A Meta-Analysis of Interventions to Facilitate School Reentry for Children with Chronic Health Conditions

By

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Abstract

The current study used meta-analysis to examine the effects of school reentry interventions in terms of two primary outcomes: increasing illness- or injury- specific knowledge among teachers or healthy peers, and enhancing positive attitudinal change towards an ill or injured child. A secondary analysis examined any change in the ill or injured child's global self-worth following the intervention. A random-effects model was used in all analyses, and effect sizes were analyzed using heterogeneity tests. Larger effect sizes were found for increases in knowledge than for enhancing positive attitudinal changes (i.e., mean ES for knowledge: 0.84 – 0.88); mean ES for positive attitudinal change: 0.68), and larger effect sizes were found for teachers than for healthy peers in both analyses. Significant heterogeneity was found between groups (i.e., teachers vs. healthy peers) and within groups in both analyses. Results of the secondary analysis indicated a medium effect for changes in global self-worth (i.e., mean ES = 0.24). This meta-analysis provides support for the effectiveness of school reentry interventions, and highlights the critical need for more empirical work in this area.

A Meta-analysis of Interventions to Facilitate School Reentry for Children with Chronic Health Conditions

Advances in modern medicine have increased the chances that children who become critically ill or injured will survive. These children are likely to return to school and the community, and are expected to reintegrate into their pre-affliction lives. A need exists for intervention programs to ease the reentry process for these children. Although their immediate illness may be resolved or their injury healed, there are often lasting effects of bouts with chronic illness or injury. Going to school is a primary task of childhood, and reentry into the school system is a major task especially for children with chronic health conditions.

Despite the fact that the Leukemia Society of America identified the development and evaluation of school reentry programs as a health priority in the late 1990s (McCarthy, Williams, & Plumer, 1998), there is still a gap in the professional literature regarding these school reentry programs. Several authors have proposed models for successful reentry programs (e.g., Harris, 2009; Power, DuPaul, Shapiro, & Kazak, 2003) and pediatric nurses have been working on school reentry interventions since the 1980s (McCarthy et al., 1998). However, few programs have been described and analyzed in the literature. The programs that have been examined tend to focus on cancer, which may be a logical emphasis given that the five-year survival rate for children with cancer is 80% (American Cancer Society, 2010), making it very likely that these children will return to school and resume "normal" pre-illness activities in the context of a life-threatening illness. Other types of school reentry interventions are less noticeable in the literature, although there has been some discussion of reentry models for other health conditions such as pediatric organ transplant (e.g., Weil, Rodgers, & Rubovitz, 2006). Often the principles

and format of school reentry programs for a specific illness or injury are generalizable to all chronic health conditions.

Interventions to Facilitate School Reentry

As noted by Prevatt, Heffer, and Lowe (2000), most programs take the form of school personnel workshops, peer education programs, or comprehensive programs. School personnel workshops are typically very brief, and aim to increase disease-specific or injury-specific knowledge and decrease anxiety surrounding the return of an ill child to the classroom. For example, a nurse from the hospital may put together a brief workshop for teachers before the return to school by a child who has recently completed a round of chemotherapy. Peer education programs similarly disseminate age-appropriate knowledge about a specific health condition and discuss needs and fears of the ill child and of the class. For example, a hospital social worker may come to a second-grade classroom and read a story about a child with cancer, focusing on facts about the disease relevant to successful reentry (e.g., cancer is not contagious, your friend may be more tired than she used to be). Peer and school personnel workshops typically occur in the ill child's school.

More comprehensive programs tend to focus on increasing collaboration between school personnel, hospital personnel, and the family, and may also include components of school personnel workshops and peer education programs. For example, a consultant-liaison may be appointed to facilitate communication between all relevant parties of the child's healthcare team (Prevatt et al., 2000). Power et al. (2003) have also proposed a multisystemic model for school reentry whereby the family, school, and health care system work together to facilitate a smooth reentry process. This model broadly consists of four steps: strengthening the family, preparing the family for a school partnership, preparing the school or a partnership with the family and

health care system, and engaging all three systems (i.e., family, school, health care system) in efforts to plan and implement a successful entry. DuPaul, Power, and Shapiro (2009) emphasized that preparing the aforementioned systems for a collaborative intervention is as essential to its success as the actual facilitation and monitoring of the intervention.

Subsequent work by Harris (2009) has also highlighted the importance of a more comprehensive approach to school reintegration, calling particular attention to the need for effective consultation-liaison. In addition to being informed about all of the child's needs, the consultant takes responsibility for communicating relevant information to the three environments in which the child exists: the home, the hospital, and the school (Harris, 2009). Other researchers have identified a similar need for collaboration and communication among parents, hospital personnel, and school personnel as perhaps the most important element of a school reentry program (e.g., Kliebenstein & Broome, 2000; McCarthy et al., 1998; Peckham, 1993). Much of the existing school reentry literature, both theoretical and descriptive, features an educative component and an integrated team-based approach to manage the child's needs and facilitate communication between all necessary parties (e.g., Henning & Fritz, 1983).

Rationale for Current Study

Approximately 10-30% of children will be affected by some type of chronic illness or physical health problem at some point in their lives. Despite a myriad of positive coping strategies and support, these children are still at risk for a wide range of psychosocial difficulties compared to healthy children. It is estimated that 10%-37% of children afflicted by chronic illness will face some type of psychological difficulty (Pediatric Psychology Network United Kingdom, 2010). Although the cognitive, academic, and social difficulties faced by children living with illness and injury are well documented, research aiming to ease the re-integration

process for children returning to school after a prolonged illness or injury experience is more nascent (Alderfer, Navsaria, & Kazak, 2009; Brown & Madan-Swain, 1993).

