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The effects of anger management on children’s social and emotional outcomes: A meta-analysis

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Abstract
The occurrence of violent behaviors and bullying in schools continues to be a recognized problem among students and school personnel. The concern caused by these behaviors have led many schools to implement anger management and other impulse control based programs for at-risk students in an effort to prevent many of these incidences. This study was a comprehensive, meta-analytic synthesis of the literature to assess the effectiveness of these interventions, using a total of 60 studies from 1979–2010 for analysis. Results indicated an overall effect size (ES) of $-0.27$, showing a small to moderate intervention effect in reducing children’s negative emotional and behavioral outcomes including anger, aggression, and loss of self control. Many different types of anger management components were found to be effective in promoting positive outcomes. Implications for school psychologists are discussed.

Keywords
anger-management programs, bullying, school psychologists, social-emotional/behavioral outcomes

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Most adults are equipped with the emotional understanding and the coping skills necessary to work through anger. However, coping with anger in childhood can be particularly challenging, as children and adolescents may not possess the skills to adequately understand and manage feelings of anger and other emotions. The confusion and inability to express feelings of anger appropriately may often lead to behavioral outbursts, bullying, and other externalizing or disruptive behaviors (Garner & Hinton, 2010). These behaviors are often exhibited during the school day when children encounter difficulties with peers or academic demands.

The occurrence of violent behaviors in schools continues to be a recognized problem among students and school personnel. The number of students in grades 9 through 12 who reported involvement in a fight on school property in 2009 reached nearly 22% while the occurrence of verbal or physical aggression and bullying for the same grades reached 20% in the same year (Centers for Disease Control, 2010). The concern caused by these aggressive behaviors have led many schools to implement anger management and other impulse control based programs for at-risk students in an effort to prevent these violent behaviors.

While the concept of implementing an anger control intervention is appealing, it can be difficult to choose an effective, anger-based program for children. Due to the nature of childhood anger, practitioners have been searching for successful early interventions for helping children to cope with feelings of anger while effectively teaching appropriate replacement behaviors. The need for preventive programs of this nature that align with the USA-based National Association of School Psychologists (NASP) practice model has also been expressed at the international level, as the literature continues to reflect a global demand for quality evidence-based studies dedicated to prevention and intervention of social and emotional difficulties (Little, Akin-Little, & Lloyd, 2011).

Anger management interventions in schools are often implemented and led by the school psychologist, and frequently take the form of groups held during lunchtime or other natural breaks from the academic curriculum (Flanagan, Allen, & Henry, 2010; Sukhodolsky, Solomon, & Perine, 2000). While many of these principles have produced moderate effects for groups overall (Kellner, Bry, & Salvador, 2008; Lochman & Wells, 2003), it is important for school psychologists to be aware of the reliability of the various types of interventions for anger and to take into account the various moderating variables that may imply a unique intervention effect depending on different characteristics of the child (i.e. younger vs. older children, those from diverse backgrounds, or children previously identified with an emotional and behavioral disability). Awareness of the most appropriate interventions dependent upon such moderator variables and manifestations of behavior is essential to proper implementation of any intervention. Taking these variables into account will uphold the intervention’s treatment integrity and ensure that the most appropriate services are delivered (NASP Principles for Professional Ethics [PPE], 2010).

To date, three meta-analyses have been conducted to measure the effectiveness of school-based anger management programs. A meta-analysis conducted by
Gansle (2005) condensed 20 articles of school-based interventions for anger, finding an overall effect size of 0.31. This meta-analysis was limited in that the number of articles included was relatively small and did not include data from unpublished articles, suggesting the need for a more extensive analysis of the literature. A second meta-analysis conducted by Ho, Carter, and Stephenson (2010), evaluated 18 articles and specifically examined outcomes of cognitive-behavioral anger management interventions for children with special education needs. An overall moderate effect size of 0.61 was found, although this study was limited to only students identified for special education. Sukhodolsky, Kassinove, and Gorman (2004) condensed 40 articles, both published and unpublished, which specifically examined the effects of cognitive-behavioral therapies on anger management of children and adolescents. An overall effect size of 0.67 was found. Yet few components of particular interventions or participant characteristics were examined. Each of these meta-analyses indicated that the limited number of articles available for synthesis at the time of analysis proved to be a limitation to the overall meta-analysis, suggesting the need for a more updated quantitative review of the literature.

