The Report committee for Sunyoung Park Certifies that this is the approved version of the following report:

The evaluation of Effectiveness of School-based Mental Health Care Programs : A meta-analysis of research

APPROVED BY

SUPERVISING COMMITTEE:

_____

Susan N Beretvas, Supervisor

_____

Gary D Borich, Co-Supervisor

The evaluation of Effectiveness of School-based Mental Health Care Programs : A meta-analysis of research

by

Sunyoung Park, B.A.; M.A.

Report

Presented to the Faculty of the Graduate School

of the University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree(s) of

Master of Arts

The University of Texas at Austin

May 2017

The evaluation of Effectiveness of School-based Mental Health Care Programs : A meta-analysis of research

Sunyoung Park, M.A

The University of Texas at Austin, 2017

Supervisor: Susan N Beretvas

Co-Supervisor: Gary Borich

The psychological support for students as school-based become an important field of education as supporting general educational performance. There were studies related to effectiveness of school-based mental health care programs and provided consistent or controversial results under various conditions. Therefore, to examine the effectiveness of school-based mental health care program delivered by teachers on internalizing and externalizing outcomes, current study conducted a systematic review and meta-analysis. Based on the electronic databases and major journals, 121 effect sizes from 24 studies are coded as final sample and four moderators are coded including type of intervention, group size, duration of intervention, and type of measurements. For both internalizing- and externalizing outcomes, publication bias were assessed. The results showed that pooled effect size for internalizing outcomes is statistically significant indicating the school-based program have an effect on reducing internalizing problems but pooled effect size for externalizing outcomes is not significant. Moderator analysis with meta-ANOVA revealed that, school-based mental health care program have more effective when the study used combination of behavioral-cognitive approach and social-skill approach intervention, larger group size (= class room), short or middle duration of intervention, and survey measurement for internalizing outcomes. On the other hand, for externalizing outcomes, combination approach intervention had more effective than using a single approach. According to the publication bias, results support there is lack of publication bias.

Table of Contents

List of Tables

List of Figure

Chapter 1: Literature Review

Psychological support for students is as important in the field of education as academic achievement because academic performance and mental health are highly related (Hoagwood et al., 2007). Psychological problems that students experience are not limited to academic achievement including developmental difficulties (Bains & Diallo, 2016) but include also problems of socialization with other students (Rajaleid et al., 2015; Stagman & Cooper, 2010). About 25 percent of adolescents in the United States suffer from psychological problems, but only about 9 percent have received counseling or treatment (Merikangas et al., 2011). Because individuals who have psychological problems at an early age tend to be at greater risk for developing more serious problems later on (Green et al., 2013), the need to establish appropriate mental health programs is an essential topic in the field of education.

Psychological problems can be generally categorized as internalizing and externalizing disorders (Borntrager & Lyon, 2015). According to the diagnostic and statistical manual of mental disorders, fifth edition (DSM-5), internalizing disorders include depression, anxiety, and social dysfunction whereas externalizing disorders involve behavior disorders such as aggressive behavior, attention-deficit/hyperactivity disorder (ADHD) and anti-social behaviors (APA, 2013).

School-based Mental Health Care Programs

Although there are various types of mental health care programs such as school-based, parents (home)-based, mental health therapy center-based, or neuropsychiatry