In general, research findings suggest that school reintegration programs may have some benefits for survivors, their healthy peers, and school personnel (Prevatt et al., 2000). However, the literature has not been well integrated and there is no clear indication that school reentry programs are effective or that a specific type of intervention is more effective than others. In order to design more effective interventions, a comprehensive analysis of the existing literature is needed to improve understanding of school reintegration programs and determine areas where research is lacking. Although a meta-analysis would be the most appropriate technique for conducting this comprehensive analysis, currently none exists to address these issues.

In 1983, Riley-Lawless called for a need to "evaluate the effectiveness of specific programs and to compare different types of programs" in order to make the school reentry process as easy as possible for children diagnosed with cancer (p. 93). In 2002, Brown reiterated this necessity in his Presidential Address to the Society of Pediatric Psychology, arguing that empirical data are needed to further the knowledge base and improve school reentry programs. Well-designed theoretical models (e.g., Harris, 2009; Power et al., 2003), often based on an ecological systems model involving collaboration and education between and among individuals involved in the reentry program, have laid the groundwork for strong reentry programs, and previous researchers have described what currently exists. However, no literature apparently exists that empirically synthesizes and analyzes previous school reentry programs. The current meta-analysis will include reports obtained from a broad search strategy to examine the current knowledge base related to school reentry, and determine whether school reintegration programs are effective in terms of increasing illness-specific knowledge and decreasing anxiety, worry,

and other negative emotions surrounding the return of an ill or injured child to school. These outcomes are reflective of what has been measured by previous research in this area (e.g., Benner & Marlow, 1991). It is expected that school reentry interventions will be associated with an increase in illness or injury-specific knowledge and a decrease in negative emotions and attitudes surrounding the return of the child to school.

Methods

Search Strategy

Several search strategies were employed to conduct a thorough and comprehensive search of the literature. First, a search comprised of a combination of two keywords joined by the word "*AND"* was conducted in several academic databases. The databases searched were: PsycINFO, PubMed, ERIC, and ProQuest Dissertation and Theses. Google Scholar was initially included in the list of databases, but was dropped after preliminary searches yielded almost 1,000 articles per search term combination, the majority of which were irrelevant and none of which met inclusion criteria. The first term was *childhood illness, chronic illness, childhood chronic illness, injury,* or *burn*. The second term was *school reentry*, *school reintegration*, or *school intervention*. A wildcard (*) was used to ensure that variations of the terms were also identified in the literature search. Upon completion of this search, a secondary search was conducted using the terms *cancer, sickle cell anemia,* and *HIV/AIDS* as the first term. This decision was made because the initial round of searches yielded a significant amount of returns for these illnesses. In total, these search terms produced 24 search combinations. Each combination was searched in each of the aforementioned databases.

As modeled by previous meta-analyses in the field of pediatric psychology (e.g., Wu & Roberts, 2008), additional search strategies were employed. Reference sections of each study

identified by the literature search were scanned for other potentially eligible studies. The reference sections of previously identified relevant articles and chapters (e.g., DuPaul et al., 2009; Madan-Swain, Katz, & LaGory, 2004; Prevatt et al., 2000) were also searched in this manner. Second, all articles identified electronically were "followed forward," meaning that all articles citing the initial study were examined for potential inclusion. Third, an electronic message was sent to the listservs of Division 16 (School Psychology), Division 37 (Society of Child and Family Policy and Practice), Division 53 (Society of Clinical Child and Adolescent Psychology) and Division 54 (Society of Pediatric Psychology), all units of the American Psychological Association with relevance to this issue, requesting relevant published or to-be-published studies. Fourth, conference proceedings of previous pediatric psychology conferences (i.e., 1987 - 2011) were searched to identify any unpublished works. Finally, experts were identified through previous publications and were sent inquiries about missing studies that might be relevant.

Inclusion Criteria

In order to be included in the meta-analysis, an identified study met the following provisions: (a) it is in English, (b) it is an intervention study, as opposed to a theoretical model or descriptive study, (c) the intervention is specific to an ill/ injured child's return to school, (d) the intervention targets school personnel, healthy classmates, or the ill/injured child, (e) there is a measurable outcome (e.g., increase in illness-specific knowledge, lessened anxiety surrounding the child's return), and (f) effect size (ES) statistics could be calculated from results presented in the study. Studies were primarily excluded for being theoretical or descriptive, or for failing to provide enough statistics to compute an ES.

Coding of Studies

A comprehensive coding protocol was designed in order to identify important information about each study. The principal investigator and a research assistant independently coded all articles, and a 91% reliability rating was obtained for descriptive and effect size variables. Any discrepancies were discussed until consensus was reached.

Coding first identified the type of intervention conducted in the study (e.g., peer-focused, teacher-focused, integrated approach). Interventions were classified based upon intended audience (e.g., peers, school personnel, or parents) and intervention setting (e.g., in the child's school, at the hospital, at a conference). Intended audience was identified as an a priori moderator, with the assumption being that effect sizes may vary between teacher-focused and peer-focused interventions because of differences between these groups (e.g., age, level of education). Outcome measures were coded into the following categories: (a) increase in illness-specific knowledge, (b) decrease in illness-specific worries (e.g., fear, anxiety), (c) increased desire/ willingness to interact with ill child, (d) indirect measures (e.g., ill child has increased attendance, ill child has less depressive symptoms) or (e) other. At the data analysis stage, (b) and (c) were used to represent attitudinal change. All of the following study characteristics were recorded, if available: (a) publication type, (b) year of publication, (c) sample size, (d) participant demographics (e.g., age, gender, socioeconomic status, ethnicity), (e) illness targeted by intervention, and (f) intervention specific information (e.g., length of intervention).

Statistical Approach

Given the limited sample size of the current study, two primary meta-analyses were conducted in order to maximize the impact of the study results. Included studies typically used

two measureable outcomes as indicators of effectiveness: increases in illness-specific knowledge and attitudinal changes. Thus, individual analyses were conducted for each outcome.

