PEER RELATIONSHIPS OF CHILDREN WITH CANCER: HOMOPHILY AND SOCIAL ACCEPTANCE

by

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Children undergoing treatment for malignancies may be at risk for adjustment difficulties as a result of physical symptoms or treatments related to their condition (e.g., missed school, lack of participation in extracurricular activities or sports, changes in appearance, fatigue). Children generally associate with peers who have similar social characteristics (e.g., aggressive children often befriend other aggressive children). By interrupting children's participation in social activities, cancer may disrupt these typical patterns of friendship. This study compared 84 children with cancer, ages 8-15 years, to 84 behaviorally similar, gender-, race-, and sex-matched, non-chronically peers, with regard to differences in patterns of peer affiliation, social acceptance and friendships. Sociometric data (Like Rating Scale, Revised Class Play, 3 Best Friends) were collected in children's classrooms from peers.

Results did not confirm our hypothesis that the friendships of children with cancer would be less homophilious than friendships of non-chronically ill children with regard to gender, social acceptance, or behavioral reputation. There were group differences in similarity for gender, sensitive-isolated behavior, and friend nominations. However, in all instances, homophily was greater for children with cancer. Results provided mixed support for the hypothesis that children with cancer would have more social problems than comparisons. Children with cancer were more well liked than comparisons, but received fewer friend

nominations and had fewer reciprocated friendships. Overall, these results suggest that children undergoing treatment for cancer have difficulty maintaining friendships during treatment and that friendships they do maintain are primarily with peers who are more similar to them.

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INTRODUCTION

In the United States, approximately 9,500 children and adolescents ages 18 and younger are diagnosed with cancer each year (SEER Cancer Statistics Review, 2007). While medical advancements in the past 25 years have led to a dramatic rise in the number of children who survive cancer, contemporary treatment protocols are extremely intense and have the potential to disrupt the lives of patients and families. Although the impact of pediatric cancer on social functioning and development has the potential to be pervasive, the existing body of research is limited in scope and method (for reviews, see Reiter-Purtill & Noll, 2003; Reiter-Purtill, Waller, & Noll, 2009). To better understand the effects of pediatric cancer on children's friendships, we have examined domains of social functioning that have been neglected in research to date, specifically friend characteristics and friendship homophily. Examination of the effects of cancer and its treatment on children's friendships is warranted, given the large body of research indicating that peer relationships and social competence are prospectively associated with social and emotional functioning (Bagwell, Newcomb, & Bukowski, 1998; Lansford et al., 2007; Nangle, Erdley, Newman, Mason, & Carpenter, 2003; Prinstein & Aikins, 2004); externalizing and health risk behaviors (Prinstein & La Greca, 2004); and future economic success (Conti, Galeotti, Mueller, & Pudney, 2009).

Here, we report findings from a study of differences in social acceptance and patterns of peer affiliation between 84 children with cancer (ages 8 to 15 years) and 84 non-chronically ill

classmates. In this study, we compare behavioral and reputational homophily within the friendships of children with cancer and friendships of behaviorally similar, age-, gender-, and race-matched classmates. Our use of behaviorally similar comparison classmates allowed us to examine whether these relationships are distinct for children with cancer on measures of social acceptance as well as friendship homophily, independent of the effects of behavioral reputation.

In the following sections, we outline the potential social impact of pediatric cancer and its treatment. Mechanisms through which pediatric cancer and its treatment may affect peer relationships, including aspects of friendship quality not previously studied in this population, are elucidated. Following this, previous findings regarding peer relations of children with cancer are reviewed and limitations of the existing literature discussed.

1.1   PEER RELATIONS OF CHILDREN AND ADOLESCENTS

Peer relations are an integral component of children's development. Friendships provide opportunities for children to practice and develop social skills and are characterized by reciprocity and intimacy (Hartup, 1989). For adolescents, friendships offer opportunities to explore their identities and try new behaviors while becoming more independent from parents.

1.1.1   Major theoretical constructs

The existing developmental literature describes three major dimensions of social experience: social acceptance, behavioral reputation, and friendship. Social acceptance refers to the child's overall status in his or her peer group (Is the child liked?). Behavioral reputation (What is the

child like?) reflects peers' perceptions of the child's characteristic social behavior within the peer group (Parker & Asher, 1987). Both social acceptance and behavioral reputation reflect the collective opinions of all children in the child's peer group (typically the child's classroom) and they are often related. For example, children who are highly aggressive or sensitive/isolated are more likely to be rejected by their peer group (Bierman, 2004; Ray, Cohen, Secrist, & Duncan, 1997). In contrast to social acceptance and behavioral reputation, both of which reflect the peer group's overall view of a child, friendship involves a relationship between two peers that is typically characterized by mutual liking.

To describe children's friendships, Hartup (1996) suggests that we consider three major dimensions: 1) does the child have friends; 2) identity and characteristics of friends; and 3) friendship quality. Having friends is generally protective; it may at least partially buffer children from host of psychosocial risk factors (for a review, see Bukowski & Adams, 2005). Conversely, friendlessness is prospectively associated with the development of internalizing problems (Ladd & Troop-Gordon, 2003) and is linked to loneliness (Brendgen, Vitaro, & Bukowski, 2000; Parker & Seal, 1996). While friendship is often a predictor of positive outcomes, the characteristics of one's friends may provide some insight into the potential impact of a child's friendships. Affiliation with certain types of peers may be a risk factor for problematic outcomes. For example, adolescents with delinquent friends report experiencing similar levels of depression to adolescents without friends; those with delinquent friends also demonstrate more delinquent behavior than adolescents not affiliated with delinquent friends (Brendgen et al., 2000). Finally, friendship quality (Is the friendship supportive?) can affect the friendship's impact. For example, a supportive, mutually accepting friendship may bolster children who are undergoing challenging experiences, such as chronic disease (Helgeson, Reynolds, Shestak, & Wei, 2006).

1.1.2   Association with developmental outcomes

Social functioning in childhood is a robust predictor of social, emotional, and occupational outcomes. Childhood peer problems, including negative behavioral reputation (e.g., aggressiveness), social rejection, and friendlessness, are developmental markers for social, emotional, and behavioral difficulties later in life (Kupersmidt & Coie, 1990; Parker & Asher, 1987). Children who are perceived by peers to be highly sad or sensitive display more internalizing symptoms ten years later and those who are seen as highly aggressive and disruptive as children have difficulty with academic and occupational functioning as adults (Gest, Arturo Sesma, Masten, & Tellegen, 2006). While social rejection predicts a number of negative outcomes, including delinquency and externalizing problems (Parker & Asher, 1987), receiving greater numbers of friendship nominations in high school is associated with economic success later in life (Conti et al., 2009). Friendship is also linked to long-term outcomes. Bagwell, Newcomb, and Bukowski (1998) reported that children who had at least one friend in fifth grade reported better overall life status adjustment and greater feelings of self-worth in adulthood, while peer rejection and lack of a friend in childhood predicted emotional problems in adulthood.

1.2   POTENTIAL IMPACT OF CHILDHOOD CANCER ON SOCIAL FUNCTIONING

Children with cancer are at risk for social challenges as a result of physical symptoms from their disease and the effects of treatment. Cancer treatment has the potential to disrupt both the

quantity and quality of children's social interactions. Treatment can lead to decreased contact with friends. Children and adolescents with cancer express concern about being separated from their friends, either due to missed days of school or isolation in the hospital or at home (Enskar, Carlsson, Golsater, Hamrin, & Kreuger, 1997; Forinder & Posse, 2008). Children are often out of school for extended periods of time while undergoing treatment for cancer, especially when they are first diagnosed (Sandeberg, Johansson, Björk, & Wettergren, 2008). For nearly all children, school and school-related activities, such as sports or music, are their primary source of social interaction with similar-aged peers. Missing school and school-related activities for an extended period of time has the potential to cause a significant decrease in contact with peers. When they return to school, children with cancer are often unable to participate in extracurricular activities (i.e., sports, school plays, etc.) due to physical restrictions and fatigue. Further, cancer treatment and treatment side effects, particularly hospital visits and fatigue, can interfere with children's interaction with friends outside of school (Sandeberg et al., 2008). Thus, cancer and its treatment have the potential to impact the quantity of children's social interactions.