hospital-based, a study by Eiraldi et al. (2016) suggests that school-based mental health care programs are not only feasible but also effective especially with adolescents. According to the Bain and Diallo study (2016), it is important to note that children who need a mental health care tend to be exposed to low-socioeconomic environments, domestic violence, and chronic stress at home so that it can be difficult for them to receive the psychological support they need at the family-level as well as from a professional center or hospital due to their parents' financial situations. School-based mental health programs, however, provide effective and accessible programs at the school-level regardless of the economic status of the family (Eiraldi et al., 2016; Amaral, Geierstanger, Soleimanpur & Brindis, 2011; Juszczak, Melinknovich & Kaplan, 2003). A study by Anakwenze and Daniyal (2013) study also reported that school-based mental health care for low-socioeconomic level groups have a positive effect on alleviating students' psychological problems. School-based mental health programs can be defined as any program or intervention delivered in a school setting that is aimed at improving students' behavioral, emotional or social functioning (Rones & Hoagwood, 2000). The programs can be categorized based on internal characteristics of the programs such as types of interventions, types of instructors (group size), and duration of interventions as well as external components such as type of measurements. With quantitative meta-analytic approach, the overall effectiveness of school based mental health programs can be assessed. Also, the components of programs mentioned above can be used to evaluate the quality of the programs in detail.

Types of interventions. In terms of types of interventions, sub-categories include cognitive-behavioral oriented interventions, social-skill training interventions, and a combination of both of cognitive and social-skill interventions. Cognitive-behavioral intervention is based on the behavioral and cognitive psychology focused on problem-based approach and action oriented therapy (Beck, 2011). On the other hand, social-skill training interventions focuses on practices in various social settings and situations with coaching, emotional support, and feedback (Quinn, Kavale, Mathur, Rutherford, & Forness, 1999). Regarding the use of cognitive-behavioral oriented interventions in schools, a recent meta-analysis found moderate positive treatment effects (d = 0.23) for cognitive-behavioral interventions implemented in school-settings (Barnes, Smith & Miller, 2014). By contrast, a separate systematic review study on social-skill training conducted by Vreeman & Carroll (2007) investigated the use of social skills training in schools and found that the effects of the programs were mixed. Some populations benefited less than others; for example, the outcomes of programs for younger students were not as positive as those for older students.

In the practice, school-based mental health programs usually include more than one type of intervention. Several approaches may be combined within a cognitive-behavioral oriented intervention or a combination of interventions may extend across cognitive-behavioral and social-skill oriented interventions. Therefore, the types of interventions need to encompass not only two categories (cognitive-behavioral and social-skill oriented interventions) but also combinations of interventions.

Type of Instructors (**Group size).** School-based mental health care programs involve various type of instructors, for example, teachers, school social workers, counselors, and psychologists (Franklin et al., 2012; Han, & Weiss, 2005). Even though all the school-based mental health care programs provide interventions at the school-level, the types of instructors who deliver the interventions to students may vary. Depending on the type of inter-connection between instructors and students, there are three ways frequently used to deliver the interventions: (1) all teachers deliver the intervention to all students (Hanson, 2016; Kearney, 2016), (2) a small group of students receive intervention from designated teachers (Frey, Lingo & Nelson, 2011), and (3) other types of instructors, such as behavioral analysists, social workers, and counselors, deliver the interventions to students (Franklin et al., 2012). Previous studies have found that the delivery of intervention by teachers, which includes the first and second types, is appropriate because teachers are familiar with classroom and behavioral management (Anderson-Butcher & Ashton, 2004; Berzin et al., 2011; Frey et al., 2011). Teacher-delivered programs focus on the advantages (Ojio et al., 2015), especially the effectiveness of school mental health programs, delivered by teachers (Wilson, & Lipsey, 2007). To understand the effects of teacher-delivered mental health programs, previous studies have focused mainly on three aspects: 1) the role of teachers as program providers (Ringwalt et al, 2010), 2) the content and nature of programs provided (Paulus, Ohmann & Popow, 2016), and 3) training, qualification, and supervision needed for teachers to be effective in program delivery (Han & Weiss, 2005). With regard to the other types of instructors, there is only a small proportion (about 5 percent) of students who have

received interventions provided by behavioral analysists, social workers, and counselors (Kelly, 2008). Most interventions delivered by other instructors work to support teacher delivered intervention (Fairbanks et al., 2008). Because most studies conducted school-based mental health program used teacher-delivered interventions, the current study will consider only teacher-delivered intervention but different group size (e.g. classroom versus small group intervention).