A limited number of studies (N = 4) also compared an experimental treatment group (e.g., social skills training + standard reentry procedure) with a control group (e.g., standard reentry procedure). Perhaps coincidentally, these studies tended to focus on outcomes specific to the ill or injured child (e.g., overall global self-worth). These studies were analyzed descriptively – a mean ES was calculated, but the results of this analysis are presented separately from the primary analyses (i.e., increase in knowledge, attitudinal changes). Additionally, several of these studies provided enough information to compute effect sizes for a pretest-posttest comparison for the experimental group. In these cases, studies were included in multiple analyses (e.g., the analysis using knowledge as an outcome variable and the analysis comparing a control and experimental group).

All effect sizes were computed using Cohen's *d.* More specifically, a formula accounting for dependent samples (i.e., pre-test and post-test designs with the same sample) was used in order to eliminate any bias that may emerge as a result of repeated measures designs.[1] For studies that utilized a different study format (e.g., control vs. experimental), a standard calculation of Cohen's *d* was utilized.[2] For studies that allowed for the computation of multiple effect sizes for a particular outcome (e.g., teacher and peer reports for knowledge gains), effect sizes were averaged in order to control for dependency and eliminate any bias (Card, 2011; Lipsey & Wilson, 2001). Because computational formulas are rarely reported in empirical articles, means and standard deviations reported by the original study authors were used to calculate effect sizes whenever possible, even when effect sizes were reported in the original

[1] $d = t_{dependent} / \sqrt{N}$
[2] $d = t\sqrt{(n_1+n_2)} / \sqrt{(n_1 n_2)}$

study. Additionally, a stem-and-leaf plot was created to identify outliers, and any studies identified as extreme outliers (i.e., greater than three standard deviations from the mean) were excluded at this point (Lipsey & Wilson, 2001). Refer to Table 1 for specific descriptions of the studies included in each analysis.

After computing an initial ES, effect sizes were weighted in order to account for sample size. In order to compute the weighted ES, a standard error must be computed for each relevant, unweighted ES. In the case of a repeated measures sample (i.e., pretest-posttest), a correlation coefficient is needed in this calculation as a measure of interindividual stability over time (Card, 2011; e.g., test-retest reliability for a particular measure used to capture an outcome variable). Such a statistic is rarely reported in published works. In the case that a study did not include a correlation coefficient and a usable correlation coefficient could not be found elsewhere (e.g., in a manual for a particular measure), a range of standard errors were computed (i.e., using three different values for "r" – assuming a small, medium, and large correlation). Therefore, both primary analyses (i.e., increase in knowledge, attitudinal change) were computed three different times, and the mean ES results are presented as a range of possible values assuming different standard errors based upon correlation coefficient. A heterogeneity analysis using the Q-statistic was computed for each ES in order to determine whether the variation in results was above and beyond what could be expected based upon standard error (Card, 2011). If the Q-statistic was significant, the sample was considered to be heterogeneous and a moderator analysis by target audience was performed. The moderator analysis essentially partitions Q into $Q_{between}$ (i.e., heterogeneity between audience type) and Q_{within} (i.e., heterogeneity within audience type). If $Q_{between}$ was significant and Q_{within} was not, the difference could be attributed to audience type (Card, 2011; Wu & Roberts, 2008).

A random-effects model has been identified by previous literature as the best way to control for bias resultant from undue weight based on sample size (Card, 2011; Schmidt, 2010). Although some have argued that a fixed-effect mean can be utilized in the absence of any heterogeneity, a random-effects model is the most responsible choice and also allows for inferences to be made that extend beyond the present sample (i.e., articles included in this particular analysis). Given this fact, a random-effects model was used to compute mean effect sizes in all cases, regardless of the heterogeneity indicated by the Q-statistic.

Cohen (1988) provides the following loose guidelines for the interpretation of effect sizes, which will be used to draw inferences about the results of the meta-analyses: small < 0.20, medium = 0.21 - 0.50, or large= 0.51 -0.80. As modeled by Graves, Roberts, Rapoff, and Boyer (2009), 95% confidence intervals will also be computed for each group of effect sizes. If zero is included in the confidence interval, the effect size will not be considered statistically significant.

Results

Study characteristics

Upon completion of the previously described exhaustive search process, twelve of the 1,146 identified studies were eligible for inclusion in this meta-analysis. Eight studies examined knowledge and attitudinal change in teachers or healthy peers as outcome variables, and four studies used a measure of the ill or injured child's self-worth/ self-esteem as an outcome variable. Ten studies were published reports, and two were unpublished dissertations. The journal articles were published between 1983-2007, and the dissertations were released to ProQuest Dissertations and Theses between 2004-2006. The majority of included studies (N = 9) featured cancer as the target illness. One study featured Tourette Syndrome, one study featured Sickle Cell Anemia, and one study featured burn injuries. In total, 494 healthy

classmates, 176 ill children, and 443 school personnel were included in this analysis. Sample size varied greatly between studies, ranging from 25 teachers to 192 healthy classmates. The majority of studies did not consistently report participant demographics. Of the eight studies that included participant age, the mean age for teachers was 35.4 (age range: 22 - 61), the mean age for healthy peers was 9.62 (age range: 7-15), and the mean age for ill children was 9.85 (age range: 5 - 17). For the six studies that reported ethnicity, the majority of participants were Caucasian (N = 373). Other represented ethnicities were African American (N = 16), Asian (N = 8), American Indian (N = 4), Hispanic (N = 35), and other (N = 13). Of the nine studies that reported gender demographics, 330 were males (i.e., 32 teachers; 208 healthy peers; 90 ill children), and 385 were female (i.e., 60 teachers; 253 healthy peers; 72 ill children). Refer to Tables 1 and 2 for study demographics and effect size statistics. Refer to Figures 1 – 3 for forest plots of effect sizes for each study.