Cancer-related factors may also affect the quality of children's social interactions. Medication side effects (i.e., chronic fatigue, irritability, sleep disruption, changes in appearance) may affect children's social behavior, possibly resulting in changes in peers' perceptions of them or decreased friendship quality. Also, it is possible that decreased social interaction has an adverse effect on social information processing skills; this, in turn, could cause difficulties negotiating social interactions, leading to decreased friendship quality or difficulty maintaining and forming friendships.

1.2.1   Effects on behavioral reputation and social acceptance

Side effects of cancer treatment may significantly alter children's social behavior. Fatigue is cited by children newly diagnosed with cancer as being the most significant obstacle to children's participation in school and interaction with friends (Sandeberg et al., 2008). This fatigue may be significant enough to alter the behavioral reputation of children on treatment for cancer. Indeed, data from peers and teachers indicates that children with cancer are perceived to be tired and frequently sick and are seen as less aggressive and disruptive than non-chronically ill comparison classmates (Noll et al., 1999). Inasmuch as aggressive and disruptive behavior is associated with negative social functioning and problematic long-term outcomes, it is feasible that fatigue may have a protective effect for some children.

Children who are less socially active may be less well-liked by their peers simply because they are less present in the social group. They also have the potential to be less well liked as a result of changes to their appearance (i.e., alopecia, weight gain, facial dysmorphic features from steroids) or their ability to participate in extracurricular activities. It is also feasible that getting "attention" from teachers and peers subsequent to a diagnosis of cancer could cause some children to resent the child with cancer. Despite the potential for a loss of social acceptance, children with cancer may receive increased attention from parents, teachers, and peers, potentially increasing their general popularity with classmates. Indeed, children with cancer sometimes report that, "[they] are more popular… everybody wants to play with [them]" (Enskar, Carlsson, Golsater, Hamrin et al., 1997, p. 23). Only one previous study has empirically examined this issue (Noll et al., 1999). These authors reported that children with cancer were viewed by peers as being more well liked than comparison classmates.

1.2.2   Effects on friendship

The effects of pediatric cancer and its treatment may adversely affect children's ability to sustain and form new friendships. Research on friendships in non-chronically ill children suggests that frequency of contact and similarity are both important for maintaining friendships. Low frequency of interaction and perceived dissimilarity are predictors of friendship dissolution in children (Berndt, Hawkins, & Hoyle, 1986) and adolescents (Duck, 1975), as are dissimilarity in activities and sports (Urberg, Degirmencioglu, & Tolson, 1998). In a qualitative study of seven Swedish adolescent survivors of stem cell transplantation who reported significant continuing psychological distress, adolescents described feeling alone, losing contact with friends, and having difficulty making new friends because they were unable to participate in many of the activities enjoyed by their same-age peers (Forinder & Posse, 2008). Similarly, younger children with cancer reported disconnection from the peer group due to lack of contact with peers their own age (Moody, Meyer, Mancuso, Charlson, & Robbins, 2006). Older children and adolescents report losing peripheral friends or those who were less close to them prior to their illness; some adolescents indicate that because of cancer, they "found out who their real friends were," meaning those who remained in contact with them after they got sick (Enskar, Carlsson, Golsater, & Hamrin, 1997; Moody et al., 2006).

1.3   MODELS TO DESCRIBE THE EFFECTS OF CANCER ON FRIENDSHIP

Although there are numerous ways that cancer could be disruptive to children's social functioning, evidence to date is mixed with regard to social outcomes. The only study that

utilized sociometric methods to assess children's friendships (Noll et al., 1999) reported no significant differences in friendship for children with cancer relative to a comparison group. There are several possible explanations for the reported lack of group differences in friendship nominations and reciprocated nominations for children with cancer relative to comparisons (Noll et al., 1999).

1.3.1 Complete resilience

First, children with cancer may be completely successful at maintaining the friendships that existed prior to their diagnosis, either on their own or with the help of parents. This may be possible, given the remarkable resilience shown by children with cancer. Numerous studies have reported that children function well after diagnosis (Noll & Kupst, 2007; Patenuade & Kupst, 2005; Phipps, 2007). However, based on the qualitative studies described above and what is known about the extensive disruption in children's social experience caused by intensive contemporary treatment protocols, it seems reasonable that subtle social problems could emerge. Further, research indicating that low frequency of contact, dissimilarity in activity participation, and even perceived dissimilarity are predictors of friendship dissolution (Berndt et al., 1986; Duck, 1975; Urberg et al., 1998) suggests that subtle problems may be present.

1.3.2 Methodological considerations

A second explanation for the lack of group differences in friendship nominations in Noll and colleague's work (1999) could be the researchers' choice of comparison peers. They utilized a comparison group consisting of classmates of the child with cancer, matched by age, gender, and

race. It is possible that group differences in friend nominations received and reciprocated friendship nominations were masked by mismatches in the distribution of behavioral reputations of children in each group. For example, using their matching strategy, a child with cancer who was sensitive and isolated could have been matched to a non-chronically ill comparison classmate who was rated by peers as high on popular-leadership behaviors, or vice versa. Children who are viewed by the peer group as leaders may be more socially successful and may receive more friend nominations than children who are perceived as being sensitive-isolated. Thus, group differences (or lack thereof) could be due, in part, to differences in the behavioral reputation of children within each group. Indeed, Noll and colleagues (1999) did report that children with cancer were perceived by peers to be significantly less aggressive and disruptive than the selected comparison classmates and were rated higher on popular-leadership behavior.

1.3.3   Social compensation: The role of homophily

Alternatively, children with cancer may lose some friends due to decreased social contact or decreased behavioral similarity, but form enough new friendships to compensate for the lost friendships, thus maintaining an equivalent number of friendships to non-chronically ill comparison peers. Based on the difficulties reported by children with cancer with regard to making new friends, we would anticipate a potential shift in patterns of friendship. Specifically, children with cancer reported that it was difficult to form new friendships because they were unable to participate in activities they previously enjoyed with friends (Forinder & Posse, 2008); therefore, it is feasible that children with cancer form new friendships with children who also do not participate in those activities. Because the friendships were formed in a context that is new and 'out of character' for the child with cancer, these new friendships are likely to be less

homophilious than friendships formed before the child became ill and therefore also less homophilious than friendships of the child's non-chronically ill peers. Homophily refers to the tendency of individuals to associate with others who are similar to them (e.g., "Birds of a feather flock together.") It plays an important role in friendship formation, maintenance, and dissolution.

The processes of making and maintaining friendships are dependent upon a number of factors, including those directly related children's access to potential friends (e.g., demographic and neighborhood characteristics) as well as behavioral, cognitive, and physical characteristics of the child (e.g., social skills, behavioral reputation, verbal ability, social information processing, appearance). Generally, we are attracted to similar others (Romero & Lepkins, 2008), largely because we are more likely to spend time with others whose activities and interests are similar to ours. Repeated shared experiences are an important part of friendship because mutual relationships are based on shared context. Over time, mutual reciprocity and shared context may cause friends to grow more similar to one another (Kandel, 1978a). If at some point we no longer perceive the other person to be adequately similar to us, we may decide that we have too little in common and end the relationship. Friends whose interests or behaviors are incompatible are unlikely to remain friends (Kandel, 1978a). Notably, behavioral similarity appears to be of greater importance in friendship formation and maintenance than attitudinal similarity (Werner & Parmelee, 1979).

1.3.3.1   Homophily in children's friendships. A number of studies provide empirical support for homophily's central role in the friendships of non-chronically ill children. Relative to non-friend dyads, friends are more similar to each other with regard to age (Challman, 1932); race and gender (Kupersmidt, DeRosier, & Patterson, 1995; Shrum, Cheek, & Hunter, 1988); illegal drug use (Akers, Jones, & Coyl, 1998; Kandel, 1978b); sociability (Challman, 1932);

aggressive behavior (Cairns, Cairns, Neckerman, Gest, & Gariepy, 1988; Guroglu, van Lieshout, Haselager, & Scholte, 2007; Haselager, Hartup, Van Lieshout, & Riksen-Walraven, 1998; Poulin et al., 1997); leadership behavior (for boys) (Poulin et al., 1997); withdrawn behavior (Guroglu et al., 2007; Kupersmidt et al., 1995; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006); physical activity (Challman, 1932); self-reported depressive symptoms (Haselager et al., 1998); academic achievement (Akers et al., 1998; French, Jansen, Riansari, & Setiono, 2003); and academic attitudes (Akers et al., 1998; Berndt, 1982). Similarity between friends is greater for demographic characteristics and behaviors (e.g., delinquency, drug use, activity participation) than attitudes or other psychological factors (Akers et al., 1998; Kandel, 1978b; Urberg et al., 1998; Werner & Parmelee, 1979). Compared to other forms of social behavior, friendship similarity is usually greatest for aggressive and antisocial behavior (Haselager et al., 1998).