Duration of intervention. There are various aspects and studies related to the amount of spending time and length of interventions (Durlak et al., 2011; Malan, 1963; Martin, Garske, & Davis, 2000; Wampold, & Zac, 2015). Even though some researchers and practicians believe that relatively longer intervention will be more effective, other psychotherapy literature claimed that the duration of intervention and effectiveness of intervention was not directly positive relationship (Durlak et al., 2011; Malan, 1963; Martin, Garske, & Davis, 2000; Wampold, & Zac, 2015). Therefore, the current study also investigated the relationship between duration of intervention and effectiveness of intervention under the school based mental health programs. To consider both amount of spending time and length of intervention, the current study includes the total amount of intervention (hours per intervention multiplied by number of interventions) as duration of intervention.

Research Question

Based on primary studies about school-based mental health programs, the current study will investigate the effectiveness of school-based mental health programs using a meta-analysis approach. First, the current study will examine the overall effectiveness of

school-based mental health programs by separating internalizing disorder outcomes and externalizing disorder outcomes. The purpose of the two types of interventions are conceptually different depending on the type of disorders. Thus, investigating the effectiveness of interventions separately may offer more reasonable implications. Second, the effectiveness of programs by types of interventions will be investigated. As mentioned, there are not only two single types of delivered treatments but also combinations of interventions based on previously reported studies. Third, the types of instructors (group size) may also have an effect on the performance of school-based mental health programs and for that reason need to be considered. Fourth, the duration of interventions need to be considered as a factor of varying effectiveness of interventions. Finally, while the type of intervention and type of instructors and duration of interventions may be regarded as internal components of programs, the type of measurements used to assess outcomes can be treated as an external component of programs. The measurement component does not cover the contents of school-based mental health programs. However, the effect sizes that will be used in meta-analysis will be based on values derived from the measurements. Therefore, the type of measurement used in previous studies can also be considered as an evaluation component.

Chapter 2: Method

Search Procedures

The primary studies were found from the following sources: PsycINFO, Academic Search Complete, CINAHL Plus, Education Full Text, ERIC, Professional Development Collection, PsycARTICLES, Psychology and Behavioral Sciences Collection, and Teacher Reference Center. The studies collected were published from 2000 to 2016 in English based on United States data sets. For the initial search "school*," "intervention*," "random*," and "teacher" were used as key words. Because the initial search yielded more than 36,760 studies across the platforms mentioned above, four coders screened the titles and abstracts to exclude overlapped studies and unrelated studies. After the screening, 286 studies remained for full-article review. At the end of the full manuscript screening, 87 articles met inclusion criteria. Based on the keywords from the 87 articles, an additional 63 potential studies were found. The four coders screened the titles and abstracts for 40 studies that were included, totaling 127 studies that were coded.

During the coding process, as shown Figure 1, 75 studies were eliminated because the studies were not of interest to the current study and 28 studies were excluded due to unavailable information to calculate effect sizes. As a result, 121 available effect sizes from the 24 primary studies were included and reported in this systematic review and meta-analysis. To interpret the results consistently, the directions of effect sizes were converted that the positive (+) direction indicates the intervention had positive effects of decreasing internalizing or externalizing problems. For example, if primary studies used

the anxiety scales as an internalizing outcome, the scores from treatment group were smaller than scores control group which means our effect size was negative and the therapy was effective. In that case, to interpret consistently, the effect sizes direction was converted into positive direction.

