Relationship Between Camp Attendance and Self-Perceptions in Children With Chronic Health Conditions: A Meta-Analysis

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Objective A meta-analysis examined the association between camp attendance and changes in self-perceptions in children with chronic health conditions.

Methods Studies using quantitative methods to assess changes in self-perceptions while attending camps designed for children with chronic health conditions were included in analyses. A random-effects model was used, and Cohen’s $d$ was used to calculate effect sizes at both post-camp and follow-up. Some potential moderators of effects were examined (i.e., type of measure of self-perceptions, children’s chronic health condition, camp components).

Results 31 studies were included in the analyses. Children experienced small, but statistically significant, improvements in self-perceptions at both post-camp ($d = .25$, 95% CI [.16–.34]) and extended follow-up ($d = .15$, 95% CI [.05–.26]). This relationship was moderated by type of measure of self-perceptions and child health condition.

Conclusions Camp attendance is associated with small improvements in self-perceptions for children with some chronic health conditions.

Key words adjustment; children; chronic illness; effect size; meta-analysis.

More than 500 disease-specific camps exist for children with an illness (Cushner-Weinstein et al., 2007). Many camps tailored for children with chronic conditions strive to provide a safe, normative, and fun childhood experience and interaction with peers that may not otherwise be possible (Warady, Carr, Hellerstein, & Alon, 1992), while still maintaining access to any needed medical care. Trained and diverse camp staff, often including physicians, nurses, pediatric psychologists, or dieticians, are present to meet children’s medical needs. Additionally, camps provide the opportunity for education and intervention through program components targeting domains that may be impacted by the child’s chronic condition, such as disease knowledge, disease management, or psychosocial functioning (Brown, 2005).

A central mission of many camps for children with chronic conditions is to improve children’s self-perceptions, such as their self-esteem and self-concept (Page & Pearson, 1990; Wong et al., 2009). Children’s self-perceptions are sometimes addressed specifically through camp interventional programming, and improvements in self-perceptions are also believed to occur through the opportunities that camp provides for interaction with other children and for positive and normalizing experiences (Page & Pearson, 1990). The support provided by peers in the social setting of camps may also enhance the self-concept of children participating in these programs (Zimmerman et al., 1987). Further, self-perceptions may improve as a byproduct of changes in disease knowledge, attitudes toward illness, adherence, or physical health that can occur during participation in camps. For example, children attending a weight-loss camp may experience improvements in self-perceptions because of weight reduction, given that being overweight has been associated...
with self-perceptions (Griffiths, Parsons, & Hill, 2010). The extent to which physical health, adherence, and disease attitudes or knowledge are addressed in summer camp programs may differ by health condition. As such, changes in self-perceptions following attendance at camps may also vary by illness or condition.

Focus on children’s self-perceptions is important, given children with chronic conditions have been shown to have poorer self-perceptions than their healthy peers (e.g., Griffiths et al., 2010; Hoare & Mann, 1994), although differential effects on self-perceptions have been found across children with various chronic conditions (Hoare & Mann, 1994). Focusing on self-perceptions in children with chronic conditions is also important, because self-perceptions have been related to attitudes toward disease (Ho, Lee, Kaminsky, & Wirrell, 2008) and medical adherence (Burkhart & Rayens, 2005). For example, Burkhart and Rayens (2005) found self-perception to be positively correlated with adherence in children with asthma. Achieving improvements in children’s self-perceptions is also critical because self-perceptions are considered a component of children’s overall health-related quality of life (e.g., Sabaz et al., 2000).

Despite the importance of children’s self-perceptions, inaccuracy in terminology has hindered research on children’s self-perceptions (Butler & Gasson, 2005). A review of self-esteem and self-concept measures found inaccurate terminology was frequently used in describing constructs (Butler & Gasson, 2005), and there are various conflicting theories regarding the definition of some self-views, such as self-esteem. This has led to significant variation across studies in the terminology used, which has led to difficulty with interpreting findings across studies. Perhaps for this reason, as well as other methodological limitations often associated with research studies assessing the effectiveness of camps (e.g., small sample size, lack of control group), results of research in this area appear to be inconsistent (e.g., Epstein, Stinson, & Stevens, 2005). Although the contributions of descriptive review articles have been helpful to the field, the inconsistency of results demonstrates the further need for systematic synthesis and potential clarification of findings. Small sample sizes and logistic components of organizing camps frequently do not allow for the testing of potential moderator variables that may influence the relationship between camp attendance and children’s self-views. Such moderators may include the child’s health condition or the influence of having camp programming that specifically addresses children’s self-perceptions. A meta-analytic approach gives the opportunity to provide clarification by allowing the identification of camp or participant characteristics that may influence outcomes or moderate the therapeutic effect of camps.

By systematically pooling effect sizes across all studies and accounting for sample size differences, a meta-analysis overcomes the limitations of small sample sizes or small effect sizes and provides the opportunity to examine the overall effect of camps on adjustment and functioning of children with chronic health conditions.