Gender and friendship mutuality also affect homophily. Haselager, Hartup, Van Lieshout, and Riksen-Walraven (1998) reported that male, but not female, friend pairs were more similar than non-friend pairs regarding shyness and victimization. However, female friend pairs may be more similar on other dimensions: In the same study, female, but not male, friend pairs were more similar than non-friend pairs with regard to cooperativeness, helpfulness, and being liked. Reciprocated friends are more similar than non-reciprocated friends with respect to aggressive behavior (Cairns et al., 1988; Kandel, 1978a) as well as achievement and social withdrawal (French et al., 2003).

     1.3.3.2 Potential consequences of decreased homophily. Homophily is associated with friendship stability. Greater similarity in attitudes and behaviors is associated with greater friendship stability over time (Kandel, 1978a). Dissimilarity in behaviors and activities (e.g.,

cigarette use, adult organized activities, sport activities) predicts friendship termination (Urberg et al., 1998). Thus, if friendship similarity is affected by pediatric cancer, there is a reasonable concern that there could be a corresponding drop in friendship stability.

1.4   LIMITATIONS OF THE CURRENT LITERATURE

While there is a rich literature describing friendships of typically developing children, work with clinical populations has been less comprehensive in its approach. Studies of the social functioning of children with cancer have utilized two sources of information: 1) parent or teacher ratings of the child's social behavior on standardized measures; and 2) peer ratings of children's social behavior, supplemented with parent and/or teaching ratings. Most studies rely on behavioral ratings provided by a single rater (usually a parent) during a clinic visit. Very few studies include peer or teacher ratings; those that do include data from peers focus exclusively on broad measures of social functioning. While social acceptance, behavioral reputation, and having friends are important indicators of social competence, they only partially describe children's social experiences. To date, no studies of peer relationships of children with cancer have examined either the second or third dimensions of Hartup's (1996) model of friendship: friend characteristics and friendship quality. It is possible that there are differences in friendship characteristics of children with cancer (e.g., decreased homophily), relative to non-chronically peers. For this reason, the current research takes a more comprehensive approach and considers both broad measures of social functioning and subtler, qualitative aspects of friendship.

1.5   SPECIFIC AIMS

The overall purpose of this study was to examine a dimension of friendship (e.g., friend characteristics) previously unstudied in this population in order to more fully describe the peer relationships of children currently receiving treatment for pediatric cancer. To this end, we explored differences in patterns of peer affiliation between children with cancer and their non-chronically ill peers. Specifically, we examined the degree of homophily within the friendships of children with cancer, relative to the friendships of matched comparison children. Within-friendship homophily was assessed for gender and several measures of social functioning: behavioral reputation with peers, best friend nominations received, number of reciprocated friendships, and overall likeability. In addition, we compared children with cancer to a novel set of comparison peers (matched on behavioral reputation in addition to race, gender, and grade level) on three measures of social acceptance (friend nominations received, reciprocated friend nominations, and overall like ratings) to further describe the social functioning of children with cancer. Specific hypotheses are as follows:

1. Children with cancer will receive significantly lower scores from peers with regard to overall like ratings. They will also receive fewer friendship nominations and have fewer of their nominations reciprocated.

2. There will be less homophily or similarity within the friendships of children with cancer, relative to the friendships of matched comparison children, with regard to behavioral reputation and social acceptance (friendship nominations received, reciprocated friendship nominations, like ratings).

3. For all children, mutual friends will be more similar than non-mutual friends, with regard to behavioral reputation and social acceptance (friendship nominations received and like ratings).

2.0 METHOD

2.1 PARTICIPANTS

This study was a secondary analysis of data collected as part of a larger study of social, emotional, and behavioral functioning of children with cancer (Noll et al., 1999; Noll, Ris, Davies, Bukowski, & Koontz, 1992; Reiter-Purtill, Vannatta, Gerhardt, Correll, & Noll, 2003). The original sample consisted of 99 children with cancer (ages 8-15 years). In addition, data were collected from classmates of the children with cancer ($N = 2,302$) in 98 classrooms. Children with cancer were identified through reviews of the local tumor registry at a large Midwestern medical center. To be eligible for the original study, children were required to be 8-15 years of age and undergoing chemotherapy for a non-primary central nervous system (CNS) malignancy at the time of recruitment. Children were excluded if they were enrolled in full-time special education or were home-schooled. Families of eligible children were contacted and asked for permission to contact their child's school. Teachers from each child's primary academic classroom (elementary school) or a required academic class (middle and high school) were asked to participate in classroom data collection and assist in the consent process. All teachers from schools that agreed to participate worked with our project and collected consent forms from families of children in their class.

2.1.1 Matching

Children with cancer were excluded from the present study if they did not nominate any friends ($N = 2$) or did not nominate at least one same-sex friend ($N = 1$). The remaining 96 children were subjected to a matching procedure. Classmates who were the same race and gender as the target child were identified as potential comparisons. For target children in multilevel classrooms, comparisons were required to be in the same grade level as the target child. One child with cancer was eliminated from the present study because they had no classmates that could be matched on both race and gender. To identify behaviorally similar peers, each child with cancer was compared in a pairwise fashion to each of his or her race-, grade level-, and gender-matched classmates using a behavioral profile similarity index, the sum of the absolute differences between scores on the four factors of the Revised Class Play (RCP; Masten, Morison, & Pellegrini, 1985). Potential comparisons were required to have nominated at least one same-sex peer. The classmate whose RCP profile differed least from the target child's RCP profile and did not differ by more than 2 standard deviations (within-classroom) on any single factor was selected as a comparison peer. Children who could not be matched to a behaviorally similar classmate ($N = 11$) were not included in the present study.

In sum, 84 children with cancer and 84 comparison children were included in this study. The sample consisted of 49 male and 35 female matched pairs. Forty-two matched pairs were in grades 2-5; 27 pairs were in grades 6-8; and 15 pairs were in grades 9-12. The sample was predominantly white ($N = 74$ pairs); 7 pairs were African American; and 3 were unidentified.

2.2   ASSESSMENTS

A research assistant administered measures to all children in the classroom with an informed consent. Children were told that they were participating in a "research project about friendships." No mention of childhood cancer was made to ensure we did not stigmatize the child with cancer or systematically alter peer nominations as a result of focusing on the child with cancer.

Behavioral reputation was assessed by peer report, using the Revised Class Play (Masten et al., 1985). Children were asked to nominate one child in their classroom for each role in an imaginary play. Children were allowed to nominate only classmates who were the same gender as the child with cancer in their class. The roles in the play reflect behavioral attributes (15 positive and 15 negative) and are distributed among four factors: Popular-leadership (10 roles), Aggressive-Disruptive (8 roles), Sensitive-Isolated (7 roles), and Prosocial (5 roles) (Zeller, Vannatta, Schafer, & Noll, 2003). Six additional roles were included in the play (Noll et al., 1999). These roles were designed to assess three domains: academic ability, athletic ability, and physical attractiveness. There are two items per domain, one positive and one negative. A subscale was formed for each domain by subtracting the number of nominations a child received for the negative role in each domain from the number of nominations received for the positive role in that domain.

Friendship was assessed with best friend nominations (Bukowski & Hoza, 1989). Children were asked to name three children in their class, of either gender, whom they consider 'best friends,' in order of preference (i.e., first, second, and third best friend). Only same-sex nominations were included in the analyses. Thus, target and comparison children's friend nominations were adjusted so that the "#1 friend" was the child's first choice *same-sex* friend nomination and so forth for the child's second and third choices for same-sex friends. For those

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children who nominated one or two different-sex friends, there are missing data for the second and/or third choice friends.

2.3   ANALYSES

Prior to analysis, all sociometric data were standardized within classroom in order to account for differences in class size. We first tested group, age, and sex differences for the 4 RCP factors and the social acceptance variables (mean like ratings, friendship nominations received, and reciprocated friendships) using a series of 2 x 2 x 2 ANOVAs. The sample size was adequate to detect a medium effect with a power of .8. We subsequently compared the prevalence of cross-gender friendship between groups using a chi-square test.