Knowledge as an outcome variable

Recall that hypothesis one stated that participation in a school reentry program would be correlated with an increase in illness-specific knowledge. A heterogeneity analysis using the Q-statistic was conducted and significant heterogeneity was found for all three iterations of the analysis utilizing knowledge as an outcome variable (i.e., large standard error, moderate standard error, small standard error). Q-statistics ranged from 61.61 – 117.42, and all values were significant at $p < .005$. Therefore, the random-effects model was used to compute mean effect sizes for knowledge as an outcome variable. Mean effect size values ranged from 0.84-0.88, indicating a large effect size for all three iterations of the analysis. Furthermore, 95% confidence intervals were computed for the overall mean effect size and ranged from [0.77, 0.91] to [0.82, 0.94], indicating the significance of this effect size. See Table 3 for results.

Target audience was identified a priori as a potential moderator, or reason for significant variation above and beyond what is expected due to standard error. This decision was made because different audiences (e.g., teachers, healthy peers) may differ in several critical ways (e.g., age, experience with illness) that could impact one's response to a reentry program. Additionally, the significant Q-statistic indicates the presence of heterogeneity, further supporting this moderator analysis. When Q was partitioned into $Q_{between}$ (heterogeneity between target audiences) and Q_{within} (heterogeneity within target audiences, Q_{within} ranged from 48.68 – 85.51 ($p < .005$) and $Q_{between}$ ranged from 12.93 ($p < .01$) to 21.96 ($p < .005$). This indicates significant heterogeneity within and between target audience, meaning that heterogeneity existed within groups (within teachers and within peers) and between groups. When mean effect sizes were computed for the intended audience of the intervention, effect sizes ranged from 1.13-1.15 for teachers (CI from [1.12, 1.14] to [1.14, 1.16]) and from 0.65-0.67 for healthy peers (CI from [0.64, 0.65] to [0.665, 0.669]). This indicates a large effect for teachers and a medium effect for peers.

Attitudinal Change as an outcome variable

A second primary hypothesis was that school reentry programs would lead to positive attitudinal change among participants. A heterogeneity analysis using the Q-statistic was conducted and significant heterogeneity was found for all three iterations the analysis utilizing attitudinal change as an outcome variable (i.e., large standard error, moderate standard error, small standard error). Q-statistics ranges from 181.90 – 276.34, and all values were significant at $p < .005$. Therefore, the random-effects model was again used to compute mean effect sizes for attitudinal change as an outcome variable. Values for mean effect size ranged from 0.678 - 0.679, indicating a medium effect size for all three iterations of the analysis. Ninety five percent

confidence intervals ranged from [0.61, 0.75] to [0.63, 0.72] and did not include 0, further supporting the significance of these findings. See Table 3 for results.

Once again, target audience was identified a priori as a potential moderator, or reason for significant variation above and beyond what is expected due to standard error. When Q was partitioned into $Q_{between}$ (heterogeneity between target audience) and Q_{within}, values for Q_{within} ranged from 25.60- 77.89 and $Q_{between}$ ranged from 156.30 – 198.44. All values of Q were significant at $p < .005$, indicating that there is significant variability within and between target intervention audience. When mean effect sizes were computed, effects ranging from 1.053 – 1.089 were found for teachers (CI from [0.90, 1.20] to [0.99, 1.19]), and effects ranging from 0.325 - 0.326 were found for healthy peers (CI from [0.24, 0.41] to [0.28. 0.37]). This indicates a large effect size for attitudinal change among teachers, and a medium effect size for attitudinal change among healthy peers.

Secondary descriptive analysis

A small number of studies (N = 4) utilized an experimental design (control vs. treatment condition) to examine effects of reentry programs on the ill child. Although not included in either primary analysis, a smaller analysis was conducted on these reports, using increases in self-esteem/ global self-worth as an outcome measure. Significant heterogeneity was not found in this sample ($Q = 5.498$, $p < 0.1$). Despite this homogeneity, a random-effects model was used to compute a mean effect size in order to account for any undetected heterogeneity masked by the small sample size (Card, 2011). The mean effect size for this analysis was relatively small ($d = 0.24$, 95% CI = [0.03, 0.45]). See Table 3 for results.

Publication Bias

In order to account for any publication bias, a modification of Rosenthal's fail-safe *N*, modeled by Card (2011) was computed.[3] This identified the number of unpublished non-significant studies that would need to exist in order to reduce the mean effect size of the outcome measures to 0.1, or the minimum effect size that would still be considered meaningful. For knowledge as an outcome variable, 59 – 62 undiscovered studies would be needed to trivialize the overall effect size for all three iterations of the analysis. For attitudinal change as an outcome variable, 46 undiscovered studies would be needed to trivialize the overall effect size for all three iterations of the analysis. To reduce the effect size to a moderate 0.4, about ten undiscovered studies would have to exist for knowledge as an outcome, and six undiscovered studies would be needed for attitudinal change as an outcome variable. Given the exhaustive search strategies employed, it is highly unlikely that this number of studies remains unearthed.

The same modification of Rosenthal's fail-safe *N* was used for the secondary, descriptive analysis. Six undiscovered studies would be needed to decrease the overall effect size for global self-esteem/ self-worth to 0.1. Again, in light of the search strategy, six studies are unlikely to remain undetected.

Discussion

As predicted, results of this meta-analysis provide support for the efficacy of school reentry programs in terms of increasing specific knowledge and enhancing positive attitudinal change. Overall, larger effects were found when knowledge was examined as an outcome variable than when positive attitudinal change was examined. Additionally, larger effects were

[3] $K_0 = k[(ES_k - Es_c)-1]$ 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

found for interventions targeting teachers than for interventions targeting healthy peers for both increases in knowledge and positive attitudinal change.

Previous literature has suggested that children as young as five can be taught specific factual information about certain health conditions (Binnie & Williams, 2002; Myant & Williams, 2005). Given these findings, it seems logical that participation in a school reentry intervention would be expected to correlate with large increases in knowledge, particularly when the intervention program contains specific information about unfamiliar illnesses (e.g., cancer, sickle cell anemia). Additionally, information acquisition is easier to measure than other outcomes (e.g., positive attitudinal change), which may be partially responsible for the large effect size for increase in knowledge.

