</td>
</tr>
<tr>
<td>Present self</td>
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<td>2.83 (&lt;0.01)</td>
<td>3.84 (0.10)</td>
<td>4.20 (0.08)</td>
<td>N &lt; M</td>
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<td>Reading</td>
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<td>53.51 (1.61)</td>
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<td>49.93 (2.08)</td>
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<td>53.21 (1.21)</td>
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<td>N &gt; M; M &lt; P</td>
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<td>SEARS empathy</td>
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<tr>
<td>Self-report</td>
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<td>47.39 (1.58)</td>
<td>53.71 (1.15)</td>
<td>N, M &lt; P</td>
</tr>
<tr>
<td>Parent-report</td>
<td>50.17 (10.15)</td>
<td>52.75 (4.24)</td>
<td>47.31 (2.03)</td>
<td>51.71 (1.17)</td>
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</table>

Table IV. Descriptive Statistics and Class-Specific Means and Standard Errors for Psychosocial Outcomes

Note. Bonferroni correction of p < .0015 was used to control for familywise error. RSCA = Resiliency Scales for Children and Adolescents (self-report); SEARS-A = Social-Emotional Assets and Resilience Scales, Adolescent Report; SEARS-P = SEARS, Parent Report; PTSS = post-traumatic stress symptoms.

Significantly at Time 2, with the exception of self-reported PTSS and parent-reported anxiety being comparable for the Positive and Moderate classes. At Time 3, the classes significantly differed in self-reported depression, and the Positive class reported significantly lower anxiety symptoms than the Moderate class. The classes did not differ on self-reported PTSS or parent-reported symptoms at Time 3. Class differences were also found in self-reported sense of benefit and burden from the most stressful life event, though only at Time 2. Participants in the Negative class reported the lowest levels of benefit and the highest levels of burden.

Participants’ psychosocial connectedness as assessed by the HMAC differed only between Negative and Moderate classes in most domains. Connectedness to siblings or future self did not differ across classes, and the latter may be partially attributable to the low internal consistency of the subscale for future self. Participants in the Negative group generally reported lower levels of connectedness (mean scores close to the rating of 3 = Sort of) than those in the Moderate group (mean scores close to the rating of 4 = True). Interestingly, those in the Negative group reported higher levels of connectedness to school and to reading compared with those in the Moderate group. Sense of relatedness as assessed by the RSCA significantly differed across classes at both time points, in expected directions, with the exception of a
lack of difference between the Negative and the Moderate groups at Time 3. Of note, participants in the Positive group reported relatedness at levels above the normative mean ($T$-score = 50).

Finally, the classes differed in self-reported social–emotional skills on the SEARS in expected directions, except in social competence and empathy, which did not differ between the Negative and the Moderate classes. In comparison, parent reports on the SEARS showed class differences only in social competence, such that participants in the Moderate class were rated as having significantly lower social competence than those in the other two groups. Overall, there was partial support for the second hypothesis that patients’ disposition at baseline would predict their later psychosocial functioning.

**Discussion**

The present study examined individual differences in disposition, operationalized as profiles of generalized expectancies and affectivity, in pediatric cancer patients. Three distinct subgroups of patients were found using LPA. A majority (59%) had a profile characterized by high levels of optimism and positive affectivity and low levels of pessimism and negative affectivity. Another 39% had a similar profile characterized by more moderate levels of these variables. A very small subgroup (2%) had a profile characterized by high levels of pessimism and negative affectivity and low levels of optimism and positive affectivity. Interestingly, the identification of three distinct subgroups is similar to the three risk-based classifications of families (Clinical, Targeted, and Universal levels of service need) in Kazak’s Pediatric Preventative Psychosocial Health Model (Kazak et al., 2012), though the Negative group in our study (corresponding to the Clinical classification) comprised a smaller proportion of the sample than the estimated 4–13% of families with Clinical classification. Moreover, as discussed below, the Positive and Moderate groups are both likely to be resilient. As a whole, they are unlikely to need specialized intervention or ongoing services outside of standard care and support, and any needs for psychological services are likely to be transient rather than chronic.

The three groups of participants differed significantly in their psychosocial outcomes 1 year and 3 years later. Symptoms of distress varied in a rank-ordered manner, such that the more positive the participant’s disposition profile, the fewer or less severe the symptoms they had at follow-up. Although the results should be interpreted with caution owing to the very small size of the Negative group, only this group presented with elevated self- and parent-reported anxiety, depression, PTSS, and perceived burden, which is consistent with existing research connecting high levels of pessimism and negative affectivity and low levels of positive affectivity to distress (Grant et al., 2006; Jacobs, Reinecke, Gollan, & Kane, 2008; Lonigan et al., 2003). Of note, a vast majority of the sample (98%) presented with Positive or Moderate profiles, which reported normative levels of symptoms. Furthermore, their disposition appears to facilitate challenge-related growth, as the Moderate and Positive groups both reported higher levels of benefit finding at Time 2. These findings suggest that pediatric cancer patients are, by and large, quite resilient and adapt successfully to—even grow from—life stressors, including cancer diagnosis and treatment. This is consistent with existing findings that resilience in terms of having normative levels of distress is the norm, rather than the exception, among pediatric cancer patients (Noll et al., 1999; Phipps et al., 2014; Wechsler & Sánchez-Iglesias, 2013; Woodgate, 1999).