Structural Equation Modeling (SEM) was used to examine group differences in homophily between children and their nominated friends for the 4 RCP factors, the social acceptance variables, and the three supplemental RCP scales (physical attractiveness, athletic ability, academic ability). SEM with directional paths is considered to be an appropriate analytic technique for assessing similarity within distinguishable dyads (Gonzalez & Griffin, 1999). A path model was explored using multiple groups SEM to determine whether group membership affected the strength of the relations between variables. Comparing the fit of the model in which all paths are freely estimated to a model in which one of the paths is set to be equal across groups allows us to determine whether the path or association differs significantly between children with cancer and comparisons. Chi-square difference tests are used to assess whether the model fit for the more constrained model differs significantly from that of the less constrained model.

The SEM model (Figure 1) was designed to assess similarity across three dyads (3

nominated friends). For each variable, the target (or comparison) child's score was modeled as a predictor of the scores of each of the target (or comparison) child's nominated friends (up to 3). To account for the effect of friendship reciprocity on nominated peers' scores on the RCP factors, six dummy variables were created to indicate reciprocity (yes/no) for each of the target and comparison child's friend nominations. That is, if one of the target child's choices for same-sex friend also nominated the target child as one of his/her three best friends, the nomination was considered to be reciprocated. Along with the target or comparison child's score, these dummy variables were included as predictors for each of the nominated friends' scores.
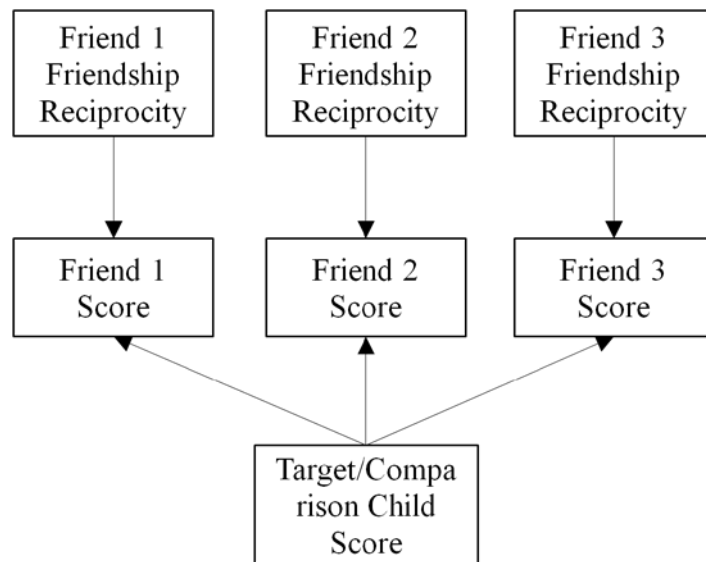
Figure 1. Hypothesized model for multiple groups SEM showing associations between target (nominating) child and nominated same-sex friends

In these analyses, we sought to obtain the most parsimonious model by comparing the associations between the target/comparison children and their nominated friends in a stepwise fashion. First, the association between target and first best friend was compared between groups

(cancer versus comparison). If this association did not differ significantly between groups, it was constrained across groups. This procedure was repeated for the associations between target and the second choice friend and target and the third choice friend.

Analyses were conducted in Mplus (Version 4.1; Muthén & Muthén, 2006) using individual data. The Full Information Maximum Likelihood (FIML) approach was used to handle missing data. Because the peer-rated sensitive-isolated behavior (RCP) data were skewed, MLR was chosen an estimation method. MLR is a maximum likelihood estimation method that is robust when data are not normally distributed. Chi-square difference tests for are scaled to account for use of MLR.

Finally, linear regression was used to examine the effects of gender, friendship reciprocity, race, and grade level on similarity between target children and their #1 same-sex nominated friend for the same variables examined in the SEM analyses. Since this work was utilizing a novel framework to examine social relationships of children with cancer, no corrections were made for multiple comparisons.

3.0   RESULTS

3.1   SAMPLE DEMOGRAPHICS

Because the comparisons for this study were selected after data collection had been completed, demographic information was not available for most of the comparison children (Table 1). Note that for previous work (Kashikar-Zuck et al., 2007; Noll et al., 1999; Noll, Reiter-Purtill, Moore et al., 2007; Noll, Reiter-Purtill, Vannatta, Gerhardt, & Short, 2007; Noll et al., 1992; Noll et al., 1996; Vannatta et al., 2008), classmates who were the same race and gender were similar on family occupational prestige; parent education; child age and IQ; and family marital status.

Table 1. Demographic Characteristics of Children With Cancer ($N = 79$)

Characteristic	M	SD
Family socioeconomic status[a]	38.94	17.53
Father age (years)[b]	40.65	5.04
Mother age (years)	38.74	7.24
Father education[c]	13.71	3.00
Mother education	13.23	2.14
Number of children living at home (mother)	2.62	1.19
Mother's marital status (currently married)	54 (64%)	
Age of target child (years)	12.03	2.43

Note. Demographic data were missing for 5 children.
[a] Based on Revised Duncan (TSEI2; Nakao & Treas, 1992). Higher scores indicate greater occupational attainment.
[b, c] $n = 58$-59. There are less data for fathers due to the prevalence of single-parent households.

3.2   PRELIMINARY ANALYSES

For each of the 4 RCP factors (Popular-Leader, Aggressive-Disruptive, Sensitive-Isolated, and Prosocial), a 2 x 2 x 2 ANOVA with three between-subjects factors (status of child: cancer versus comparison; sex; and grade level: grades 1-5 and 6-12) was conducted. A median split was used for grade level. These analyses were performed to ensure that the matching procedure was successful in pairing children with cancer with behaviorally similar comparison peers, but also served to identify possible age and sex differences in RCP scores in an exploratory fashion. As expected, there was no significant main effect of group for any of the RCP factors. However, there was a significant main effect of grade level for Popular-Leadership behavior, $F(1, 160) =$

5.77; $p < .05$; $\eta^2 = .03$, with younger children ($M = .29$, $SD = .92$) receiving higher scores than older children ($M = -.03$, $SD = .83$). For Prosocial behavior, there was a significant main effect of gender, $F(1, 160) = 4.36$; $p < .05$; $\eta^2 = .03$; males ($M = .56$, $SD = .99$) were perceived by their peers as being more Prosocial than females ($M = .24$, $SD = .81$).

3.3 GROUP COMPARISONS FOR SOCIAL ACCEPTANCE VARIABLES

To examine the first hypothesis, a 2 x 2 x 2 MANOVA with three between-subjects factors (status of child: cancer versus comparison; gender; and grade level: grades 1-5 and 6-12) was conducted for each of the three measures of peer acceptance (mean like ratings, friendship nominations received, and reciprocated friendships). There were no significant main effects of sex or grade level and no significant interactions for any of the three measures. In all the analyses, social acceptance variables were standardized within classroom to account for differences in class size. However, raw data for these measures provide a more concrete picture of children's reputation with their peers and therefore is described in the text (standard scores are presented in Table 2).

3.3.1 Like ratings

Children with cancer ($M = 3.75$, $SD = .68$) were significantly more well liked than comparison peers ($M = 3.59$, $SD = .64$) (Table 2).

3.3.2   Best friend nominations

There was a significant, main effect of group for best friend nominations. On average, children with cancer received 2.54 friend nominations ($SD = 1.87$), significantly fewer than comparisons ($M = 3.42$, $SD = 2.1$) (Table 2).

3.3.3   Reciprocated friendships

For reciprocated friendships, the main effect of group was significant. Comparison children had significantly more reciprocated friendships ($M = 1.63$, $SD = .94$) than children with cancer ($M = 1.23$, $SD = .90$) (Table 2).

Table 2. Group Comparisons for Standardized Social Acceptance Variables ($N = 168$)

Measure	Cancer		Comparison		$F(1, 165\text{-}167)^{a}$	η^2
	M	SD	M	SD		
Like Rating Scale	.50	.83	.25	.78	4.12*	.02
Friend Nominations	-.03	.88	.45	.99	9.24**	.05
Reciprocated Friends	-.13	.86	.36	.88	11.52**	.06

*$p < .05$; ** $p < .01$; two tailed tests
Note. $\eta^2 = SS_{factor}/SS_{total}$
[a] $n = 166$. Like ratings were not collected from one classroom.

Results provide mixed support for the first hypothesis. While children with cancer were more well liked than comparisons, they received fewer friend nominations and had fewer reciprocated friendships.