Previous research on disability and illness suggests that older children are significantly more accepting of peers with chronic health conditions than younger children (e.g., Kister & Patterson, 1980; Royal & Roberts, 2007). Unfortunately, small sample size and inconsistent reporting across studies disallowed for a moderator analysis using child age as a predictor. Although the moderator analysis performed (i.e., teachers vs. healthy peers) could be assumed to partially account for age, numerous other confounding factors (e.g., level of education) disallow any inferences based solely on age. Despite the finding of heterogeneity between and within groups, the difference in the magnitude of effect sizes between teachers and healthy peers does provide some guidance as to which group of individuals learns the most as a result of a school reentry intervention. This difference in effect sizes (i.e., d = 1.13-1.15 for teachers; d = 0.65 - 0.67 for healthy peers) may suggest that future interventions targeting children and future interventions targeting school personnel should differ in certain ways in order to maximize intended impact, such as length of a workshop or breadth of information covered.

There were very large differences between attitudinal change for teachers and attitudinal change for healthy peers, which is a particularly interesting finding. This finding may suggest that, although children are capable of learning novel information about unfamiliar illness, this new knowledge is not necessarily correlated with decreased fear, worry, or desirability to interact with the healthy peer. Previous research has demonstrated that, even as children acquire specific factual information about certain diseases, they continue to hold some misconceptions (Gelman & Raman, 2007; Myant & Williams, 2005). For example, evidence suggests that young children overextend their notions of contagion, often assuming that noninfectious diseases can be spread in the same fashion as infectious diseases (Kister & Patterson, 1980). Although factual information may cause teachers to feel more confident and better able to handle the return of an ill child, peers may not be able to make these same connections between knowledge, attitudes, and behavioral intentions. This consideration may be reason to consider an additional component of school reentry programs for healthy peers, designed specifically to address personal or social interactions with and concerns about the ill or injured peer. While increased knowledge may lead to a heightened understanding of the ill or injured child's experiences, peer relationships are also an essential component of any child's school experience. In order for a peer-focused school reentry program to be most effective, it is plausible that attitudes should be addressed separately from specific facts. For example, children may still worry about playing with or talking to the ill or injured child, despite possessing factual information about contagion. To alleviate these fears, a component of the intervention could focus on brainstorming activities to engage in with the ill or injured child, or appropriate conversation starters. Additionally, future research could explore concerns typically held by healthy peers, and these concerns could

be incorporated into future interventions. Relatedly, interventions could explicitly attend to specific concerns expressed by participating children.

The results of this study should be interpreted with some caution, given the small sample size and the fact that the majority of studies meeting inclusion criteria were at least 15 years old. The age of the included studies is not of concern in and of itself, but it is of note that the lack of recently published empirical work is not commensurate with the amount of scholarly writing that has occurred on the topic in recent years. Although school reintegration is written about extensively, published empirical work in the area is not keeping up. As the percentage of children who will reenter school following an illness and injury continues to rise, empirically based evidence must be generated in order to increase understanding and best serve these populations.

Perhaps related to the publication date of the majority of included studies, only one study utilized the Internet to implement a reentry intervention for teachers (Dubowy et al., 2006). The Internet is currently used to implement a wide range of health interventions, from treatment for childhood anxiety disorders (March, Spence, & Donovan, 2009) to the delivery of cognitive-behavioral therapy for children with chronic pain (Palermo, Wilson, Peters, Lewandowski, & Somhegyi, 2009). Additionally, research has demonstrated that computer-based programs are effective in terms of decreasing loneliness and hospital fears among ill children, as well as improving accessibility to and understanding of illness-specific knowledge (Battles & Weiner, 2002; Brokstein, Cohen, & Walco, 2002). Subsequently, there is reason to consider a web-based approach in terms of school reentry interventions. For example, illness-specific knowledge could easily be integrated into an animated game or story for young peers, or a brief tutorial could be created for teachers to access at their own convenience. In addition to increasing ease

of access, an Internet-based intervention could easily allow for more "hands-on" exercises (e.g., problem-solving activities; short vignettes and questions) and complexity of presentation (e.g., individualized modules). The Internet has proven to be an exciting development for many facets of health service delivery and education, and there is reason to believe that school reentry models would benefit from inclusion of web-based components.

It is important to note that, although inclusion criteria allowed for interventions that targeted any type of childhood illness or injury, almost all of the studies focused on cancer. Although survivors of childhood cancer are a large group deserving of attention, theoretical and descriptive articles do suggest that school interventions exist for a range of illness and injury (e.g., Weil et al., 2006). Despite this, only one identified study targeted childhood injury (burns; Girolami, 2004), and two studies targeted illnesses other than cancer (Tourette Syndrome; Holtz & Tessman, 2007; Sickle Cell Anemia; Koontz et al., 2004). There is reason to think that effective interventions for one type of illness might be equally effective for other illness types; however, this cannot be assumed without empirical support. This assertion is not to suggest that empirical research related to school reentry and cancer should halt, but rather that research should expand to include other types of illness and injury.

Additionally, a smaller descriptive analysis using self-esteem among ill children as an outcome variable was performed. Results of this analysis yielded a much smaller effect size than the effect sizes for increased knowledge and positive attitudinal change. Although this finding may initially be surprising, a school reentry intervention does draw attention to a particular illness or injury. This heightened attention could lead to self-consciousness or worry on behalf of the ill or injured child. Future research should continue to examine long-term outcomes for the affected child; for example, more positive changes might occur after the classroom

environment resumes its normal rhythm, and the focus shifts away from the ill child. Conversely, it is conceivable that an intervention drawing attention to a specific illness or injury could have unintended negative consequences for the ill or injured child (e.g., increased likelihood to be bullied). Future research must also examine the possibility of negative effects, especially before a school reentry intervention is implemented for a specific child.