The current study uses a meta-analytic approach to examine changes in children’s self-perceptions following attendance at a camp tailored for children with a chronic health condition. Self-perception was chosen as the outcome to be assessed because many camps describe changes to children’s self-perceptions as a goal of camp attendance (Page & Pearson, 1990; Wong et al., 2009). Assessing improvements in this area following camp attendance is also important because this is an aspect of quality of life and psychosocial functioning that is believed to change through the support provided through camp experiences, rather than through set programming to address this facet of functioning. The lack of empirical research assessing mechanisms for change in child self-perceptions during camp participation means that currently camp structure and programming are developed based only on theoretical perspectives of what may impact child self-perceptions. Addressing self-perceptions in children is particularly important because research indicates that self-perceptions are amenable to change among children, despite being more stable in adulthood (Trzesniewski, Donnellan, & Robins, 2003). Therefore, childhood may be a key period for addressing child self-perceptions. Given this importance of addressing child self-perceptions, the current meta-analysis focuses on this facet of psychosocial functioning. Additionally, this construct was selected because change in self-perceptions has been a frequent outcome variable in individual studies that have assessed camp outcomes. Less frequently examined constructs, including other outcomes measures, are too disparate to summarize in a meta-analysis.

The meta-analysis attempts to clarify previous findings in an area of research that has been hindered by use of inaccurate terminology in describing children’s self-views (Butler & Gasson, 2005), and methodological limitations of individual studies of the effectiveness of camps (e.g., small sample size). The current study will seek to overcome this limitation by examining changes in various facets of self-perceptions as defined by the measure used in assessment, rather than the terminology used by study authors. Additionally, the current study examines whether children with different chronic conditions experience varying psychosocial outcomes following camp attendance and whether a camp that contains a specific programming
component to address self-perceptions yields greater improvements in this area. These moderators were selected to aid with identification of children most likely to benefit from camp attendance and whether development of programming addressing self-perceptions is an effective use of camp resources.

Empirical evaluation of psychosocial programs for children, such as camps, is central to identifying whether outcome goals are achieved and highlighting potential needs for modifications (Roberts & Steele, 2005). Currently, information on the potential benefits of camps for kids with chronic conditions is lacking, because study results appear to be inconsistent, and many individual studies have been under-powered. Therefore, camp staff and health care professionals are unable to provide families accurate information on the potential benefits of attending camp. Additionally, information that would allow camp staff to develop the most beneficial camp programming and camp experience for children is lacking. For example, understanding the types of camp programming associated with beneficial outcomes for children following camp attendance or the children most likely to benefit from camp experiences would allow more effective camps to be developed.

Therefore, the study assessed the following hypotheses: (1) Children would show significant improvements in self-perceptions over the course of participation in a camp, (2) Children attending camps with programming designed specifically to target children’s self-perceptions would show greater improvements in this construct, (3) Changes in self-perceptions would vary across children with different health conditions, with children attending camps that target improvements in health outcomes (e.g., obesity) showing greatest improvements in self-perceptions, and (4) Changes in self-perceptions measured by various instruments would vary, given different measures assess different aspects of this construct. However, given inconsistencies in past research, specific hypotheses on the measures that would show greatest improvements were not established, and this analysis was considered as exploratory.

Methods

Search Strategy
Numerous search strategies were used to conduct a comprehensive search for eligible reports, consistent with previous recommendations for thorough reviews (e.g., Reed & Baxter, 1994; White, 1994). First, a series of searches of keywords were conducted in the academic databases PubMed, PsycINFO, ERIC, and Proquest Dissertation and Theses. Sets of three keywords were used in each search (i.e., camp; child, adolescent, or youth; self-concept, self-esteem, self-worth, or self-competence). These keywords produced 12 possible search combinations. When possible, database filters were set to return only articles in English and only articles with child and adolescent participants. Second, reference lists of identified articles or other relevant literature were examined for eligible studies. Third, forward searches of all identified eligible articles were conducted using Google Scholar. Fourth, conference programs and proceedings were examined from relevant conference meetings (e.g., regional and national conferences in pediatric psychology) from 1987 to 2011. Last, an electronic message was distributed to the LISTSERVs of Division 53 (Society of Clinical Child and Adolescent Psychology) and Division 54 (Society of Pediatric Psychology) of the American Psychological Association requesting any published or unpublished research meeting inclusion criteria. The decision to include dissertation, theses, and conference presentations was made to address potential bias that may result from inclusion of only published studies. Inclusion of such works has been suggested as part of a thorough meta-analytic search and potential strategy for reducing potential “file drawer” bias (e.g., Cooper & Hedges, 1994; Lipsey & Wilson, 2001; McLeod & Weisz, 2004). Additionally, such procedures have been used previously in meta-analyses conducted on topics within pediatric psychology (e.g., Pai, Drotar, Zebracki, Moore, & Youngstrom, 2006; Wu & Roberts, 2008).