3.4   GENDER HOMOPHILY

To assess gender homophily, we compared the proportions of peer nominations made by children with cancer and comparisons that were cross-sex (i.e., a girl nominates a boy as a friend). The child with cancer who had been excluded from the other analyses because he had nominated only cross-sex friends was included in this analysis, along with a behaviorally similar comparison classmate matched in the same manner as the other comparisons. Thus, these analyses involved 170 children. Overall, children in the cancer group made 255 friend nominations; the comparison group made 253 friend nominations (1 child had missing data for friend 3 and another child nominated themselves as a friend). Of these, there were proportionally more cross-sex nominations in the comparison group (16%) than the group of children with cancer (9%). A chi-square test was employed to examine group differences in the prevalence of cross-sex nominations. Thirty-two (38%) comparisons nominated at least one cross-sex friend. This was significantly greater than the proportion of children with cancer (24%) who nominated at least one cross-sex friend, $\chi^2(1, N = 170) = 3.99$ $p = .046$. Thus, gender homophily for friend nominations was greater in the target group than comparison group.

3.5 SEM ANALYSES: HOMOPHILY IN BEHAVIORAL REPUTATION AND SOCIAL ACCEPTANCE

Multivariate SEM was used to test the remaining hypotheses regarding homophily within the friendships of children with cancer and comparisons. Analyses were conducted separately for each of the 4 primary and 3 supplementary RCP scales as well as the three social acceptance variables (like ratings, friendship nominations received, and reciprocated friendships). The same procedure (described above), using nested models to assess group differences in the associations between target/comparison children and their friends, was followed each time.

3.6 HOMOPHILY FOR REVISED CLASS PLAY

3.6.1 Sensitive-isolated

A baseline model that allowed all target-friend relationships to be estimated freely was estimated in both groups simultaneously. This model fit the data well, $\chi^2(18) = 18.903$, $p = .398$, $CFI = .957$, $RMSEA = .024$, $SRMR = .056$. To examine group differences in the association between target and friend 1 sensitive-isolated behavior, a model was estimated in which this path was equated across groups. This model was significantly different (χ^2 difference $= 6.273$, $p < .05$) than the baseline model, so the friend 1 path was freely estimated in the remaining group comparisons. Subsequent constrained models did not differ significantly with regard to model fit; therefore, in the final model, the associations between target/comparison and friend 2 and target/comparison and friend 3 sensitive-isolated behavior were equated across groups (Figure

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2). This model fit the data well, $\chi^2(20) = 19.43$, $p = .494$, *CFI* = 1.000, *RMSEA* = .000, *SRMR* = .058.

In the final model, the association between sensitive-isolated behavior of children with cancer and their first choice same-sex friend ($\gamma = .37$) was significantly greater than the association between sensitive-isolated behavior of comparison children and their first choice same-sex friend ($\gamma = .09$). Sensitive-isolated behavior of both target and comparison children was positively, but not significantly, associated with their second and third friend choices. Friendship mutuality was not significantly associated with friends' sensitive-isolated behavior in either group.

*p < .05
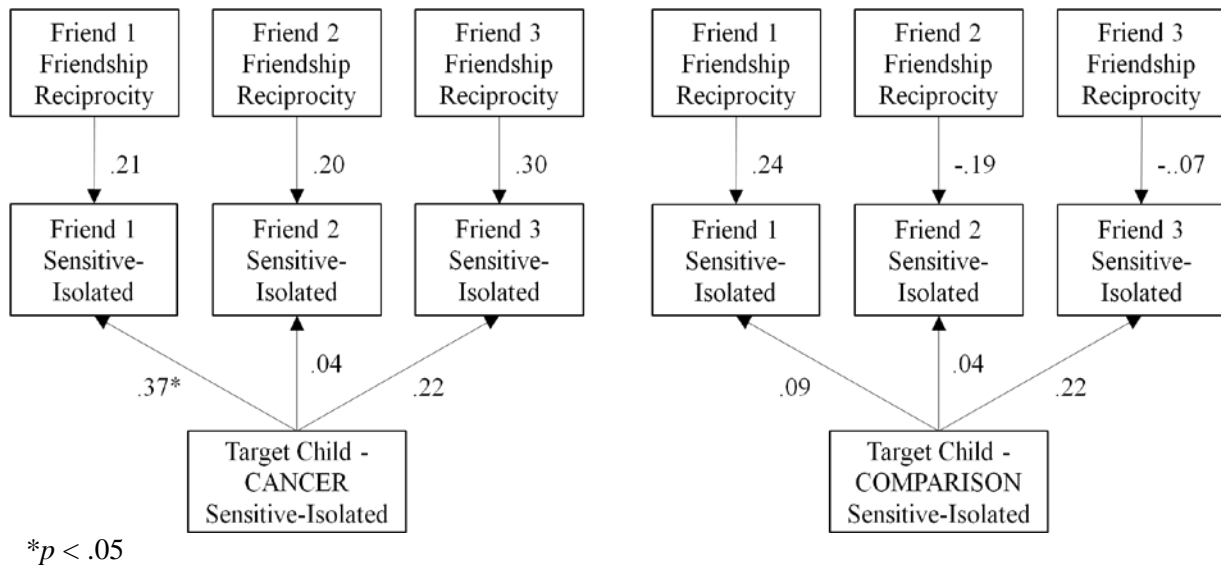
Figure 2. SEM results showing the effects of target child's sensitive isolated behavior and friendship mutuality on nominated same-sex friends' sensitive-isolated behavior for cancer and comparison groups

3.6.2 Aggressive-disruptive

A baseline model that allowed all target-friend relationships to be estimated freely was estimated in both groups simultaneously; this fit the data well, $\chi^2(18) = 21.98$, $p = .233$, $CFI = .258$, $RMSEA = .051$, $SRMR = .061$. Fit did not differ significantly for any of the constrained models, so paths for friends 1, 2, and 3 were constrained across both groups in the final model. The final model is a good fit for the data, $\chi^2(21) = 25.10$, $p = .243$, $CFI = .237$, $RMSEA = .048$, $SRMR = .065$. The CFI estimate is low, but this is expected due to the generally small correlations between variables in this model. Associations between the aggressive-disruptive behavior of both target and comparison children and their nominated friends were modest and positive, but not significant in the final model.

3.6.3 Prosocial

The baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 20.34$, $p = .314$, $CFI = .000$, $RMSEA = .039$, $SRMR = .062$. Fit did not differ significantly for any of the constrained models, so paths for friends #1, 2, and 3 were constrained across both groups in the final model. The final model is a good fit for the data, $\chi^2(21) = 20.59$, $p = .484$, $CFI = 1.000$, $RMSEA = .00$, $SRMR = .062$. None of the paths in this model were significant.

3.6.4 Popular-leadership

The baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 19.89$, $p = .339$, $CFI = .762$, $RMSEA = .035$, $SRMR = .062$. Group differences in the strengths of the

associations between target/comparison and friend 1, friend 2, and friend 3 were again assessed via a nested model strategy and no significant differences were found. The final model, with all three paths between target/comparisons' and nominated friends' popular-leadership behavior equated across groups, fit the data well, $\chi^2(21) = 22.40$, $p = .377$, $CFI = .823$, $RMSEA = .028$, $SRMR = .065$. Only the friend 1 and 2 paths for similarity on popular-leadership behavior were significant (for both, $\gamma = .22$, $p < .05$). None of the associations between friend mutuality and friends' popular-leadership behavior were significant.

3.6.5 Attractiveness

A baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 16.82$, $p = .546$, $CFI = 1.0$, $RMSEA = .00$, $SRMR = .055$. Fit did not differ significantly for any of the constrained models, so all paths between the physical attractiveness ratings for target/comparisons' and their nominated friends' were equated across groups in the final model. This model fit the data well, $\chi^2(21) = 19.35$, $p = .563$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .063$. Of the three paths modeling homophily of physical attractiveness between targets and their friends, only the path for friend #2 was significant ($\gamma = .26$, $p < .05$). In both groups, there was a negative relationship of moderate strength between friend 3 reciprocity and friend 3 physical attractiveness ($\gamma = -.58$ and $-.64$, for cancer and comparison, respectively, $p < .05$).