The present study aimed to aggregate both published and unpublished studies on anger management treatment programs and to explore its effects on children’s emotional and behavioral outcomes using a meta-analytic method. In the current meta-analysis, the authors hoped to find the overall effect of anger management treatments on children’s outcomes and its differential effects by various features of samples, research methodology, and focus of the anger management intervention. Implications for school psychologists are discussed.

Method

The search process

The location of relevant studies in this research synthesis included both published and unpublished literature based on a manual as well as a computerized search of pertinent databases (e.g. PsychLit, PsychInfo, Dissertation Abstracts, MedLine and ERIC). Key terms for literature searches included the words anger management, anger group, behavior management, anger and emotional awareness, intervention, school anger program, cognitive therapy, social skills, anger groups, students, and children. As well as database resources, general search engines (e.g. Google) were employed with the above key terms to capture those studies that had not been included in the databases. Results yielded over 200 references between 1960–2011.

Studies retrieved from the initial searches were screened using specific criteria: (1) studies had to investigate the effect of some type of anger management program on children’s socio-emotional functioning (i.e. the dependent variable was a socio-emotional outcome of some form); (2) target populations had to be of school-age (5–18 years); (3) quantitative studies that allowed for the calculation of an effect size (no qualitative data were included, although possible studies that did not allow
for the calculation of an effect size were analysed to determine the mean difference directionality; (4) data that have only been used once in a manuscript to avoid replication (i.e. studies that had published more than one article on the same participants were not included, as were studies that were completed as unpublished theses and subsequently published); and (5) studies must have been reported in English.

This selection process identified a total of 81 studies. Out of these 81 studies, 21 studies were excluded due to the following reasons: (1) insufficient information for calculating effect size (e.g. mean, SD) were provided; (2) solely descriptive data was provided to assess the program; and (3) studies provided designs of anger management programs but did not assess the efficacy or outcomes of these programs.

Coding of studies

Based on a literature review, a systematic coding scheme was developed to identify salient features of each study. Specifically, variables with regard to study design, participant characteristics, anger management treatment, and type of children’s emotional and behavioral outcomes were independently coded for all the included studies by the authors with an inter-rater reliability of 0.92. All coding discrepancies between two independent coders were resolved upon discussion before statistical analysis.

Study design characteristics. Sampling method was coded into random, not-random, and not-informed. The source of data was next coded into primary data obtained by authors, and secondary data from other researchers. Lastly, other study characteristics such as publication type (i.e. published vs. unpublished) and study location (i.e. US vs. non-US) was coded.

Participant characteristics. Participants were coded as children with Attention Deficit Hyperactivity Disorder (ADHD), children with conduct disorder, children with bipolar disorder, children with other diagnoses, and not informed. Second, the source of referral to anger management program was coded as teacher, parent, discipline, other, and not informed. Other coded participant’s information were mean age and/or grade level, ethnicity (i.e. White, African American, Hispanic, Native American, Asian, Mixed, and not informed), and gender (i.e. male, female, or mixed) were coded.

Anger management program characteristics. The anger management intervention was characterized into: (1) coping skills training such as the In Control program designed to teach coping-skills to adolescents; (2) emotional awareness and self-control such as the strategies used in the SCARE program; (3) problem solving CBT such as using strategies from the Second Step violence prevention program designed to teach anger-related problem solving skills; (4) relaxation techniques
such as deep breathing exercises; and (5) role play or modeling activities involving
acting out scenarios with the professionals implementing the intervention. These
categories were constructed based on the description provided by the authors of
the study, as well as the features of the intervention the children were receiving.
This sorting process was performed by the authors. Other coded information
related to the anger management program was the total length of the intervention
(i.e. number of sessions) and time per session (measured in minutes).