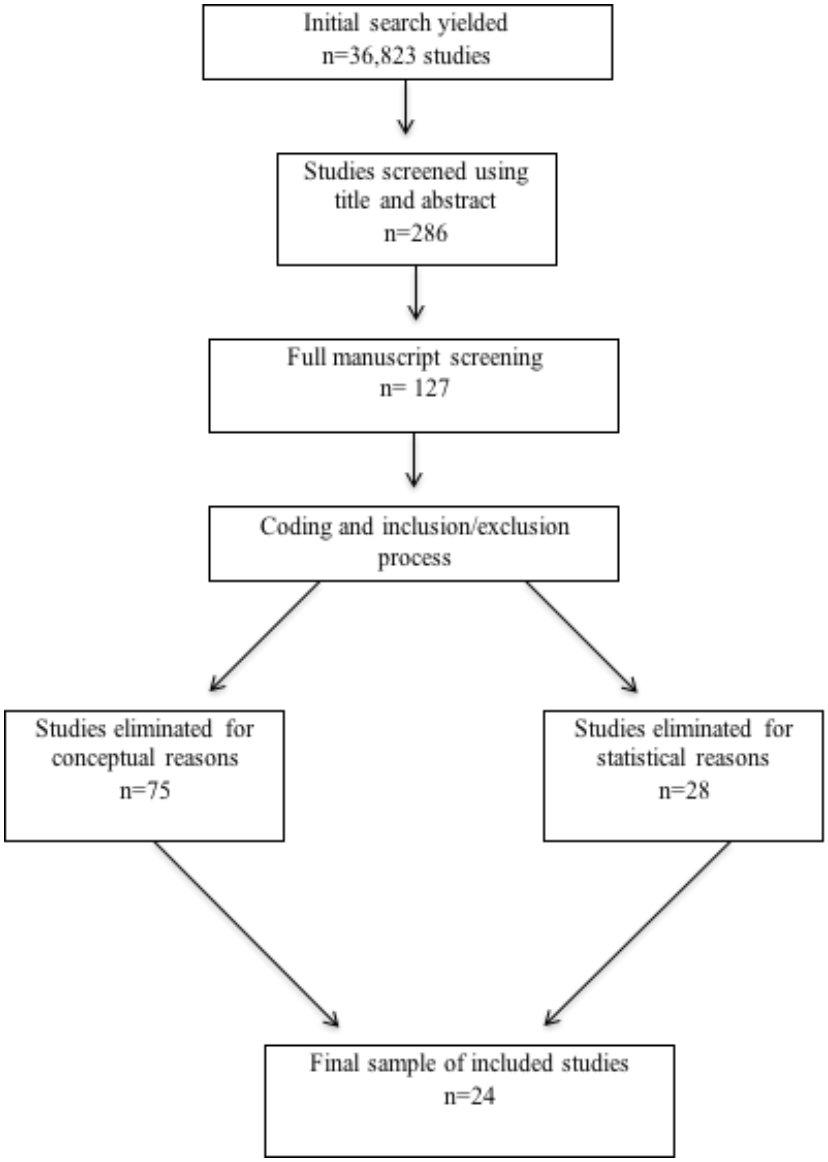

Figure 2.1 Flowchart of Inclusion and Exclusion Procedure

Inter-Rater Agreement

Two coders conducted the initial search and selected articles that met the criteria. Then three coders coded the total sample of included articles. Any disagreements were settled with a fourth coder. Finally, the same individuals who conducted the initial search conducted a search within the grey literature to find more articles for inclusion. Three separate coders then coded the studies included from the grey literature. A fourth coder settled any disagreements. Out of the 24 coded studies, there was a 93% agreement rate between the three primary coders.

Statistical Analysis

Meta-analysis was conducted with sampled statistics reported from sampled 23 studies with SPSS 23.0 program. Meta-analysis is a type of statistical analysis used to synthesize the results from previous studies investigating a similar research question (Glass, 1976). The purpose of synthesizing results is to summarize findings from previous studies through the use of a synthesized index. The effect size is one type of synthesized index that is frequently used to provide the magnitude and direction of the relationship between variables. The current study calculated effect size results for each primary study using Hedges' *g* effect size with the small sample bias correction (Cooper, Hedges, & Valentine, 2009). In calculating $\hat{\delta}$, we first calculated Hedges' g using