Inclusion Criteria

Eligible reports from the inception of databases through July 2011 and meeting inclusion criteria were included in the meta-analysis. For inclusion, the report needed to fulfill the following criteria: (a) written in English; (b) a presentation of an original research study; (c) study participants were children with a chronic physical health condition (e.g., asthma, diabetes, overweight, cancer); (d) study participants engaged in a camp designed specifically for children with a chronic condition or to integrate children with a chronic condition with other children; (e) quantitative methods were used to assess the ability of the camp to improve child outcomes; (f) one outcome variable was related to children’s global self-perceptions, such self-concept or self-esteem; and (g) presented statistics necessary to calculate an effect size or such information could be obtained through contact with authors. In instances where study articles did not include the necessary information to compute effect sizes, efforts to contact study authors either by e-mail or U.S. postal service were
made. A minimum number of participants were not required for studies to be included, and studies had sample sizes ranging from 14 to 204 (M = 57.48, SD = 46.33).

Specific operational definitions were identified or created for terms used in the inclusion criteria. The definition of chronic condition provided by Short and Rosenthal (2003) was used, describing these conditions as “illnesses or impairments that are expected to last for an extended period of time and require medical attention and care that is beyond what is normally expected for an individual of the same age” (p. 18). The condition of pediatric overweight was considered to meet this operational definition, as the definition was broad to include any health impairment and not specific to illness. Further, previous research and policy considers weight problems a disease or chronic health condition. For example, U.S. government medical policies (e.g., Medicare) have changed their definitions to include obesity within their definition of an illness (U.S. Department of Health & Human Services, 2004), and the World Health Organization considers obesity a chronic disease that requires long-term strategies for management (World Health Organization, 2000). Additionally, previous meta-analyses in pediatric psychology have included obesity when examining literature on pediatric chronic health conditions (e.g., Kahana, Drotar, & Frazier, 2008). Camp was defined as any program for a group of children that provided both leisure and educational activities for a period of time lasting at least one entire day and occurring in a recreational and frequently outdoors settings. Camp offered year round were included (i.e., not restricted only to summer camps, per se). Self-perceptions were defined as any child or adolescent perception, feeling, or attitude toward global self, including their worth and competence. This definition is an integration of different conceptualizations of self-esteem and self-concept that include feelings of competence and worth (Mruk, 2006) and “how one perceives oneself” (Sebastian, Burnett, & Blakemore, 2008, p. 442). Only global self-views were used in the analyses to eliminate any disease-specific or domain-specific self-views because these disease-specific constructs could not be collapsed across children with various conditions. Further, not enough studies using the same types of measures of self-perceptions reported individual subscale scores that would allow examination of whether particular facets of certain types of measures improved.

The database search terms returned 578 entries. Eighteen of these entries were repeats (i.e., the same report was returned from more than one search), meaning that 560 original entries were found. Articles were excluded for the following reasons: study was not in English (n = 1), article did not present original research (n = 185), participants were not children or adolescents <18 years old with a chronic health condition (n = 258), participants did not attend a camp designed for children with a chronic health condition (n = 36), study did not use quantitative methods to assess outcomes from attending camp (n = 34), study did not assess the impact of camp on children’s self-perceptions (n = 16), article used the same data as another eligible article (n = 1), and information needed to compute an effect size could not be obtained (n = 2). Twenty-seven articles obtained through the database searches qualified for inclusion. An additional five articles meeting inclusion criteria were identified through the alternative search strategies, yielding 32 articles for inclusion. Thirty-one of these studies used a pre–post within-groups design, while one study (Hazzard & Angert, 1986) compared outcomes of campers to outcomes for a control group. The nature and computation of effect sizes do not allow for effect sizes from studies using both within- and between-group designs to be included in one meta-analysis (Lipsey & Wilson, 2001). Consequently, the Hazzard and Angert (1986) study was excluded from study analysis. Thus, the meta-analysis included 31 studies. This information is presented in graphical form consistent with the PRISMA model in Figure 1.

**Coding of Studies**

A comprehensive coding manual and protocol were developed to identify important information about each study (e.g., participant demographics, camp characteristics) and the statistics necessary for effect size computation. For 10% of articles included in the meta-analysis, two coders independently coded study characteristics used in primary or moderation analyses in order to calculate inter-rater reliability. Reliability was calculated as percent agreement and was 89%, with there being one instance in which coders differed. In this instance, consensus was achieved, and this code was used. Information about each manuscript (e.g., year of publication, manuscript type), each camp (e.g., location of camp, whether the camp included a program/component specifically addressing self-perceptions), and each sample (e.g., the children’s health condition, age of children were coded) was coded. Information was collected to calculate effect sizes for initial post-camp evaluations and when available extended follow-up evaluations.