**Child outcome characteristics.** Children’s outcome measures were categorized into: (1)
Overall behavioral and emotional outcome such as the total behavioral or emo-
tional index of self- and teacher-reported measures; (2) Conduct problem/
Delinquency such as reported number of office referrals and other discipline refer-
ralls related to anger; (3) Knowledge of anger management principles such as com-
pleteness of a post-quiz assessing knowledge of specific principles taught during the
intervention (i.e. relaxation techniques); (4) Blood pressure; (5) Anger, including
state and trait dimensions, measured by scales such as the *State-Trait Anger
Expression Inventory* (STAXI-2); (6) Aggression via measures of the *Behavior
Assessment System for Children* (BASC) and similar behavior rating scales; (7)
Self-control including self-regulation and self-esteem; (8) Forgiveness such as
self-reporting on the *Enright Forgiveness Inventory for Children* (EFI-C); and (9)
Social skills such as results from the *School Social Behavior Scale* (SSBS) and
similar rating scales. These nine categories were also constructed based on the
description provided by the authors of the study. Further, the rater of children’s
outcome measures was coded into child, teacher, parent, and others (e.g. peers).

**Effect size**

Depending on the study design employed by the included studies, different
methods for computing the effect size ($g_i$) were used. First, when studies used
the pre-test–post-test control group design (PPC), the standardized mean change dif-
fERENCE between treatment and control groups ($g_{ppc}$) was computed using the for-
mula (Morris, 2008),

$$g_{ppc} = \frac{\bar{Y}_{trt} - \bar{X}_{trt} - \bar{Y}_{ctl} + \bar{X}_{ctl}}{S_{ppc, pooled}},$$

where $\bar{Y}_{trt}$ and $\bar{X}_{ctl}$ are post-test mean scores for treatment (trt) and control (ctl) groups;
$\bar{X}_{trt}$ and $\bar{X}_{ctl}$ are pre-test mean scores for each group; and $S_{ppc, pooled}$ is the pooled
SD of scores from each group. This value was calculated as

$$S_{ppc, pooled} = \sqrt{\frac{(n_{trt} - 1)SD^2_{X, trt} + (n_{ctl} - 1)SD^2_{X, ctl} + (n_{trt} - 1)SD^2_{Y, trt} + (n_{ctl} - 1)SD^2_{Y, ctl}}{2(n_{trt} + n_{ctl} - 2)}},$$

where $n_{trt}$ and $n_{ctl}$ are sample sizes for each group; $SD_{X, trt}$ and $SD_{X, ctl}$ are SD of
the pre-tests for each group; and $SD_{Y, trt}$ and $SD_{Y, ctl}$ are SD of $Y_{trt}$ and $Y_{ctl}$
(Morris, 2008). When no descriptive statistics were reported, Hedge’s $g_i$ was com-
puted from the reported $t$ or $F$ statistics using the formulas outlined in Rosenthal.
The comparison group without an anger management intervention was treated as the control group. Second, when only the pre-test and post-test without a comparison group were provided, the standardized mean change (g_{change_i}) was computed as

\[ g_{change_i} = \frac{\bar{Y}_i - \bar{X}_i}{S_{pooled_i}/\sqrt{2(1 - r_{XY_i})}}, \]

where \(\bar{X}_i\) and \(\bar{Y}_i\) are pre-test and post-test mean scores; \(S_{pooled_i}\) is a pooled SD of pre-test (X) and post-test (Y) scores; and \(r_{XY_i}\) is the correlation between the pre-test and post-test score (Lipsey & Wilson, 2001). Because the correlation between the pre-test and post-test score was not reported in the studies, \(r_{XY_i}\) of 0.5 was used to compute \(g_{change_i}\) as a default.