$$g = \frac{\bar{Y}_1 - \bar{Y}_2}{S_{within}} \quad (1)$$

where in the numerator, $\bar{Y}_1$ and $\bar{Y}_2$ are the sample outcome means for the treatment and control group, respectively. In the denominator, S_{within} is the pooled within-groups standard deviation calculated using:

$$S_{within} = \sqrt{\frac{(n_1 - 1)S_1^{\,2} + (n_2 - 1)S_2^{\,2}}{n_1 + n_2 - 2}}, \tag{2}$$

where s_i^2 is the sample variance and n_i is the sample size for group *i*. The variance of the sampling distribution of Hedges' *g* is given by

$$V_g = \frac{n_1 + n_2}{n_1 n_2} + \frac{g^2}{2(n_1 + n_2)}. \tag{3}$$

Hedges' *g* tends to be overestimated when used with small sample sizes (Hedges, 1981). Thus, a correction is needed that removes this bias. To convert Hedges' *g* to the bias-corrected estimate of δ ($\hat{\delta}$), the following correction factor (*J*) is needed:

$$J = 1 - \frac{3}{4df - 1} \tag{4}$$

where the *df* is the degrees of freedom used to estimate S_{within}, which for two independent groups is $n_1 + n_2 - 2$. After calculating the correction factor, we can obtain the value of the bias-corrected estimate of δ ($\hat{\delta}$) using the following equation:

$$\hat{\delta} = J \times g \tag{5}$$

where the formula for the variance of the sampling distribution of $\hat{\delta}$ is

$$V_{\hat{\delta}} = J^2 \times V_g. \tag{6}$$

The bias-corrected estimate of δ will always be less than Hedges' *g* because the correction factor (*J*) is always less than 1, and the variance of $\hat{\delta}$ will always be less than the variance of Hedges' *g*. However, the correction factor will be very close to 1 when *df* is large; thus, the difference between the bias-corrected estimate of δ ($\hat{\delta}$) and Hedges' *g* is not substantial for larger sample sizes (Hedges, 1981).

Fixed- and Random-Effects Model. As noted earlier, there are two models used to summarize the calculated effect sizes per study: one model is the fixed effects model and the other is the random effects model. The models differ in their associated assumptions about the distribution of effect sizes. The fixed effect model involves the assumption that sampled studies share a single, true effect size and thus the observed effect sizes vary across studies only because of sampling error. Under the fixed effects model, the observed effect sizes are assumed composed of a true effect size (δ) and sampling error (ε_i):

$$\hat{\delta} = \delta + \varepsilon_i \tag{7}$$

Because effect sizes from different studies using different sample sizes and outcome scales have different precision, weights are needed to give more weight to studies with more precise effect size estimates. The most commonly used weight and the one that provides the most precise true effect size estimates is the weight that equals the inverse of the effect size estimate's variance (Borenstein et. al., 2009):

$$W_i = \frac{1}{V_{\hat{\delta}_i}} \tag{8}$$

These weights are then applied to each effect size estimate and a weighted mean of $\hat{\delta}$ is then calculated as follows:

$$\bar{\delta}_{\cdot} = \frac{\sum_{i=1}^{k} W_i \hat{\delta}_i}{\sum_{i=1}^{k} W_i}, \tag{9}$$

where *k* is the number of effect sizes (studies) in the meta-analysis. The variance of the summary effect size is estimated as the reciprocal of the sum of the weights:

$$V_{\bar{\delta}_{\cdot}} = \frac{1}{\sum_{i=1}^{k} W_i} \tag{10}$$

The random effects model involves the assumption that there are differences among the studies that result in their having heterogeneous true effects. According to the random effects model, the observed effect sizes ($\hat{\delta}_i^*$) are a function of the grand mean effect size (δ^*), the deviation of the study's true effect from the grand mean (ζ_i), and sampling error (ε_i):