**Statistical Approach**

Two primary meta-analyses were conducted to examine whether camp attendance was associated with...
Records identified through database searching (n = 578)

Additional records identified through other sources (n = 5)

Records after duplicates removed (n = 565)

Records excluded for not being in English (n = 1)

Records excluded because not original research (n = 185)

Records excluded because participants were not children or adolescents under 18 with a chronic health condition (n = 258)

Records excluded because participants did not attend a camp (n = 36)

Records excluded because study did not utilize quantitative methods to assess outcomes from attending camp (n = 34)

Records excluded for not assessing the impact of camp on children’s self-esteem (n = 16)

Records excluded because the same data was presented in a different eligible article (n = 1)

Records excluded because information could not be obtained to compute effect size (n = 2)

Records excluded because study did not utilize quantitative methods to assess outcomes from attending camp (n = 34)

Studies eligible (n = 31)

Studies included in meta-analysis (n = 31)

Figure 1. Flow diagram of articles identified and included.
improvements in self-perceptions at post-camp ($n = 31$) and then again at follow-up ($n = 11$). For post-camp outcomes, a moderator analysis was conducted to identify whether certain types of measures of self-views showed greater improvement over the course of camp attendance. Five types of measures were used by multiple studies included in analyses. Each of these measures represented a separate category in the moderator analysis, and all other measures were collapsed into an “other” measure category. The five measures used in multiple studies were Self-Perception Profile for Children and Adolescents (Harter, 1985), Piers-Harris Children’s Self-Concept Scale (Piers, Herzberg, & Harris, 2002), Rosenberg Self-esteem Scale (Rosenberg, 1965), Culture-free Self-esteem (Battle, 1981), and Child Health Questionnaire (Landgraf, Abetz, & Ware, 1996). Although page limitations do not allow a detailed presentation of details on each measure, the reader is referred to the measure validation articles and manuals cited above for further details. Additionally, for post-camp outcomes, moderator analyses were also conducted to determine potential effects of specific health conditions or potential effects of having a program component in camp specifically addressing self-perceptions. Report of the specific components of camp programming was variable among studies, and many studies ($n = 20$) did not provide enough detail to determine whether a camp component addressing self-perceptions was included. Therefore, reports that stated the camp contained a component addressing self-perceptions were compared with reports that either did not contain such a component or that did not provide the details necessary to identify whether such a component was present. Moderator analyses could not be conducted for follow-up outcomes given sample size restrictions.

All studies included in the meta-analysis used a pre–post methodology and a continuous measure of self-perceptions. Therefore, all effect sizes were computed using Cohen’s $d$. Formulas accounting for dependent samples were used, because pre-test post-test designs are conducted with only one sample. For studies that reported non-significant changes in self-perceptions but did not include statistics from analyses ($n = 7$), the effect size was estimated as 0. Despite this bias, the method is considered appropriate when the goal of the analysis is to reject a null hypothesis of an effect size of zero because it leads to a downward bias in the mean effect size (Lipsey & Wilson, 2001). When multiple effect sizes for change in self-perceptions during the same time point were computed in a given study, a weighted average of the effect sizes was taken to maintain independence and to allow larger sample sizes to have a greater impact on the mean effect size for that study. A stem-and-leaf plot of effect sizes did not identify any extreme outliers greater than three standard deviations from the mean. Table I presents the study information for those reports included in analyses. The effect sizes obtained for each study were weighted based on sample size, so that larger sample sizes would have a greater impact on the overall mean effect size for each meta-analysis. Weighted effect sizes were calculated through use of a standard error, which was computed based on sample size, correlation coefficient of interindividual stability of the measure over time (e.g., test–retest reliability; Card, 2011), and unweighted effect size. For articles that did not report a correlation coefficient of interindividual stability for the measure used, this correlation coefficient was obtained from another published source, such as the manual of the particular measure or a measure validation study performed with a similar sample.

Q-statistics were computed to test the homogeneity of effect sizes to determine whether variation was greater than expected based upon only standard error for each primary analysis. A significant Q-statistic demonstrates the sample is heterogeneous to an extent beyond expected by standard error (Card, 2011) and supports the use of a random-effects model. Random-effects models allow for inferences to be made about a population of studies beyond those included in the present analysis, while other models (i.e., fixed-effects models) allow inferences to only be made about the set of studies included in the meta-analysis. Interpretation of effect sizes used the guidelines established by Cohen (1988): small < .20, medium = .21–.50, and large > .51. The significance of the mean effect sizes was also assessed through computation of 95% confidence intervals, and confidence intervals containing a value of zero were considered to represent a non-significant effect size (Lipsey & Wilson, 2001).