Third, from a post-test control group design, the standardized mean difference (\(g_i\)) was computed using the formula represented by

\[ g_i = \frac{\bar{Y}_{trt_i} - \bar{Y}_{ctl_i}}{S_{pooled_i}}, \]

where \(S_{pooled_i}\) is the pooled SD of \(Y_{trt_i}\) and \(Y_{ctl_i}\). This mean difference is calculated as

\[ S_{pooled_i} = \sqrt{((n_{trt_i} - 1)SD_{trt_i}^2 + (n_{ctl_i} - 1)SD_{ctl_i}^2)/((n_{trt_i} - 1) + (n_{ctl_i} - 1))}, \]

where \(SD_{trt_i}\) and \(SD_{ctl_i}\) are SD of \(Y_{trt_i}\) and \(Y_{ctl_i}\) for each group (Lipsey & Wilson, 2001).

Effect sizes from the studies using children’s positive outcomes such as self-esteem, empathy, and anger control were reverse-coded so that the computed effect sizes held the same meaning. Thus, a negative effect size indicated a beneficial intervention effect in reducing children’s negative outcomes such as aggression, anger, and anxiety. Further, the computed effect sizes (\(g_i\)) were corrected for small sample size bias using the formula (Hedges, 1994) represented by

\[ d_i = g_i * [1 - 3/(4 * df - 1)]. \]

In the subsequent analyses, the unbiased effect size (\(d_i\)) was modeled.

**Statistical analyses**

The statistical analyses were based on the methods described in Cooper, Hedges, and Valentine (2009). The computed ESs weighted by the inverse of its associated variance were used to assess the overall homogeneity with \(Q_{total}\) statistics. When \(Q_{total}\) was significant, the fixed-effects assumption cannot be assumed and therefore the random-effects model which incorporates the estimated additional uncertainty
was used to estimate the overall intervention effect. Otherwise, the fixed-effects model was used in assessing homogeneity of variance.

Further, the categorical moderators (i.e. children’s outcomes) or continuous moderators (i.e. mean age) were explored to explain the variations across effect sizes. For moderator analyses with significant within-group variations, the mixed-effects model that incorporates additional variability was employed. Otherwise, the fixed-effects model with predictors was used (Raudenbush, 2009).

Dependency

A number of studies provided dependent effect sizes from the same participants, which in turn violates the assumption of independence (Glesser & Olkin, 2009). Of several ways to handle dependency among effect sizes in meta-analyses (Becker, 2000), the authors used the ‘shifting unit of analysis’ approach suggested by Cooper (1998). In this approach, the authors first coded all of the studies as if effect sizes were from an independent sample. For instance, if a study provided children’s outcomes that were rated by teachers and parents, two effect sizes were computed. Then, for estimating the overall effect of anger management interventions, these two effect sizes were averaged prior to analysis. Thus, each sample contributed only one independent effect size for computation. However, in estimating the differential intervention effect by raters, each effect size was used to compute the intervention effect separated by raters so that effect sizes within the subcategories of raters were independent. This method was used to retain as many data as possible from each study, yet continue to hold the assumption of independent effect sizes for statistical analysis.

Results

Description of studies

From the included 60 studies (s = 38 for published and s = 22 for unpublished studies), a total of 61 effect sizes were extracted given that Bosworth, Espelage, DuBay, and Daytner (2000) provided separate effect sizes by gender. Studies were published between 1979–2010 and most of the studies (s = 52) were conducted in the USA, while the rest of them were from other countries. Sample sizes used in the included 60 studies ranged from 4 to 287 (M = 55.50, SD = 60.54), totaling 3,386 participants. Mean age of participants ranged from 5 to 17.30 years old (M = 12.42, SD = 2.76). The majority of samples (s = 44) was based on a mixed-gender group, while 14 samples were exclusively based on boys and one sample included only girls.