$$\hat{\delta}_i^* = \delta^* + \zeta_i + \varepsilon_i \tag{11}$$

In fixed-effects meta-analysis, it is important to remember that the weight used to average effect size estimates is the inverse of the effect size's sampling error variance. Under the random effects model, however, the weight that is used also incorporates the between-studies variance (τ^2) along with the sampling error (within-study) variance. One way for estimating τ^2 is the method of moments procedure. The degree of freedom (*df*) in the equation is the number of sampled studies, $k - 1$:

$$\tau^2 = \frac{Q - df}{C} \tag{12}$$

where Q captures the degree of heterogeneity and is calculated as follows:

$$Q = \sum_{i=1}^{k} W_i \hat{\delta}_i^2 - \frac{(\sum_{i=1}^{k} W_i \hat{\delta}_i)^2}{\sum_{i=1}^{k} W_i} \tag{13}$$

and where the term, C, is

$$C = \sum W_i - \frac{\sum W_i^2}{\sum W_i}. \tag{14}$$

Given the researcher has calculated τ^2 then the random effects weight, W_i^*, for study i is the inverse of the random effects variance, $V_{\hat{\delta}_i}^*$, such that

$$W_i^* = \frac{1}{V_{\hat{\delta}_i}^*} \tag{15}$$

where the random effects variance in Equation 16 is the sum of the within- and between-studies variances:

$$V_{\hat{\delta}_i}^* = V_{\hat{\delta}_i} + \tau^2. \tag{16}$$

Given the random effects weight has been calculated for each study then the weighted random effects summary effect $\bar{\delta}_\cdot^*$ can be calculated using:

$$\bar{\delta}_\cdot^* = \frac{\sum_{i=1}^{k} W_i^* \hat{\delta}_i^*}{\sum_{i=1}^{k} W_i^*}. \tag{17}$$

If it is reasonable to assume that all sampled studies are sufficiently homogeneous then the fixed effect model can be used. However, that scenario is sufficiently rare and instead the random effects model is more commonly encouraged. Methodological researchers have argued that the assumption of the fixed effects model is not practical. For that reason, many researchers (for example, Hedges & Vevea, 1998; Kisamore & Brannick, 2008; National Research Council, 1992; Raudenbush, 1994; Hunter & Schmidt, 2004; Schmidt, Oh, & Hayes, 2009) strongly recommend use of the random effects model. When synthesizing effect estimates, therefore, we assumed a random-effects model to handle potential heterogeneity between studies. For meta-ANOVA analyses exploring moderators as sources of heterogeneity, we estimated mixed-effects models.

As mentioned, because internalizing and externalizing outcomes are theoretically and empirically different from each other in terms of etiology and treatment effectiveness, the current study pooled treatment effect size estimates for internalizing and externalizing outcomes separately. Because effectiveness of programs may differ due to unique characteristics of the programs, each study used type of interventions, type of instructors, duration of intervention, or type of measurements. Meta-ANOVA was conducted with categorical predictors (Cooper, Hedges, & Valentine, 2009; Konstantopoulos & Hedges, 2009) based on between studies variance statistics (see Equation 12).

Chapter 3: Results

Study Characteristics

The current study includes 24 studies with overall sample size of 32,985 across studies. The reported mean age of students across the 24 studies was 11.4 years old, and over one-third (n = 9, 37.5%) of the studies used a mixture of grade levels, meaning that data was gathered from a combination of elementary, middle, and high school settings. The average percentage of male participants was 51.4% across all studies. Of studies that reported their samples' race/ethnicity (n = 23), the percentages of the participants were as follows: 34.9% White, 25.3% African American, 36.1% Hispanic, and 18.3% other including Asian American and Native American.

Regarding treatment modalities, 75% of the studies included interventions with multiple components (n=18) using a combination of cognitive-behavioral intervention and social skills training including talk therapy and peer mediation. More specifically, out of the 24 included studies, 58.3% of studies used a behavioral strategy (n=14), 66.7% used a cognitively oriented program (n=16), 91.7% used a social skills program (n=22), none of the studies reported using counseling programs, and 12.5% used peer mediation (n=3). Twenty studies (91.7%) used teacher as the primary interventionist, and two studies (8.3%) used teachers who were assisted by a mental health care provider not affiliated with the school.