Results

Study Characteristics

The 31 eligible studies were dated 1973–2010 and included 24 (77.42%) published journal articles, 6 (19.33%) theses or dissertations, and 1 (3.23%) conference poster. For those camps reporting their location, camps

$$d = t_{dependent}/\sqrt{N}, \quad d = (M_{T2} - M_{T1})/s_p$$

$$ES_d = \frac{SE_d}{\sqrt{(2(1 - \alpha)/n) + (ES_d/2n)}}$$

$$ES_U = M - z_{1 - \alpha}(SE_{ES}), \quad ES_L = M + z_{1 - \alpha}(SE_{ES}),$$

where

$$SE_{ES} = \sqrt{1/\sum w}$$
### Table I. Effect Sizes for Studies Included in Post-Camp and Follow-Up Analyses

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample size</th>
<th>Chronic health condition</th>
<th>Post-camp outcomes</th>
<th>Follow-up outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unweighted ES</td>
<td>Weighted ES&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>2. Bennett, Beldon, Snethen, &amp; Warady (1988)</td>
<td>16</td>
<td>Peritoneal dialysis or received a kidney transplant</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>5. Devine &amp; Dawson (2010)</td>
<td>31</td>
<td>Craniofacial difference</td>
<td>.66</td>
<td>9.47</td>
</tr>
<tr>
<td>6. Eng &amp; Davies (1991)</td>
<td>69</td>
<td>Cancer</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>7. Gately, Cooke, Butterly, Knight, &amp; Carroll (2000)</td>
<td>40</td>
<td>Obesity</td>
<td>.50</td>
<td>6.82</td>
</tr>
<tr>
<td>8. Gately, Cooke, Barth, Bewick, Radley, &amp; Hill (2005)</td>
<td>185</td>
<td>Obesity</td>
<td>.35</td>
<td>5.81</td>
</tr>
<tr>
<td>11. Hunter, Rosnov, Koomtz, &amp; Roberts (2006)</td>
<td>70</td>
<td>Diabetes</td>
<td>–.03</td>
<td>–.54</td>
</tr>
<tr>
<td>13. McCraw &amp; Travis (1973)</td>
<td>33</td>
<td>Diabetes</td>
<td>.47</td>
<td>6.17</td>
</tr>
<tr>
<td>14. McRae, Mullins, Moncrief, &amp; Moncrief (1988)</td>
<td>20</td>
<td>Various chronic diseases</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>15. Meltzer &amp; Rourke (2003)</td>
<td>66</td>
<td>Cancer</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>17. Moons et al. (2006a)</td>
<td>16</td>
<td>Congenital heart disease</td>
<td>.38</td>
<td>5.06</td>
</tr>
<tr>
<td>18. Moons et al. (2006b)</td>
<td>25</td>
<td>Congenital heart disease</td>
<td>.38</td>
<td>5.37</td>
</tr>
<tr>
<td>19. Nicholas, Williams, &amp; MacLuskey (2009)</td>
<td>22</td>
<td>Asthma</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>20. Pulgaron, Salamon, Patterson, &amp; Barakat (2010)</td>
<td>50</td>
<td>Asthma</td>
<td>.03</td>
<td>.44</td>
</tr>
<tr>
<td>22. Regan, Banks, &amp; Beran (1993)</td>
<td>67</td>
<td>Epilepsy</td>
<td>.26</td>
<td>3.94</td>
</tr>
<tr>
<td>24. Rohrbacher (1973)</td>
<td>204</td>
<td>Obesity</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>26. Scharf (1985)</td>
<td>33</td>
<td>Diabetes</td>
<td>.02</td>
<td>.22</td>
</tr>
<tr>
<td>27. Stefl, Shear, &amp; Levinson (1989)</td>
<td>36</td>
<td>Juvenile Rheumatoid Arthritis</td>
<td>.40</td>
<td>5.42</td>
</tr>
<tr>
<td>29. Wong et al. (2009)</td>
<td>21</td>
<td>Obesity</td>
<td>.40</td>
<td>4.95</td>
</tr>
</tbody>
</table>

<sup>a</sup>Weighted effect size computed with random-effect weight.
occurred in 6 different countries and 11 different states or territories in the United States. Camps lasted for a range of 3 to 56 days, and 11 camps (35.48%) were specified to be over-night camps (although many camps, n = 20, did not report this information). Camps were designed for children with the following health conditions: 8 (25.81%) overweight, 6 (19.35%) diabetes, 5 (16.13%) asthma, 3 (9.68%) cancer, 2 (6.45%) congenital heart disease, and 4 (12.90%) others (i.e., peritoneal dialysis or kidney transplant, craniofacial difference, epilepsy, juvenile rheumatoid arthritis). Three camps (9.68%) were attended by children with various conditions. Overall, these studies included 1,782 children, with the number of participants in each study ranging from 14 to 204. The majority of studies did not consistently report participant demographic information (e.g., age, gender). For example, 26% of studies reported no information about participant age. Of those studies that did report participant age, some reported age range while others reported average age. For studies that reported participant age range, children ranged between 5 and 20 years of age. The majority of studies reporting age of participants had children of various ages participating and did not focus on children within a small age range; for example, the majority of camps were attended by children ranging in age from a minimum of 5–9 years old and a maximum of 16–18 years of age. All studies assessed children’s perceptions of self through self-report questionnaires (i.e., not parent or counselor report).