Publication bias

In the current meta-analysis, the authors included both unpublished and published studies so that publication bias would likely not be problematic. However, when
publication bias was assessed using Egger’s regression test of intercept (Sutton, 2009), a significant result ($t (59) = 3.87, p < 0.01$) indicated that the included studies might pose a slight publication bias.

**Overall effect of anger management programs**

A total of 61 $d$-effect sizes examining the intervention effect of anger management programs on children’s emotional and behavioral outcomes were first analysed. The significant $Q_{Total}$ statistic of 92.13 indicates that the included $d$-ES were heterogeneous, meaning these effect sizes were not from the same population. Further, the estimated $d$-ES under the random-effects model was $-0.27$ with a standard error ($SE$) of 0.04, which was statistically significant ($z = -6.09, p < 0.01$). Such a significant but negative result indicates that anger management interventions reduced children’s negative emotional and behavioral outcome measures including anger, aggression, and loss of self control, when compared to the control group with no anger management intervention. Table 1 displays these findings.

**Table 1.** Results from statistical analyses

<table>
<thead>
<tr>
<th></th>
<th>$k$</th>
<th>$\bar{d}$</th>
<th>SE</th>
<th>95% CI</th>
<th>$Q_{within}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, $Q_{Total}$ (60) = 92.13***</td>
<td>61</td>
<td>$-0.27^{**}$</td>
<td>0.04</td>
<td>$-0.36$</td>
<td>$-0.19$</td>
</tr>
<tr>
<td>Outcomes, $Q_{between}$ (8) = 13.74, $p = 0.09$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall behavioral/emotional index</td>
<td>14</td>
<td>$-0.14^{**}$</td>
<td>0.05</td>
<td>$-0.25$</td>
<td>$-0.04$</td>
</tr>
<tr>
<td>Conduct/delinquency</td>
<td>3</td>
<td>$-0.29^{*}$</td>
<td>0.13</td>
<td>$-0.56$</td>
<td>$-0.03$</td>
</tr>
<tr>
<td>Knowledge of anger management principles</td>
<td>1</td>
<td>$-1.28^{**}$</td>
<td>0.50</td>
<td>$-2.26$</td>
<td>$-0.29$</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>1</td>
<td>$-0.05$</td>
<td>0.36</td>
<td>$-0.76$</td>
<td>0.66</td>
</tr>
<tr>
<td>Anger</td>
<td>17</td>
<td>$-0.33^{**}$</td>
<td>0.07</td>
<td>$-0.47$</td>
<td>$-0.20$</td>
</tr>
<tr>
<td>Aggression</td>
<td>16</td>
<td>$-0.34^{**}$</td>
<td>0.08</td>
<td>$-0.50$</td>
<td>$-0.17$</td>
</tr>
<tr>
<td>Self control</td>
<td>5</td>
<td>$-0.09$</td>
<td>0.16</td>
<td>$-0.41$</td>
<td>0.23</td>
</tr>
<tr>
<td>Forgiveness</td>
<td>1</td>
<td>$-0.80$</td>
<td>0.62</td>
<td>$-2.01$</td>
<td>0.40</td>
</tr>
<tr>
<td>Social skills</td>
<td>3</td>
<td>$-0.12$</td>
<td>0.13</td>
<td>$-0.37$</td>
<td>0.13</td>
</tr>
<tr>
<td>Outcome raters, $Q_{between}$ (6) = 5.40, $p = 0.49$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>124.54***</td>
</tr>
<tr>
<td>Teacher</td>
<td>19</td>
<td>$-0.27^{**}$</td>
<td>0.05</td>
<td>$-0.37$</td>
<td>$-0.16$</td>
</tr>
<tr>
<td>Parent</td>
<td>8</td>
<td>$-0.15^{*}$</td>
<td>0.08</td>
<td>$-0.30$</td>
<td>0.00</td>
</tr>
<tr>
<td>Child</td>
<td>24</td>
<td>$-0.15^{**}$</td>
<td>0.05</td>
<td>$-0.25$</td>
<td>$-0.05$</td>
</tr>
<tr>
<td>Observer</td>
<td>2</td>
<td>$-0.27$</td>
<td>0.18</td>
<td>$-0.63$</td>
<td>0.08</td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>0.06</td>
<td>0.21</td>
<td>$-0.35$</td>
<td>0.48</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>$-0.30^{*}$</td>
<td>0.13</td>
<td>$-0.56$</td>
<td>$-0.04$</td>
</tr>
<tr>
<td>Not informed</td>
<td>10</td>
<td>$-0.13$</td>
<td>0.10</td>
<td>$-0.32$</td>
<td>0.06</td>
</tr>
</tbody>
</table>