This meta-analysis contributes to the school reentry literature in several valuable ways. First, empirical support has been gathered for the efficacy of school reentry programs. Although extensive writing has and continues to occur related to school reentry, this meta-analysis appears to be the first report to provide strong empirical support for the overall efficacy of such programs. However, the impact of this meta-analysis was restricted by a relatively small number of available empirical studies. This study provides the basis to believe that empirically supported school reentry programs will ensure a smoother reentry for ill children, their teachers, and their healthy peers. Nonetheless, research needs to provide support for this educated "hunch," making sure to demonstrate that school reentry programs have the intended positive effects. Future research must also adopt better reporting practices, in order to increase the accuracy of effect size computations and subsequent conclusions (i.e., eliminate the need to compute a range of possible values by reporting all necessary information). Additionally, future research should focus attention on as broad a spectrum of illness and injury as is possible, in order serve as many children as possible. This meta-analysis serves as an important first step in the process of strengthening the empirical body of literature surrounding school reentry programs.

References

References marked with an asterisk indicate studies included in the meta-analysis.

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Table 1

Demographic Information for All Included Studies

Study	Disease	Audience	Age range	Overall N	% male	% Caucasian
Pallmeyer, Saylor, Treiber, Eason, Finch, & Carek (1986)	Cancer	Teachers	23-58	25	8	-
Baskin, Saylor, Furey, Finch, & Carek (1983)	Cancer	Teachers	24-60	26	8	-
Delong (1999)	Cancer	Peers	-	172	40	-
Treiber, Schramm, & Mabe (1986)	Cancer	Peers	-	192	49	93%
Benner & Marlow (1991)	Cancer	Peers	-	39	-	-
Ross, Diserens, & Turney (1989)	Cancer	Teachers	-	351	-	-
Dubowy, Rieger, Songer, Kleinmann, Lewandowski, Rogers, & Silber (2006)	Cancer	Teachers	22-61	41	15	100
Holtz & Tessman (2007)	Tourettes	Peers	7-15	91	51	70
Koontz, Short, Kalinyk & Noll (2004)	Sickle cell	Child	8-12	24	-	-
Varni, Katz, Colegrove, & Dolgin (1993)	Cancer	Child	5-13	64	60	48
Girolami (2004)	Burn	Child	8-16	39	85	82
Katz, Rubinstein, Hubert, & Blew (1989)	cancer	Child	5-17	49	39	53

Note. - = not reported in study.

Table 2

Effect Size Statistics for All Analyses

Study	Weighted mean ES for Knowledge			Weighted mean ES for Attitudes			Weighted mean ES for global self-worth
	r = .1	r = .4	r = .9	r = .1	r = .4	r = .9	-
Pallmeyer, Saylor, Treiber, Eason, Finch, & Carek (1986)	1.96	3.75	5.21	1.15	1.32	2.23	-
Baskin, Saylor, Furey, Finch, & Carek (1983)	7.72	8.19	9.59	1.83	2.04	3.44	-
Delong (1999)$^{+}$	4.30	4.1	3.87	0.57	0.62	0.96	-
Treiber, Schramm, & Mabe (1986)	4.70	4.51	4.56	0.85	0.92	1.44	-
Benner & Marlow (1991)*$^{+}$**	2.91	2.72	2.63	0.98	1.04	1.55	-
Ross, Diserens, & Turney (1989)$^{+}$**	6.37	5.95	5.75	4.84	5.16	7.84	-
Dubowy, Rieger, Songer, Kleinmann, Lewandowski, Rogers, & Silber (2006)	8.88	9.29	10.62	3.49	3.84	6.12	-
Holtz & Tessman (2007)**	10.56	10.42	10.98	1.55	1.54	2.52	-
Koontz, Short, Kalinyk and Noll (2004)	-	-	-	-	-	-	1.16
Varni, Katz, Colegrove, and Dolgin (1993)	-	-	-	-	-	-	7.42
		-	-	-	-	-	-1.98
		-	-	-	-	-	16.34
Girolami (2004)	-						
Katz, Rubinstein, Hubert, and Blew (1989)	-						

Note. - = not reported in study. * = in order to compute an ES for this study, a critical t-value was used based upon degrees of freedom and significance level. Therefore, the computed effect sizes are likely conservative. $^{+}$ = it was possible to find a correlation coefficient for knowledge for this study, so "r" was constant in all three iterations of the analysis. ** = it was possible to find a correlation coefficient for attitudes for this study, so "r" was constant in all three iterations of the analysis.

Table 3

Mean Weighted Effect Size (wES) Statistics for all Analyses

	Knowledge										Attitudes								Global self-worth		
Sample	N	Mean wES			95% CI			Q			Mean wES			95% CI			Q		Mean wES	95% CI	Q
		r = .1	r = .4	r = .9	r = .1	r = .4	r = .9	r = .1	r = .4	r = .9	r = .1	r = .4	r = .9	r = .1	r = .4	r = .9	r = .1	r = .4	r = .9		
Total sample	8	.88	.86	.84	[0.83, 0.94]	[0.79, 0.91]	[0.83, 0.94]	117.4	73.20	61.60	0.68	0.68	0.68	[0.63, 0.72]	[0.61, 0.75]	[0.61, 0.75]	276.3	191.7	181.9	0.24	[0.03, 0.45]	5.50
Teachers	4	1.14	1.13	1.15	[1.13, 1.15]	[1.12, 1.14]	[1.13, 1.15]	-	-	-	1.05	1.07	1.09	[0.91, 1.20]	[0.96, 1.20]	[0.91, 1.20]	-	-	-			
Healthy Peers	4	0.67	0.66	0.65	[0.67, 0.67]	[0.65, 0.66]	[0.67, 0.67]	-	-	-	0.33	0.33	0.33	[0.24, 0.41],	[0.24, 0.41],	[0.24, 0.41],	-	-	-			
Ill or Injured Child	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Figure 1: Increased Knowledge as an Outcome Variable