Post-Camp Improvements in Self-Perceptions

The hypothesis that children’s self-perceptions would be improved following completion of camp was tested through the first primary analysis. The Q-statistic demonstrated significant heterogeneity, $Q(30) = 285.697$, $p < .001$. Therefore, the random-effects model was used for calculation of mean effect size. The overall mean effect size was found to be small (Cohen, 1988), but statistically significant, $d = .23$, 95% CI [0.16–.34]. Moderation analyses were performed by partitioning the Q-statistic into $Q_{between}$ and $Q_{within}$. For analyses of whether the measure used to assess self-views moderated the relationship, both $Q_{between}$ ($Q(5) = 100.02$, $p < .001$) and $Q_{within}$ ($Q(26) = 185.68$, $p < .001$) were found to be statistically significant, meaning there was significant variation in improvement of self-views across measures used to assess constructs and significant heterogeneity within groups. Significant changes in children’s self-perceptions were found on several measures, while other measures did not detect statistically significant changes across camp participation. Table II presents the mean effect sizes for each type of measure, and the number of studies using each measure. Disease diagnosis or health condition was also assessed as a potential moderator. Both $Q_{between}$ ($Q(5) = 40.11$, $p < .001$) and $Q_{within}$ ($Q(26) = 245.59$, $p < .001$) were found to be statistically significant, indicating significant heterogeneity within and between chronic health condition groups. Effect sizes for each chronic health condition group are presented in Table III and the number of studies represented in each effect size. Effect sizes were found to be statistically significant from zero for only the overweight, congenital heart disease, and “other condition” groups. Effect sizes were not found to be statistically significant from zero for the diabetes, asthma, and cancer condition groups. Comparison of effect size confidence intervals between groups found only a significant difference between the diabetes group and the overweight group to be statistically significant. Moderator analyses also assessed whether the presence of a program component specifically addressing self-views moderated the relationship between camp attendance and self-perceptions. Both $Q_{between}$ ($Q(1) = 37.54$, $p < .001$) and $Q_{within}$ ($Q(29) = 248.16$, $p < .001$) were found to be statistically significant, indicating significant heterogeneity within and between groups. However, although the mean effect size was larger for camps with a component addressing self-views ($d = .34$, 95% CI [0.16–.53]) than for camps without such a component ($d = .22$, 95% CI [0.11–.32]), the difference between mean effect sizes was not found to be statistically significant.

### Table II. Effect Sizes by Type of Measure Used to Assess Children’s Self-Perceptions

<table>
<thead>
<tr>
<th>Measure</th>
<th>Studies</th>
<th>$d$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-perception profile for children and adolescents</td>
<td>9</td>
<td>.13</td>
<td>-.04 to .30</td>
</tr>
<tr>
<td>Piers-Harris Children’s Self-Concept Scale</td>
<td>8</td>
<td>.21*</td>
<td>.02 to .39</td>
</tr>
<tr>
<td>Rosenberg Self-esteem Scale</td>
<td>4</td>
<td>.59*</td>
<td>.34 to .83</td>
</tr>
<tr>
<td>Culture-free self-esteem</td>
<td>2</td>
<td>.00</td>
<td>.38 to .38</td>
</tr>
<tr>
<td>Child Health Questionnaire</td>
<td>2</td>
<td>.38*</td>
<td>.01 to .76</td>
</tr>
<tr>
<td>Other measure</td>
<td>6</td>
<td>.28*</td>
<td>.07 to .49</td>
</tr>
</tbody>
</table>

*p < .05.

### Table III. Measures Used in Assessment for Each Health Condition Group

<table>
<thead>
<tr>
<th>Measure by health condition</th>
<th>Studies</th>
<th>$d$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>6</td>
<td>.07</td>
<td>-.14 to .27</td>
</tr>
<tr>
<td>Asthma</td>
<td>5</td>
<td>.21</td>
<td>-.02 to .44</td>
</tr>
<tr>
<td>Cancer</td>
<td>3</td>
<td>.02</td>
<td>-.28 to .33</td>
</tr>
<tr>
<td>Overweight</td>
<td>8</td>
<td>.46*</td>
<td>.29 to .64</td>
</tr>
<tr>
<td>Congenital heart disease</td>
<td>2</td>
<td>.38*</td>
<td>.01 to .76</td>
</tr>
<tr>
<td>Other/Multiple conditions</td>
<td>7</td>
<td>.23*</td>
<td>.04 to .43</td>
</tr>
</tbody>
</table>

*p < .05.
Follow-Up Improvements in Self-Perceptions

Eleven studies conducted a follow-up assessment of changes in self-perceptions. Follow-ups occurred at 1 month (n = 1), 1.5 months (n = 1), 2 months (n = 1), 3 months (n = 3), 4 months (n = 2), 5 months (n = 1), and 6 months (n = 1). Significant heterogeneity was found in the sample (Q (10) = 45.38, p < .001), and therefore, a random-effects model was used. The overall effect size for improvement in self-perceptions at follow-up was found to be small (Cohen, 1988), and the 95% confidence interval for the effect size demonstrated it to be statistically significant from zero, d = .15, 95% CI [.05–.26].