3.6.6 Athletic ability

The baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 9.061$, $p = .958$, $CFI = 1.0$, $RMSEA = .00$, $SRMR = .045$. Fit did not differ significantly for any of the

constrained models, all paths between the peer ratings of athletic ability for target/comparisons'

and their nominated friends' were equated across groups in the final model. This model fit the

data well, $\chi^2(21) = 11.236$, $p = .958$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .048$. Although the path

modeling homophily of athletic ability between targets and their #1 friends was not significant,

the paths for friends 2 and 3 were significant ($\gamma = .19$ and -.22, respectively, $p < .05$). There were

no significant relationships between friendship reciprocity and friends' athletic ability ratings.

3.6.7 Academic competence

A baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 13.819$, p

$= .741$, $CFI = 1.0$, $RMSEA = .00$, $SRMR = .051$. Fit did not differ significantly for any of the

constrained models, so all paths between the peer ratings of academic competence for

target/comparisons' and their nominated friends' were equated across groups in the final model.

This model fit the data well, $\chi^2(21) = 15.839$, $p = .779$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .053$.

However, none of the paths in the final model were significant.

In sum, group differences in similarity were found for only one measure of behavioral

reputation. Relative to comparisons, children with cancer were perceived by peers to be more

similar to their first choice friend selection with regard to sensitive and isolated behavior.

3.7   HOMOPHILY FOR SOCIAL ACCEPTANCE VARIABLES

3.7.1   Like ratings

The baseline model, with all paths freely estimated, was a good fit for the data, $\chi^2(18) = 8.28$, $p = .974$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .039$. As above, comparisons were made for a series of nested models in order to assess group differences in the strengths of the associations between target/comparison and friend 1, friend 2, and friend 3. Fit did not differ significantly for any of the constrained models, so all paths between targets or comparisons and their nominated friends' mean like ratings were equated across groups in the final model. This model fit the data well, $\chi^2(21) = 11.89$, $p = .943$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .054$. Only the friend 1 and 2 paths for similarity on mean like ratings were significant ($\gamma = .22$ and .32, respectively, $p < .05$).

3.7.2   Friend nominations received

The baseline model, with all paths freely estimated, was not a good fit for the data, $\chi^2(18) = 31.16$, $p = .028$, $CFI = .220$, $RMSEA = .093$, $SRMR = .074$. When this model was compared to a model with the friend #1 path constrained across groups, the model fit was significantly different (χ^2 difference $= 4.53$, $p = .013$). Therefore, the friend 1 path was not constrained in subsequent model testing. Model fit did not differ significantly for subsequent constrained models, so in the final model (Figure 3), paths between target/comparisons' and their second and third nominated friends' total friend nominations received were equated across groups. The final model fit the data well, $\chi^2(21) = 30.977$, $p = .056$, $CFI = .350$, $RMSEA = .031$, $SRMR = .074$. The path linking

total best friend nominations received by targets and their #1 friends was significant only in the target group ($\gamma = .23$); for comparisons, this association was small and negative ($\gamma = -.07$).
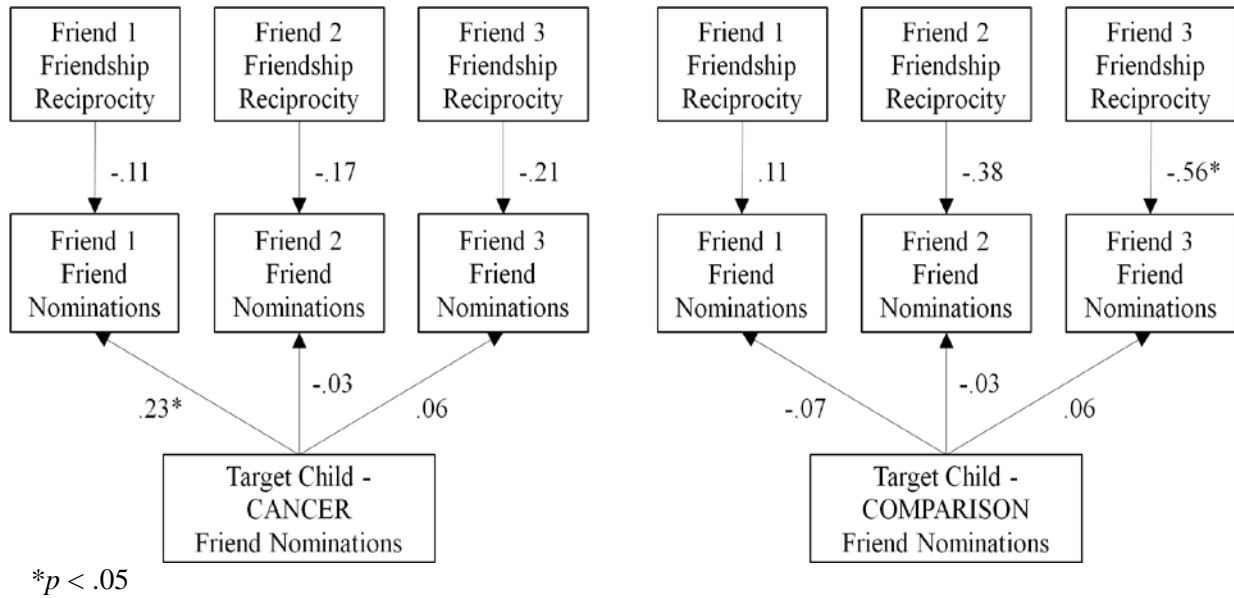
Figure 3. SEM results showing the effects of target child's total friend nominations received and friendship mutuality on nominated same-sex friends' received friend nominations for cancer and comparison groups

3.7.3   Reciprocated friends

A baseline model, with all paths freely estimated, was an acceptable fit for the data, $\chi^2(18) = 25.86$, $p = .103$, $CFI = .764$, $RMSEA = .072$, $SRMR = .078$. Fit did not differ significantly for any of the constrained models, so all paths between the mean number of reciprocated friendships for target/comparisons' and their nominated friends' were equated across groups in the final model. This model fit the data well, $\chi^2(21) = 26.93$, $p = .173$, $CFI = .822$, $RMSEA = .058$, $SRMR = .081$.

The path coefficients for similarity with regard to the number of reciprocated friendships were all small and non-significant.

In sum, group differences in similarity were found for only one measure of social acceptance. Relative to comparisons, children with cancer were more similar to their first choice friend selection with regard to total friend nominations received.

3.8 HOMOPHILY AND INTERACTIONS WITH MUTUALITY, RACE, GENDER, AND GRADE LEVEL

Multivariate linear regression was employed to examine the third hypothesis (e.g., mutual friends are more similar than non-mutual friends). An exploratory analysis of the effects of race, gender, and grade level on homophily was also conducted by including these terms as interactions in the regression examining effects of mutuality on homophily. We did not make predictions regarding effects for the exploratory analyses.

To model the effects of friendship mutuality, race, gender, and grade level on homophily, a series of nine regression analyses was conducted, one for each dependent variable of interest (each of the 4 primary RCP factors and 3 supplementary RCP scales) and 2 social acceptance variables (like ratings and friend nominations). In each regression, the dependent variable was the target child's first choice same-sex nominated friend's score on the variable of interest. The target child's score on the variable of interest was entered as a predictor in the first block of the regression along with the target child's grade, sex, race, and a dummy variable indicating whether the first choice friend nomination was reciprocated (mutuality). The second block contained four interaction terms (target child's score on variable of interest by grade, by race, by

sex, and by mutuality).

None of the variables showed a significant R^2 change when the second block of predictors (interactions) was added to the initial model. Further, multicollinearity was a significant problem in all of the regression models when interaction terms were included. Therefore, regression models that did not include interaction terms will be discussed here. Five regression models predicting first choice friend values were significant overall: like ratings (Table 3), RCP Sensitive-Isolated (Table 4), RCP Prosocial (Table 5), and two RCP supplemental subscales, Academic Ability and Athletic Ability (Tables 6 and 7, respectively). Friendship mutuality was a significant predictor of first-choice friend scores for RCP Prosocial and RCP Sensitive-Isolated; when the first-choice friend was a mutual friend, their scores were higher on these outcomes.