Results of the Meta-Analysis

As shown Table 1, the overall mean effect size for externalizing outcomes from 94 effect sizes reported was 0.010 (SE = 0.038, $p > .05$) under the random effects model

and it is not statistically significant. On the other hand, in terms of internalizing outcomes from 27 effect sizes, assuming random effects model, the mean effect size was 0.136 (*SE* = 0.009, $p < .05$) and statistically significant. It indicates that school-based mental health care programs have an effect on resolving internalizing outcomes. The significant difference in treatment effect size for internalizing versus externalizing outcomes (Q_{bet} (1) = 10.30, $p < .05$) indicates that school-based psychosocial interventions are significantly more effective for internalizing than for externalizing outcomes.

Table 3.1
Overall effect size for internalizing and externalizing outcomes

	K	Pooled ES (*SE*)
Internalizing	27	.136* (.038)
Externalizing	94	.010 (.009)
Total	121	Q_{bet} (1) = 10.30*

Note. K = number of effect sizes, Pooled ES = Pooled Effect Size, SE = standard error
** p <.05*

Type of intervention. Within 27 effect sizes for internalizing outcomes, seven effect sizes were from the study design only including social skill interventions, but twenty effect sizes were from the study considering combination of several types of interventions (see Table 2). The mean effect size from only including social skill intervention was 0.092 (*SE* = 0.079, $p > .05$) and was not significant. However, the pooled effect size for the combination of interventions was 0.155 (*SE* = 0.044, $p < .05$) and it was statistically significant. It shows that the intervention includes various types of approaches had more influence on internalizing outcomes. As shown Table 2, the average

effect sizes between effect sizes by social skill intervention only and effect sizes by combination of interventions were not significantly different (Q_{bet} (1) = 0.84, $p > .05$).

On the other hand, under the externalizing outcomes, pooled effect size for cognitive-behavior interventions and for social skills based interventions were not significant but for combination of interventions ($\bar{\delta}_{.}^{*}$ = 0.115, *SE* = 0.033, $p < .05$) were significant (see Table 2). Also, the differences between two types of interventions which only use either cognitive-behavioral intervention or social skills based interventions versus combination of interventions were significant (Q_{bet} (2) = 14.90, $p < .05$).

Table 3.2
Results of meta-ANOVA with type of interventions for internalizing and externalizing outcomes

Type of interventions	Internalizing		Externalizing	
	K	Pooled ES (*SE*)	*K*	Pooled ES (*SE*)
Behavioral	-		3	
Cognitive	-		1	
Behav + Cog	-		5	
Cognitive-Behavioral Only	-		9	-.006 (.034)
Social Skill Only	7	.092 (.079)	55	-.007 (.008)
Cog + Social	-		6	
Behav + Social	3		3	
Behav + Social + Peer	1		4	
Behav + Cog + Social	16		16	
Combination	20	.155* (.044)	29	.115* (.033)
Total	27	Q_{bet} (1) = 0.84	93	Q_{bet} (2) = 14.90*

Note. K = number of effect sizes, Pooled ES = Pooled Effect Size, SE = standard error
** p <.05*

Group size. The pooled effect size for bigger size of program (e.g. classroom) under the internalizing outcomes ($\bar{\delta}_{.}^{*}$ = 0.192, *SE* = 0.031, $p < .05$) and for smaller group size interventions under externalizing outcomes ($\bar{\delta}_{.}^{*}$ = -0.122, *SE* = 0.107, $p < .05$) are

significant (see Table 3). However, none of differences between bigger sizes (e.g. classroom) and smaller group intervention for internalizing and externalizing is significantly different.