(continued)
Effects by children’s outcome measures

The effect of anger management programs was evaluated on nine outcomes: Overall behavioral and emotional index, Conduct problem/ Delinquency, Knowledge of anger management principles, Blood pressure, Anger, Aggression,
Self-control, Forgiveness, and Social skills. The overall ES was not significantly different depending on types of children’s outcome measures ($Q_{\text{Between}}(8) = 13.74$, $p = 0.09$), indicating that the anger management programs were equally effective in alleviating all of children’s negative outcomes. In particular, of these nine outcomes, the statistically significant effects of the anger management interventions were found on the following five outcome measures, including the total index of behavioral and emotional outcomes ($d = -0.14$, $SE = 0.05$, $k = 14$), conduct problem/delinquency ($d = -0.29$, $SE = 0.13$, $k = 3$), knowledge of anger management principles ($d = -1.28$, $SE = 0.50$, $k = 1$), anger ($d = -0.33$, $SE = 0.07$, $k = 17$), and aggression ($d = -0.34$, $SE = 0.08$, $k = 16$).

The effect on these five outcomes was not dependent on how children’s outcomes were rated ($Q_{\text{Between}}(6) = 5.40$, $p = 0.40$). In particular, the effect of anger management programs was statistically significant when outcome measures were rated by children ($d = -0.15$, $SE = 0.05$, $k = 24$), teachers ($d = -0.27$, $SE = 0.05$, $k = 19$), parents ($d = -0.15$, $SE = 0.08$, $k = 8$), and others, such as peers ($d = -0.30$, $SE = 0.13$, $k = 3$). These findings suggest no significant rater effects when evaluating the outcomes of anger management programs on children’s behavioral and emotional functioning.

**Effects by anger management focus**

No statistically significant mean ES differences were found depending on the type of anger management program ($Q_{\text{Between}}(5) = 9.09$, $p = 0.11$), indicating that anger management interventions were equally effective regardless of its focus, with the exception of incorporating role-play (modeling). Thus, the anger management program was statistically effective when it was focused on coping skills training ($d = -0.19$, $SE = 0.06$, $k = 17$), emotional awareness and self-control ($d = -0.16$, $SE = 0.06$, $k = 12$), problem-solving ($d = -0.33$, $SE = 0.06$, $k = 27$), and relaxation ($d = -0.69$, $SE = 0.23$, $k = 1$). Yet no significant intervention effect was found when the anger management program included role play as the central focus of the intervention.

In addition, no significant intervention effects due to treatment length or the time of each intervention session were found. Particularly, slopes for treatment length ($Q_{\text{Model}}(1) = 0.80$, $p = 0.37$) and time per session ($Q_{\text{Model}}(1) = 0.63$, $p = 0.43$) were 0.005 ($SE = 0.005$) and −0.001 ($SE = 0.002$), respectively, indicating that intervention effects were not different depending on either moderator.