Table 3. Summary of Multiple Regression Analyses for First-Choice Friends' Like Ratings

($N = 166$)

Variable	B	SE(B)	β
Target Child Like Ratings	.17	.08	.16*
Grade	-.06	.02	-.19*
Sex	.03	.13	.02
Race	.04	.04	.08
Mutuality	-.06	.13	-.04
R^2		.07	
F		2.39*	

*$p < .05$, **$p < .01$

Table 4. Summary of Multiple Regression Analyses for First-Choice Friends' RCP Sensitive-

Isolated Scores ($N = 168$)

Variable	B	SE(B)	β
Target Child RCP Sensitive-Isolated	.20	.06	.24**
Grade	.06	.02	.21**
Sex	.12	.10	.09
Race	-.02	.03	-.04
Mutuality	.21	.10	.15*
R^2		.14	
F		5.23**	

*$p < .05$, **$p < .01$

Table 5. Summary of Multiple Regression Analyses for First-Choice Friends' RCP Prosocial

Scores ($N = 168$)

Variable	B	SE(B)	β
Target Child RCP Prosocial	-.01	.08	-.01
Grade	-.09	.03	-.23**
Sex	.24	.15	.13
Race	.03	.05	.05
Mutuality	.33	.15	.17*
R^2		.10	
F		3.53**	

*$p < .05$, **$p < .01$

Table 6. Summary of Multiple Regression Analyses for First-Choice Friends' RCP Academic

Ability Scores ($N = 168$)

Variable	B	SE(B)	β
Target Child RCP Academic Ability	.00	.09	.00
Grade	-.16	.04	-.28**
Sex	-.08	.23	-.03
Race	.10	.07	.11
Mutuality	.38	.22	.13
R^2		.10	
F		3.78**	

*$p < .05$, **$p < .01$

Table 7. Summary of Multiple Regression Analyses for First-Choice Friends' RCP Athletic

Ability Scores ($N = 168$)

Variable	B	SE(B)	β
Target Child RCP Athletic Ability	.10	.10	.07
Grade	-.16	.05	-.26**
Sex	-.72	.24	-.23**
Race	.06	.07	.06
Mutuality	.07	.24	.02
R^2		.14	
F		5.07**	

*$p < .05$, **$p < .01$

Exploratory analyses examining other predictors of friend 1 scores indicated that race was not a significant predictor in any of the regressions. Grade was a significant predictor all of the five significant regression models. There was an inverse relationship between grade level and friend 1 scores for like ratings, RCP Prosocial, RCP Academic Ability, and RCP Athletic Ability. However, friend 1 scores RCP Sensitive-Isolated increased with child's grade level. Sex was a significant predictor of friend 1 scores for only one outcome: friend 1 Athletic Ability was lower when the target child was male.

4.0   DISCUSSION

This study compared the social functioning and friendship characteristics of 84 children with cancer and 84 classmates, matched by gender, race, and behavioral reputation. This was in contrast to previous work in which 76 children with cancer, ages 8-15, were compared to classmates matched on age, race and gender (Noll et al., 1999). Compared to previous research (Noll et al., 1999), the matching strategy employed in the present study allowed us to better control for the effects of children's behavioral reputation on their social acceptance and friendship characteristics. Thus, we were able to evaluate whether two children with a similar social reputation have similar patterns of social acceptance and friendships when one of the children is being treated for cancer.

The results partially supported our hypothesis that, compared to classmates with similar social behavioral characteristics, children with cancer would have more problems with social acceptance and friendship. While children with cancer were more well liked by their peers than comparisons, they had fewer reciprocated friendships and received fewer friend nominations. The current findings are in line with previous work using a similar sample and different set of comparisons (Noll et al., 1999). In both the present and previous studies children with cancer had significantly higher like ratings than comparisons. Although no significant group differences were found in the previous work (Noll et al., 1999) for friendship nominations received or reciprocated friendships, there were non-significant trends for each; children with cancer had

fewer friend nominations and fewer reciprocated friendships than comparisons. Finally, in both the previous and current studies, there were no significant effects of age or sex on social acceptance. Of note, while children with cancer received significantly fewer best friend nominations and reciprocated friendship nominations, these differences occurred because the comparison peers had so many friends. On average children with cancer had more friendship nominations than an "average" child in the room, but fewer than the current comparisons.

4.1   GROUP DIFFERENCES IN SOCIAL ACCEPTANCE

Results from the current study, as well as Noll and colleagues' work (1999), suggest that cancer does not adversely impact children's social acceptance, as measured by like ratings. Indeed, children with cancer were significantly more well liked by their peers than comparisons in both studies. In the current study, the average like rating of children with cancer was ½ standard deviation above the average like rating for children in the same classroom.

4.1.1   Behavior change

There are several possible explanations for the apparent boost in peer acceptance that accompanies a pediatric cancer diagnosis. The existing literature suggests that individual-level child characteristics are associated with acceptance or liking by the peer group; specifically, children who exhibit more aggressive behaviors tend to be less accepted by peers (Cairns et al., 1988; Ray et al., 1997), while prosocial behavior is associated with greater peer acceptance (Crick, 1996). Group differences in individual-level characteristics such as behavioral reputation

could partially explain previous findings (Noll et al., 1999). Specifically, in previous work (Noll et al., 1999), children with cancer were perceived by peers to be significantly less aggressive and disruptive than comparisons and there was a trend toward children with cancer being perceived as higher in sociability and leadership behaviors. These positive behaviors may have contributed to the higher level of social acceptance reported. However, the matching procedure employed in the current research should largely control for the effects of behavioral reputation on social acceptance; targets and comparisons in the current study are similarly low in aggressive behavior and high in popular-leadership behavior. Still, in the current study, children with cancer were significantly more well liked than comparisons. This suggests that cancer confers benefits to one's social acceptance beyond those based on behavioral reputation alone.

4.1.2 Social evaluation

One may also expect that children "feel sorry for" a child with cancer and that this translates into increased liking. Peers may use different 'rules' for evaluating a child's social behavior if that child has cancer; perhaps peers are more willing to accept and like a peer who behaves in a socially aversive manner if that child has cancer. If so, the correlations between behavioral reputation and like ratings should differ between children with cancer and comparisons. To explore this possibility, we examined possible group differences in the correlations between like ratings and child characteristics that are generally accepted as being related to social acceptance (e.g., behavioral reputation, appearance, athletic competence, and academic competence) (Table 8). Generally, these relationships do not differ between groups; this suggests that children do not 'change the rules' for decisions about liking based on behavior, appearance, or athletic or academic competence if a child has cancer.

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4.1.3   Contextual factors

Contextual variables may play an important role in social acceptance of children with cancer. When a child is diagnosed with cancer, communities and schools typically rally to provide support. Classroom or school-wide activities that are consequences of cancer treatment may influence peers' social perceptions of children with cancer. When a child is missing from school because they are undergoing treatment for cancer, it is common for that child's peers to participate in a number of teacher-led activities intended to provide support and maintain communication with the ill child (e.g., writing and sending get-well cards, school-wide fundraising for the child's family). In doing all of this, teachers probably spend a fair amount of time speaking positively about the ill child and encouraging the child's peers to do the same. Because children do take cues from teachers' behavior toward a child when deciding how they feel about that child (for a review, see Mikami, Lerner, & Lun, 2010), all of this activity may increase the social acceptance of children with cancer.

While adults' modeling is likely to have a strong effect on children's behavior toward peers with cancer, particularly in younger children, there are also contextual factors at the level of the peer group itself. It seems plausible that there is agreement within the peer group regarding appropriate social behavior toward children with cancer (i.e., it is not acceptable to tease a child with cancer about their cancer or its visible side effects). Children may learn this social convention via explicit instruction from parents and teachers or through observation of adults' behavior toward children with cancer or other ill children. As with any group norm, we would expect peer acceptance of children with cancer to be strongly reinforced within the peer group. Consequences for violating this norm probably vary by age and gender, but could range from social rejection or loss of social status to either physical or relational aggression (e.g., being

ostracized or punched by peers for teasing a classmate with cancer).

It is also possible that psychosocial dimensions of treatment for pediatric cancer positively influence children's social acceptance with peers. During treatment, children develop relationships with numerous healthcare professionals; these healthcare professionals are typically optimistic, caring, and reliable adults. These relationships provide opportunities for children to practice social skills and may facilitate the development of emotional regulation. Given the robust effects of observational learning, it is also plausible to expect that children may begin to adopt some positive characteristics of these professionals (e.g., optimistic attitude, reliability, empathy). Additionally, research suggests that the experience of having cancer may contribute to emotional and cognitive growth (Barakat, Alderfer, & Kazak, 2006). If undergoing treatment for cancer does confer some benefit with regard to improved social skills or emotional regulation, this could positively influence children's peer acceptance.