Publication Bias

A modified version of the fail-safe N modeled by Card (2011) was computed to account for publication bias by identifying the number of unpublished non-significant studies that would need to exist to reduce the mean effect size to a non-meaningful effect size of <.1.4 For the post-camp effect size, 46.15 reports of unidentified non-significant studies would be needed to negate these findings. For the follow-up effect size, 5.76 studies would be needed to counter the results. Given the thorough search strategy used (e.g., including dissertations and conference presentations), it is believed to be unlikely that many relevant studies were unidentified. However, the fail-safe N for follow-up effect sizes is quite low, and it may be possible that enough unidentified studies could exist to counter these results. Therefore, the follow-up analyses should be interpreted with caution.

Discussion

Results of this meta-analysis demonstrated a small, yet statistically significant, improvement in self-perceptions following attendance at a camp for children with a chronic health condition. A statistically significant effect was also found for those reports examining extended follow-up, although this effect was smaller than at post-camp. Outcomes following camp were found to differ based on the child’s health condition, with children who were overweight, who had congenital heart disease, or who had another condition (e.g., epilepsy and juvenile rheumatoid arthritis) showing statistically significant differences in self-perceptions at post-camp. Certain measures of self-perceptions were also found to be more likely to improve over the course of camp attendance. Whether or not the camp included an educational component specifically addressing self-views did not impact the relationship between camp attendance and improvements in self-perceptions.

Although it is encouraging that a statistically significant improvement in self-perceptions was found, the effect was small. This is somewhat concerning, given that many camps include improvements in self-perceptions as a central goal to the camp philosophy (Page & Pearson, 1990; Wong et al., 2009). These changes may be less than desired, and with some health condition groups even negligible. Therefore, empirical research to identify camp activities that are effective at improving self-perceptions is needed, rather than developing camp programming solely based on theoretical conceptualizations or camp staff views on which components are important to include. Limited self-perception improvements may have occurred because children did not necessarily have poor self-perceptions at the beginning of camp, and therefore, there may have only been a small room for improvement in self-perceptions for many children. Many of the measures used lacked clinical cutoff scores or age and gender standardized norms, and therefore, it was not possible to identify the potential room for improvement or need for improvement in self-perceptions. Future research should examine whether children with poor clinical-level self-perceptions, specifically, progress to age-appropriate self-perceptions over the course of camp participation. The stable nature of self-perceptions may also have limited change over the short time period of camp attendance. Although research suggests self-perceptions may be more amenable to change in childhood than adulthood (Trzesniewski et al., 2003), self-perceptions may still not be flexible enough to be modified over a short-term camp, which often lasts one week or less. Future research should examine whether greater improvements in self-perceptions across camp attendance are found among younger children whose self-perceptions are more flexible and still developing.

It should also be noted that the mean effect sizes calculated in this meta-analysis are likely conservative estimates, given the estimation technique used for reports presenting non-significant findings without specific statistics (i.e., effect size estimated to be zero). The effect sizes of such studies may have been above 0 and may have only been non-significant owing to the low sample sizes used in much of the camping literature. Therefore, the effects of camps may have been greater than the effect size demonstrated by the current meta-analysis. However, it is also possible that the current study’s use of Cohen’s d for calculating effect sizes for dependent groups may lead to overestimation of effect sizes, given the likely correlation between an individual child’s pre- and post-camp

\[
\text{k}_0 = \text{k} \left( \frac{\text{ES}_k}{\text{ES}_c} - 1 \right)
\]

where ES_k = mean ES from k studies, ES_c = minimum ES that is considered meaningful, and k_0 = # of studies to reduce the mean ES to ES_c.
self-perceptions. Additionally, the small sample sizes of studies included in the meta-analysis also may lead to greater bias and overestimation in using Cohen’s $d$ to calculate effect sizes.

Incorporation of an educational component addressing self-perceptions was not found to be associated with greater improvements in self-views. Perhaps, improvements in self-perceptions during camp occur indirectly through the opportunity to spend time with other children with similar conditions, which may normalize the child’s experience and chronic condition, and to participate in an enjoyable normative childhood experience (i.e., attendance at a summer camp). Therefore, addition of components addressing self-perceptions directly to camp programming may not be necessary.