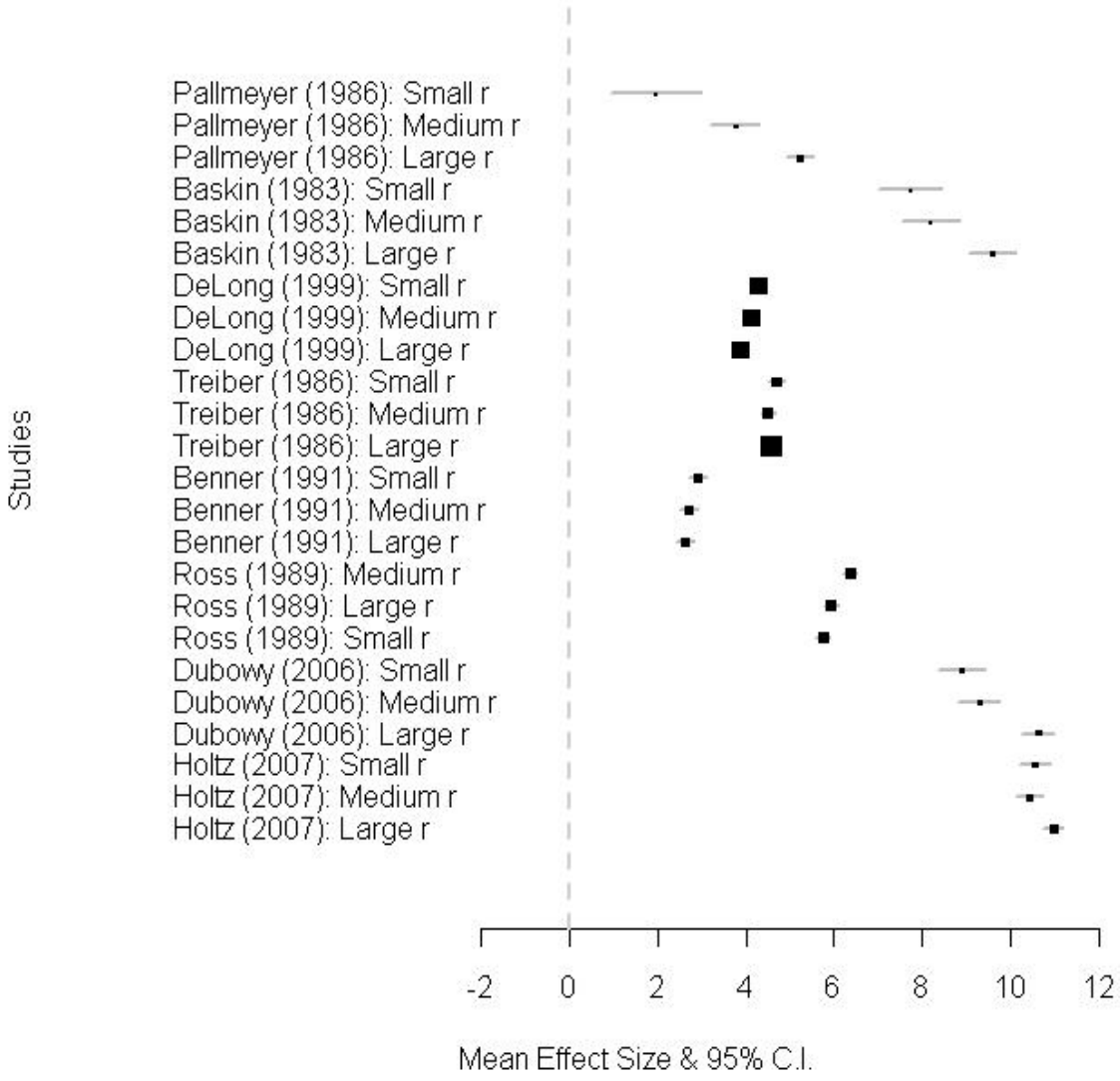

Figure 2: Positive Attitudinal Change as an Outcome Variable