**Participant characteristics**

The effectiveness of anger management interventions was not statistically different for any of the four moderating participant characteristics: Diagnosis ($Q_{\text{Between}}(3) = 1.34$, $p = 0.64$), mean age ($Q_{\text{model}}(1) = 0.05$, $p = 0.82$), gender ($Q_{\text{Between}}(3) = 1.70$, $p = 0.92$) or ethnicity status ($Q_{\text{Between}}(3) = 1.40$, $p = 0.71$). Yet there were variations among the gender and ethnicity variables. In terms of gender,
mean ESs were statistically significant for boys-only treatment groups ($\bar{d} = -0.23$, $SE = 0.08, k = 14$) and mixed-gender groups ($\bar{d} = -0.25$, $SE = 0.04, k = 44$), but no significant intervention effect was found for girls. Moreover, effect sizes were significant for all of the ethnic groups but African American children ($\bar{d} = -0.35$ for White; $\bar{d} = -0.25$ for Mixed ethnic groups; $\bar{d} = -0.21$ for samples with no ethnicity information provided). However, because of the few number of categorical effect sizes within the gender and ethnicity moderator variables, the statistical power was too low to detect the overall mean difference. Thus, low statistical power in effect nulls the significant differences found in these two moderator variables.

**Other moderators**

Additional moderator analyses were performed to examine whether the mean ESs differed by other moderators including publication type ($Q_{Between}(1) = 2.39, p = 0.12$), study location ($Q_{Between}(1) = 0.94, p = 0.33$), and sampling ($Q_{Between}(1) = 0.80, p = 0.67$). None of these moderators explained variation across studies and therefore did not play a significant role in the effect of the anger management intervention.

**Discussion**

The effects of anger management programs on children’s outcomes were measured using 61 independent samples from 60 studies including 38 published and 22 unpublished ones. The results of the meta-analysis yielded a mean effect size of $-0.27$, indicating a small to moderate intervention effect in reducing children’s negative emotional and behavioral outcomes. The magnitude of the intervention effect is similar to the Gansle (2005) meta-analysis, in which 20 published studies resulted in a mean effect size of 0.31. However, an analysis of 40 studies by Sukhodolsky et al. (2004) found a medium effect size of 0.67 when assessing the effects of CBT on children’s anger outcomes. The higher effect size in the Sukhodolsky analysis is more similar to that of Ho et al. (2010) and the overall effect size of 0.61. The reason for this discrepancy across effect sizes likely involves the inclusion of more studies with varying treatment components. The problem solving component of CBT was found to be one of the most effective in reducing children’s negative outcomes in the current analysis as well as previous analyses. However, as the present meta-analysis revealed, when problem-solving using CBT is compiled with other treatment components such as coping skills and role play, the overall mean effect was lessened as the individual effect sizes for these treatment strategies were not as high.

The most salient finding of this meta-analysis involves the apparent positive effects of school-based anger management programs on children’s social and emotional outcomes. Moderator variables aside, anger management intervention was found to have a small but positive effect on children’s outcomes. In particular, the two outcomes that were most positively affected by the anger management
programs were raters’ reports of the students’ aggressive behaviors and the students’ reported feelings of anger. This finding is important for school psychologists, as instances of physical aggression and other externalizing behaviors amongst students are often commonly reported reasons for initiating special education and behavioral referrals (Kaufman et al., 2010).

Additionally, with the exception of role play, no statistically significant differences were found between the various methods of the emphasis or focus of the anger management programs (i.e. teaching problem solving skills, emotional awareness), suggesting that treatment was effective regardless of the focus. These findings are unique, in that the literature base has typically found some degree of significant variation in the effectiveness of different CBT anger management-programs (i.e. problem solving, coping skills training). For example, Sukholdsky et al. (2004) found skill-development \( (d = 0.79) \) and eclectic approaches \( (d = 0.74) \) of anger management training to be more effective than emotional awareness education programs \( (d = 0.36) \). The only variation the current study revealed was the relative ineffectiveness of role playing as the sole focus of anger management interventions. A possible explanation of this may be that role play alone may not provide students with enough skills to feel confident in resolving situations in which angry feelings are provoked. While no research to date appears to explore this exclusively, the majority of the anger management programs in the current literature base consist of a mixture of role play and supplemental instruction in anger management techniques (Lipman et al., 2006; Lochman & Wells, 2003). Moreover, Sukholdsky et al. (2004) showed that modeling contributed to positive outcomes among youth involved in anger management interventions. It is likely that although modeling may be an effective component of anger management interventions, other aspects of the intervention may exert more of an influence on students’ outcomes. More research is needed to explore the various components of anger management interventions and to what degree certain aspects of the intervention play a role in promoting beneficial outcomes for children.