The greatest improvements in self-perceptions were found for children who were overweight. The camps attended by these children typically included strong physical activity and diet components and included weight loss as the central goal of camp participation. Participation in weight loss camps may lead to greater improvements in self-perceptions by promoting children’s physical health and weight loss. Children attending camps may begin to show improvements in self-perceptions as weight loss occurs because being overweight has been linked to lower self-esteem (Griffiths et al., 2010). Perhaps, camps focused on management of a child’s chronic condition may be more beneficial for children with corollary effects on self-perception. For children with diabetes, cancer, and asthma, the goal of improving self-perceptions during camp attendance has not been met, and modifications to camp programming or whether alternative programs for improving self-perceptions should be examined.

When examining the particular measures that were associated with greatest improvements, no clear picture emerges about which constructs are most sensitive to change over the course of camp attendance. Two types of measures of self-esteem and one type of measure of self-concept detected improvement over the course of camp attendance: other measures of self-perceptions did not detect improvement. Effect sizes also varied across measure claiming to assess the same construct. For example, self-perceptions assessed using the both Rosenberg Self-esteem Scale and the self-esteem subscale of the Child Health Questionnaire improved over camp participation, but significant changes were not seen in self-perceptions assessed using the Culture-free Self-esteem measure. This variance may highlight known difficulties with terminology in this area of study, and measures claiming to assess the same construct may actually examine different constructs or different subtleties of the same construct.

Study findings have several implications for development of camp programming and children’s participation in camps designed specifically for children with chronic conditions. First, camp staff should be aware that children with many chronic conditions (e.g., diabetes) may not display benefits in self-perceptions over the course of camp participation so that the benefits expected from camp attendance can be accurately portrayed to families considering camps. Additionally, health care providers may want to encourage camp participation among children in the health condition groups demonstrated to benefit from camps (i.e., overweight, congenital heart disease). Secondly, when planning camp programming, staff should be aware that having a camp component addressing self-perceptions may not be necessary, because this does not lead to greater self-perception improvements. Instead, camps may want to consider activities that are simply for entertainment or education value or that have been demonstrated empirically to contribute to beneficial outcomes.

There are also several methodological concerns that should be considered when interpreting study results. For example, certain self-perception measures may be more sensitive to change over time, which may have led to differences across measures independent of any true differences in constructs. Use of a certain type of measure was also confounded with the variation in individual camps and illness groups. Table IV presents the measures used in assessment of camps for each illness group. Future research could extend knowledge by having children complete multiple measures of self-perception before and after camp attendance to examine differences across measures within the same group. Another potential confound is that camps were typically exclusively attended by children with only one chronic health condition. Therefore, it may be differences between the camps themselves, rather than the variable of the chronic condition experienced by the children, that may have led to differences between groups. The fact that several of the moderating variables were confounded makes it difficult to determine the impact of each variable while controlling for other potential sources for variation. Future investigation of change in self-perceptions in children with multiple chronic conditions attending the same camps is necessary. Additionally, other meta-analyses should be conducted to examine the potential impact of camps on other outcomes to identify other potential benefits of camp, such as disease knowledge, attitude toward illness, and adherence.

All studies reviewed in this meta-analysis used a pre–post camp methodology; therefore, effect sizes were computed based on improvements seen across time.
within one dependent sample. The passage of time or developmental changes over time may have produced differences in self-perceptions over time, independent of any camp effects. This signifies the need for experimental approaches to assessing camps. For example, future research using wait-list control groups and randomized control trials to assess outcomes following camp attendance would be beneficial. Using a wait-list control condition would allow all children to ultimately attend camp and could limit some of the difficulties with a randomized control trial in this setting. Additionally, sometimes camps cannot accommodate all who wish to attend and these could serve as control comparisons. Another consideration in interpreting findings of the current analysis is that study quality and camp quality were not measured, and subsequently it could not be assessed whether considerations of quality were related to change in self-perceptions. Few studies included in the meta-analysis assessed outcomes at extended follow-up, such that fewer than six studies supporting no association between camp attendance and self-perceptions at follow-up would be needed to nullify the positive findings of the meta-analysis. This is a limitation and should be a factor when considering findings of this meta-analysis. However, although this number of studies seems low, the search strategy used in the current study was comprehensive (i.e., used multiple methods for investigating both published and non-published reports), and therefore, the existence of even this many unidentified reports would be unlikely.

Children display a small, but statistically significant, improvement in self-perceptions over the course of camp attendance, improvements in an area where children with some chronic health conditions have demonstrated deficits. Factors such as the health condition of children attending camp and the particular construct measured were found to be related to level of improvement. This meta-analysis strengthens empirical support for the benefits of camp attendance and the development of camps that are effective for improving outcomes for children with chronic health conditions.

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Conflicts of interest: None declared.

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An asterisk (*) in the list of references denotes studies included in the meta-analysis.


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