4.2   GROUP DIFFERENCES IN FRIENDSHIPS AND FRIENDSHIP NOMINATIONS

Although children with cancer were more well liked than comparisons, they had fewer reciprocated friendships and received fewer friend nominations. This replicates the previous finding (Noll et al., 1999), although this difference did not reach significance in the previous work. While the current research was not longitudinal and thus does not allow us to draw conclusions about changes in number of friendships due to cancer and its treatment, the results do indicate that children with cancer have fewer friends than we might expect, given their behavioral reputation and peer acceptance (like ratings). Thus, it is reasonable to conclude that cancer has some effect on friendship that is independent of social behavior and peer acceptance.

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One possible explanation for the group differences in friendship is simply the characteristics of the comparisons included in the study sample. That is, relative to the rest of the children in their classrooms, the comparisons in this study were particularly high on popular-leadership behavior and low on aggressive-disruptive behavior; however, unlike the target group, comparison children's behavioral reputations were in no way attributable to cancer and its treatment. Thus, it is possible that the results simply indicate that improved social behavior resulting from the effects of cancer and treatment does not immediately confer benefits in the form of increased friendships. If this were the case, we would expect to see group differences in the correlations between behavioral reputation, friendship nominations received, and number of reciprocated friendships. However, examination of these associations in this sample indicates that this is generally not the case (see Table 8).

Another explanation for the effects of cancer on friendship involves treatment-related disruptions in children's social interactions (e.g., missing school or play dates, inability to participate in sports or other activities). These disruptions may contribute to friendship dissolution because shared experience is essential for maintenance of friendships. Treatment-related disruptions in social interactions may be particularly problematic for friendships that are of lower quality or shorter duration. Presumably, higher quality friendships or friendships based on lengthy past association would be more likely to survive these types of disruptions.

A third explanation for group differences in friendship is that cancer-related changes in behavioral reputation could lead to changes in existing friendship ties. Negative treatment-related changes in social behavior could contribute to overall rejection by the peer group as well as loss of friendships. Also, changes in behavioral reputation – in any direction – could lead to a child being less behaviorally similar to his or her friends. For example, a child who was aggressive and

disruptive and had aggressive friends prior to being diagnosed with cancer may lose his aggressive friends if cancer treatment decreases his aggressive-disruptive behavior. Unfortunately, the cross-sectional nature of this study does not allow us to directly examine the interplay between behavior, homophily, and friendship ties over time. However, we can examine homophily within the existing friendships of children with cancer in order to indirectly assess this possibility; greater homophily within the group of children with cancer would suggest that children retained friendships primarily with peers who were more similar to them.

Table 8. Correlations Between Behavioral Reputation, Appearance, Athletic and Academic Competence, Like Rating Scale, Best

Friend Nominations, and Reciprocated Friendships by Group ($N = 166$)

Child Variable	Like Rating Scale		Friendship Nominations		Reciprocated Friendships	
	Cancer	COMP	Cancer	COMP	Cancer	COMP
Behavioral Reputation (RCP Factors)						
Popular-Leader	.61**	.67**	.64**	.55**	.41**	.35**
Prosocial	.53**	.45**	.09	.24*	.04	.17
Aggressive-Disruptive	-.34**	-.24*	.07	-.01	.05	.08
Sensitive-Isolated	-.49**	-.58**	-.47**	-.40**	-.36**	-.35**
RCP Supplemental Scales						
Attractiveness	.51**	.73**	.43**	.56**	.41**	.32**
Athletic Competence	.39**	.48*	.29*	.40**	.27*	.39**
Academic Competence	.30**	.40**	.28*	.20	.22*	.15

*$p < .05$, **$p < .01$

4.3   HOMOPHILY IN FRIEND SELECTIONS

Results did not confirm our hypothesis that the friendships of children with cancer would be less homophilious than friendships of non-chronically ill children with regard to gender, social acceptance, or behavioral reputation. There were group differences in homophily for gender, RCP Sensitive-Isolated scores, and friend nominations received. In all instances, children with cancer were more similar to their friends than were comparisons. These findings suggest that, in general, cancer and its treatment do not significantly disrupt typical patterns of friendship affiliation ("Birds of a feather stick together"); indeed, children with cancer are more similar to their friends than non-chronically ill children with similar behavioral profiles.

The increased homophily observed in the friend selections made by children with cancer could be indirect evidence for a pattern of selective friendship dissolution described by adolescents with cancer. Specifically, in a qualitative study of adolescents who had completed treatment for cancer (Enskar, Carlsson, Golsater, & Hamrin, 1997), adolescents reported that cancer often leads to the loss of peripheral friends. In the same study, adolescents also noted that they grew closer to their closest friends during treatment. These two processes would lead to children with cancer having fewer friends than comparisons, but being more similar to their friends than comparisons. Indeed, this is what the results from the current study indicate.

Lastly, results from the linear regression analyses are difficult to interpret. Due to significant multicollinearity between predictors when interaction terms were included in the models, inferences drawn from these models would be dubious at best. However, without interaction terms, these models unfortunately do not provide a particularly meaninging view of

the relationships between mutuality, race, sex, grade level, and similarity on the variables of interest.

4.4   CONCLUSIONS

All together, the results suggest that cancer and its treatment do not alter children's tendency to choose similar peers as friends, but do negatively affect their ability to form or maintain friendships. Although results support the notion that children are generally socially resilient in the face of challenges such as major illness (Noll & Kupst, 2007), paired with previous research (Noll et al., 1999), results from the current study also indicate that children with cancer may be at increased risk of losing friendships during treatment. This provides empirical support for concerns expressed by parents and children regarding the impact of treatment on friendships (Enskar, Carlsson, Golsater, & Hamrin, 1997; Enskar, Carlsson, Golsater, Hamrin et al., 1997).

4.4.1   Implications for intervention

All together, the results suggest that any clinical intervention designed to improve social functioning in children with cancer should primarily target friendship ties rather than social behavior. Children with cancer appear to be functioning as well if not better than their peers, with regard to social behavior. However, they do fall behind behaviorally matched peers with regard to friendships nominations received and reciprocated friendships, indicating difficulties maintaining relationships. To address this, parents, health professionals, and school staff can all play a role in facilitating regular social interaction between children undergoing treatment for

cancer and his or her classmates. It is likely that technology (e.g., video conferencing that allows children to 'attend' school and internet chat with friends) will play an increasing role in helping children to stay connected to their peers.

4.4.2 Limitations

Several limitations of this research should be considered. First, the cross-sectional nature of this study did not allow us to directly examine the effects of cancer and its treatment on children's social behavior and friendships over time. Second, our choice of dyads to include in the SEM analyses limits the generalizability of this research. Specifically, we included all same-sex friend nominations, regardless of mutuality. Friendship is generally defined in the developmental literature as a mutually agreed upon relationship between two peers. Because we did not limit analyses to mutual friendships, one cannot interpret results of the SEM analyses as evidence of actual friendship homophily; rather, results describe the role of similarity in children's selection of peers they view as friends. Third, evaluating the third hypothesis (i.e., that children who are mutual friends are more similar than those who are only linked by a non-reciprocal friendship nomination) via linear regression was problematic. In future work, we plan to explore other analytic strategies for examining factors affecting similarity between individuals. For example, using difference scores as an outcome variable may allow for clearer interpretation of the findings. Fourth, examination of homophily in this study was limited to same-sex friend nominations; although most children nominated same-sex peers as friends, many nominated at least one different sex peer. Finally, this research did not examine friendship quality, an important aspects of children's friendships.

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4.4.3 Future directions

The possibilities for future research regarding peer relations of children facing special challenges are vast. Relationships with peers are not limited to dyadic friendships. Small groups or cliques become an increasingly important part of children's social experience as they move into adolescence. Further, friendships are situated within a larger peer context. Social norms can significantly affect how accepting peers are of each other's behavior (Stormshak et al., 1999) and structural aspects of children's social networks have profound effects on friendships (Espelage, Green Jr, & Wasserman, 2007). Lastly, it is clear that children's behavior, acceptance by the peer group, and friendships are interdependent and evolve together over time. Ideally, future work should consider the longitudinal co-evolution of individual and network characteristics.

With regard to the effects of childhood cancer on social development, it would be reasonable to next focus our attention on identifying those children who are most vulnerable to losing friends during treatment. A host of possible variables should be included, taking into consideration multiple levels of the child's experience (i.e., individual, social network, school, family). Children with cancer that involves the central nervous system (CNS) may be particularly vulnerable to social problems, but for different reasons than children without CNS involvement. Although these children were excluded from this study, social functioning in these children is certainly a topic that deserves further consideration.

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