An additional finding of interest was the lack of significance across raters in measuring the effectiveness of the anger management treatment. There appears to be stability across different individuals rating the effectiveness of the anger management programs, suggesting that many raters could be recruited to assist in the measurement of outcomes and provide consistent and accurate information. This finding has also been shown to be the case in similar measures of social and emotional well-being, especially in instances requiring the use of multiple informants (Bulotsky-Shearer & Fantuzzo, 2004). Agreement across informants in regards to assessing the effectiveness of anger management treatments provides several implications for school psychologists. Primarily, this finding suggests that school psychologists may be able to rely on the reporting of a variety of individuals regarding the effectiveness of anger management interventions on a student’s progress and outcomes. Informants could include parents, teachers, peers, and the student themselves. The ability to use multiple raters not only preserves school resources by
eliminating the need for specialized training, but also reduces the amount of time required by the school psychologist in assessing a program’s effectiveness.

As with any quantitative review, there are limitations inherent in the analyses due to methodological limitations of the included studies. For the current analysis, there were few studies that included enough pertinent information regarding the reporting of means, Standard Deviations, and effect sizes. Many of the published articles served as instructional tools as opposed to statistical descriptions of anger management interventions and outcomes. Moreover, only a handful of studies reported ethnicity or diagnostic variables, leaving unanswered the question as to whether there are differential treatment effects based on these variables. Information regarding empirically-based interventions in working with culturally diverse students is a necessary component of delivering culturally competent interventions and ensuring best practice for school psychologists (Miranda, 2008; Theron & Donald, 2012; Toland & Carrigan, 2011). Further analysis and evidence of the effectiveness of various methods of anger management programs on the outcomes for students from culturally diverse backgrounds is necessary. Thus, future research needs to explicitly identify the samples for which the treatment is being provided, as the NASP standards have made clear the need to consider the individual needs of students when providing treatment (NASP PPE, 2010).

Yet, while the current study has several limitations, it also provides a more comprehensive and current examination of the effectiveness of anger management on the outcomes of school-age children. The overall findings of this meta-analysis provide evidence to suggest that anger management intervention—regardless of participant characteristics or the type and focus of treatment implemented—produces positive effects on students’ behavioral, social, and emotional outcomes. Of particular importance is the effectiveness of these interventions on the externalizing behaviors exhibited by many students receiving special education and office discipline referrals. Students exhibiting externalizing behaviors early in their educational careers are at later risk for high levels of risk taking behavior, substance abuse, and delinquency (Thompson et al., 2011). Similarly, research continues to show that high rates of externalizing behavior, particularly for male students, leads to an increased likelihood of early school drop-out (Robst & Weinberg, 2010). Early prevention and intervention of these externalizing behaviors, by way of anger management and similarly focused programs, aim to decrease the prevalence of these and other maladaptive behaviors.

Schools are increasingly viewed as a de facto mental health and behavioral service provider (Jacob & Coustasse, 2008). Because school aged children and adolescents spend the majority of their day at school, the importance of having an accessible anger management program during these hours is significant. The implications for school psychologists are clear, and continue to emphasize the importance of providing evidence-based anger management services, similar to those included in the current analysis, to students experiencing detrimental, anger-related behaviors.
References

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