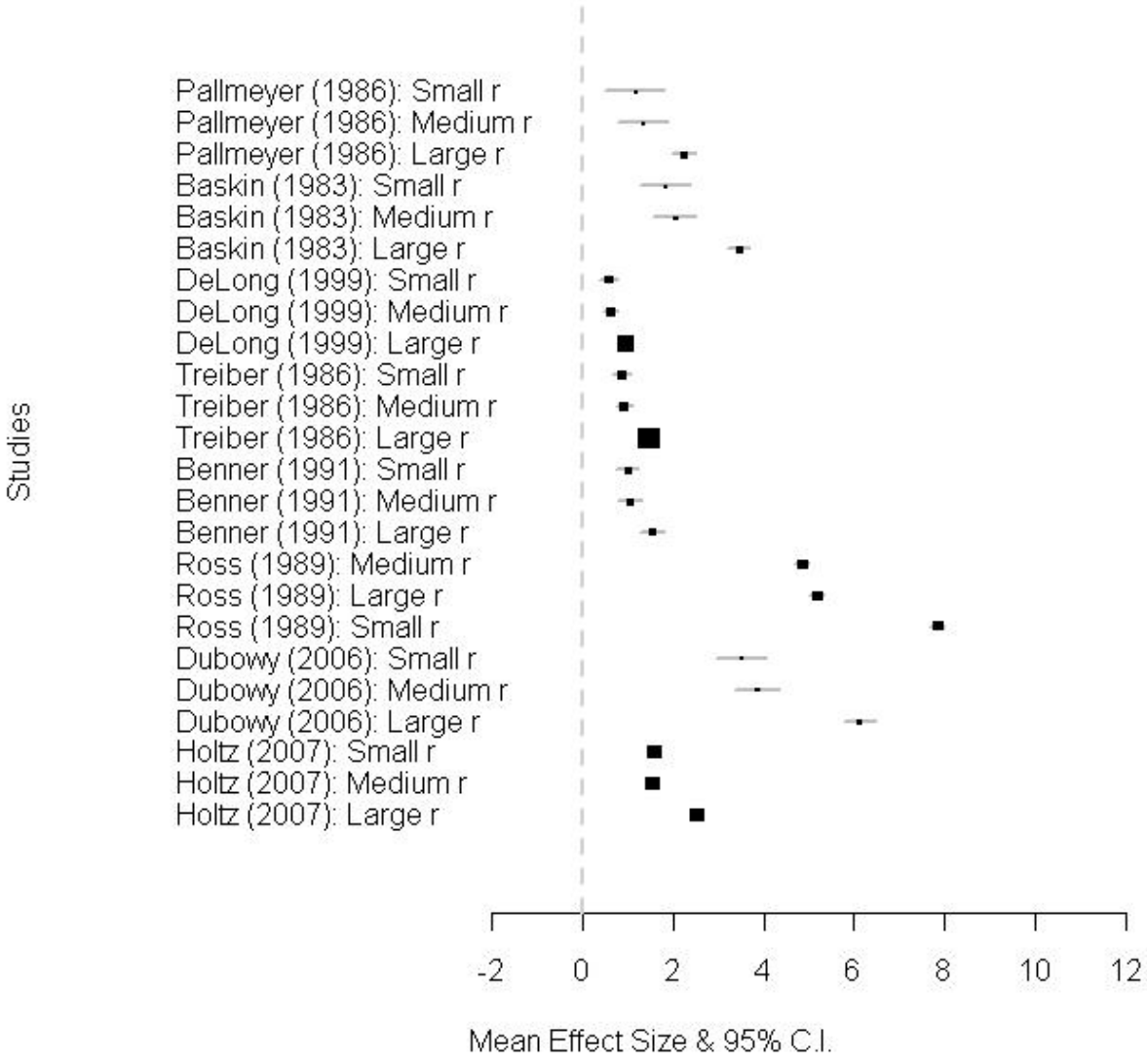
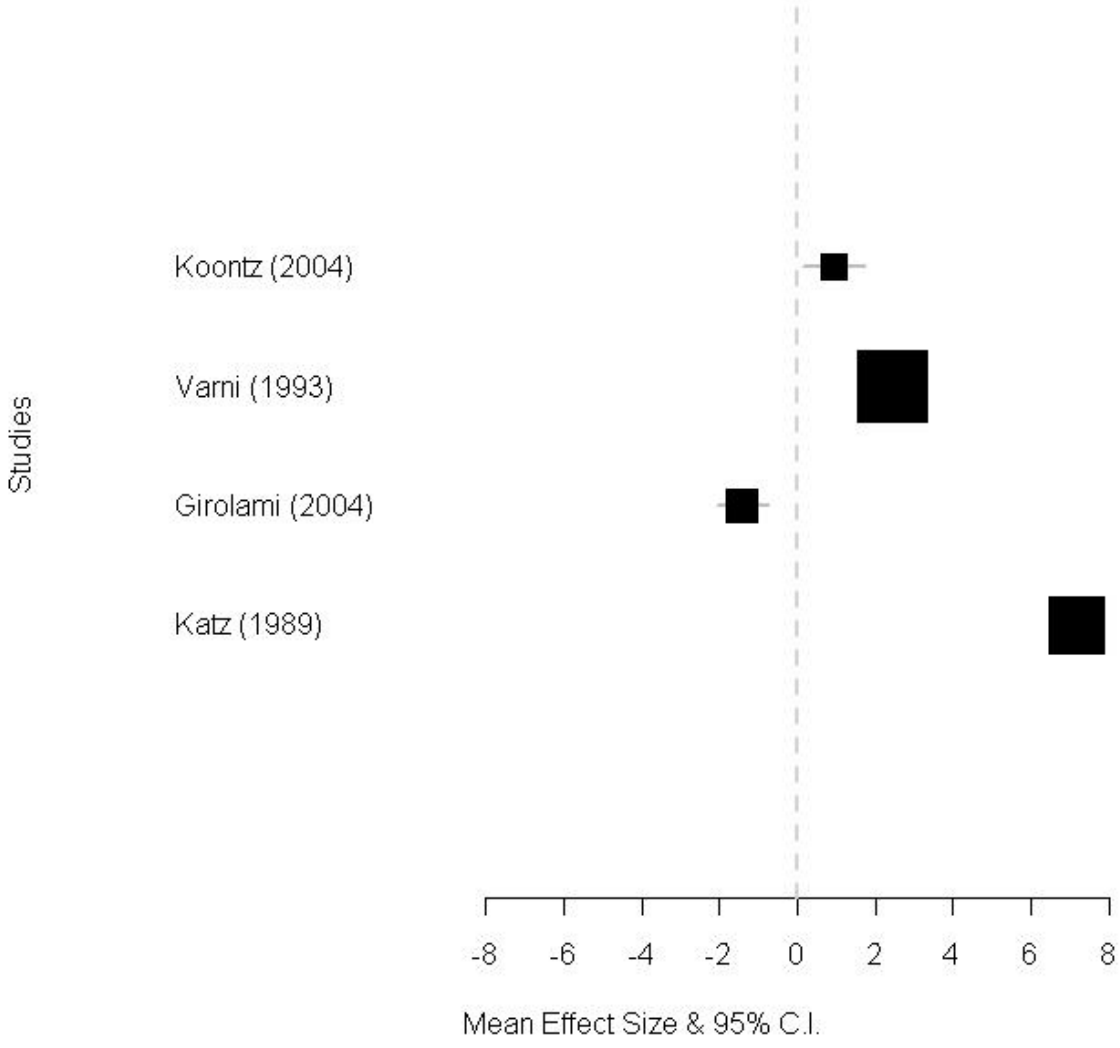
Figure 3: Global Self Worth as an Outcome Variable