The participants’ social–emotional functioning also differed based on their profile of disposition. On average, the Positive and Moderate groups reported higher levels of connectedness to others, whereas the Negative group reported stronger connectedness to school and to reading than the Moderate group. It is possible that participants in the Negative group are using reading and academic activities as adaptive coping strategies; however, they may also be using them to compensate for lower connectedness to important others, avoid social interactions, or are driven by a higher sense of perfectionism, which can accompany negative cognitions and affectivity (Parker, 1997). In contrast, the Positive group scored particularly high on self-reported relatedness to others and social-emotional competence, scoring above the normative average. Although the Negative group scored the lowest in these areas also, it did not significantly differ from the Moderate group in relatedness, social competence, or empathy by the third time point, possibly reflecting a regression to the mean, improvements over time, or disposition better predicting proximal outcomes.

Contrary to expectations, the three groups did not differ in parent-rated self-regulation, responsibility, or empathy. Moreover, the Moderate group was rated as having significantly lower social competence than the other two groups. This is puzzling, as other parental ratings did not indicate any psychosocial difficulties for the Moderate group but did so for the Negative group. As no outliers were found, the differences cannot be attributed to unusual data. It is possible that those in the Negative group are exposed to fewer social opportunities where their social skills can be evaluated or, given that they report low connectedness to parents, their parents may be unaware of deficits.

The present study extends existing studies of disposition in pediatric cancer patients (e.g., Howard Sharp et al., 2014; Miller et al., 2009; Phipps et al., 2009) by showing that their expectancies and affectivity vary together and significantly predict later psychosocial
functioning. Although these links have been studied longitudinally (e.g., Harper et al., 2014; Sulkers et al., 2013), the present study was the first to use a person-centered approach to show that empirically derived subgroups of patients with different disposition also differ in later outcomes. Thus, we were able to clarify the prevalence of certain dispositional profiles and identify patients that are more or less likely to be well-adjusted over time.

There are a few main clinical implications of our findings. First, a vast majority of pediatric cancer patients reports higher levels of positive dispositional traits than negative traits and are well-adjusted over time. They likely will require minimal intervention. A very small subset of patients that are vulnerable to later maladjustment can be distinguished by high levels of pessimism and negative affectivity and low levels of optimism and positive affectivity. Thus, screening patients for a combination of exaggerated traits of both high negativity and low positivity, which are marked and may even be identifiable through interactions and interviews during standard clinical care, may help identify this vulnerable group for referral to further assessment and intervention. Over time, this group of children are at increased risk not only for anxiety, depression, and PTSS, but also for responding to stressors with a higher sense of burden and lower sense of positive growth. They also report the lowest levels of social connection and positive social–emotional traits in themselves. These children would likely benefit from being monitored for distress and receiving support to enhance coping, stress management, and social support. They may also benefit from cognitive-behavioral interventions targeting their negative cognitive style and negative affect, which may prevent psychopathology (Fisak, Richard, & Mann, 2011; Horowitz & Garber, 2006).

Finally, the present study has several limitations. Data were available for only a subset (87.5%) of those initially enrolled in the study, though the sample size was large enough to detect a number of significant effects. Additionally, the sample was relatively homogeneous with respect to race (74% White). Further, although the Negative group appeared to be a cogent group based on its strong contribution to the model fit and consistency in functioning over time, it was a very small group. Replication of our work with other samples, possibly with more diverse patient populations, is needed. Moreover, the participants included in analysis had lower rates of relapse than those who were excluded owing to not having follow-up data. Because relapse history was a significant covariate associated with lower likelihood of membership in the Positive group, the findings in the study may have slightly overestimated the prevalence of this highly well-adjusted group. Also, as the present study was conducted at a single site, replication of findings at other treatment sites is needed. Nonetheless, the present findings provide preliminary information regarding heterogeneity in dispositional traits that exist in pediatric cancer patients and their link to psychosocial outcomes.

Conclusion

Most pediatric cancer patients were found to have profiles of disposition characterized by higher levels of protective traits (optimism and positive affectivity) than potentially risk-enhancing ones (pessimism and negative affectivity). Their disposition may help explain their resilience to the stressful nature of their cancer diagnosis and treatment, as they presented with normative levels of adjustment and good social–emotional functioning over 3 years. However, a small group of patients with lower protective and higher risk-enhancing dispositional traits appeared to be at risk for maladjustment. As many genetic and environmental factors likely contribute to the development of these dispositional traits and risk for maladjustment among pediatric cancer patients, further research clarifying how these individual differences arise is needed, to help inform intervention and prevention efforts.

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Conflicts of interest: None declared.

References