Table 3.3
Results of meta-ANOVA with type of instructors for internalizing and externalizing outcomes

	Internalizing		Externalizing	
Group size	*K*	Pooled ES (*SE*)	*K*	Pooled ES (*SE*)
Classroom	13	.192* (.031)	83	.013 (.008)
Small Group	13	.083 (.078)	10	-.122* (.107)
Total	26	Q_{bet} (1) = 2.51	93	Q_{bet} (1) = 1.77

Note. K = number of effect sizes, Pooled ES = Pooled Effect Size, SE = standard error
** p <.05*

Duration of Interventions. According to the results of moderator analysis with duration of interventions (see Table 4), both of short-term interventions ($\bar{\delta}_{\cdot}^{*}$ = 0.251, *SE* = 0.044, $p < .05$) and middle-term interventions ($\bar{\delta}_{\cdot}^{*}$ = 0.157, *SE* = 0.058, $p < .05$) had positive effectiveness on internalizing outcomes whereas there is no significant effectiveness on externalizing outcomes across duration of intervention.

Table 3.4
Results of meta-ANOVA with duration of interventions for internalizing and externalizing outcomes

Duration of	Internalizing		Externalizing	
Intervention	*K*	Pooled ES (*SE*)	*K*	Pooled ES (*SE*)
7.50	-		2	
7.92	3		3	
9.00	6		7	
Short (< 10 hrs.)	9	.251* (.044)	12	.017 (.038)
10.00	2		4	
13.20	-		4	
17.40	8		-	
Middle (>10 hrs.)	10	.157* (.058)	8	-.010 (.106)

Table 3.4: continued.

55.92	-		3	
96.48	-		2	
Long (> 50 hrs.)	-		5	-.053 (.031)
Total	19	Q_{bet} (1) = 4.47	25	Q_{bet} (2) = 4.57

Note. K = number of effect sizes, Pooled ES = Pooled Effect Size, SE = standard error
** p <.05*

Type of Measurements. Regarding internalizing outcomes, the effect sizes from survey measurement, pooled effect sizes was significantly positive ($\bar{\delta}^{*}_{.}$ = 0.158, *SE* = 0.034, $p < .05$) whereas the pooled effect size from observation approach was significantly negative ($\bar{\delta}^{*}_{.}$ = -0.285, *SE* = 0.120, $p < .05$) and the difference between two types of measurements was also significant (Q_{bet} (1) = 12.71, $p < .05$). However, in terms of externalizing outcomes, all of pooled effect sizes from survey, or combinations of measurements were not significant (see Table 5).

Table 3.5
Results of meta-ANOVA with type of measurements for internalizing and externalizing outcomes

Type of Measure	Internalizing		Externalizing	
	K	Pooled ES (*SE*)	*K*	Pooled ES (*SE*)
Survey	24	.158* (.034)	78	.010 (.009)
Observation	3	-.285* (.120)	-	
Archival report/school record	-		2	
Behavioral observation	-		6	
Survey & Observation	-		4	
Survey & Other	-		4	
Combination	-		16	.003 (.073)
Total	27	Q_{bet} (1) = 12.71*	94	Q_{bet} (1) = .01

Note. K = number of effect sizes, Pooled ES = Pooled Effect Size, SE = standard error
** p <.05*

Analysis of Publication Bias

Figure 2 and Figure 3 present the funnel plots for internalizing and externalizing outcomes, respectively. Both funnel plots are reasonably symmetric, indicating that publication bias does not appear to be a source of bias in this review. When using trim and fill method to examine adjusted estimates (Duval, & Tweedie, 2000), for internalizing outcomes, the unadjusted effect size estimate was 0.136 ($p < .05$) and the adjusted effect size estimate was 0.106 ($p < .05$) after trimmed four effect sizes. For externalizing outcomes, the unadjusted effect size estimate was 0.010 ($p > .05$) and the adjusted effect size estimate was 0.008 ($p > .05$) after trimmed three effect sizes. For both types of outcomes, the analyses provided similar effect size estimate for the funnel plot to be symmetric supporting a likely lack of publication bias in these effect size estimates.

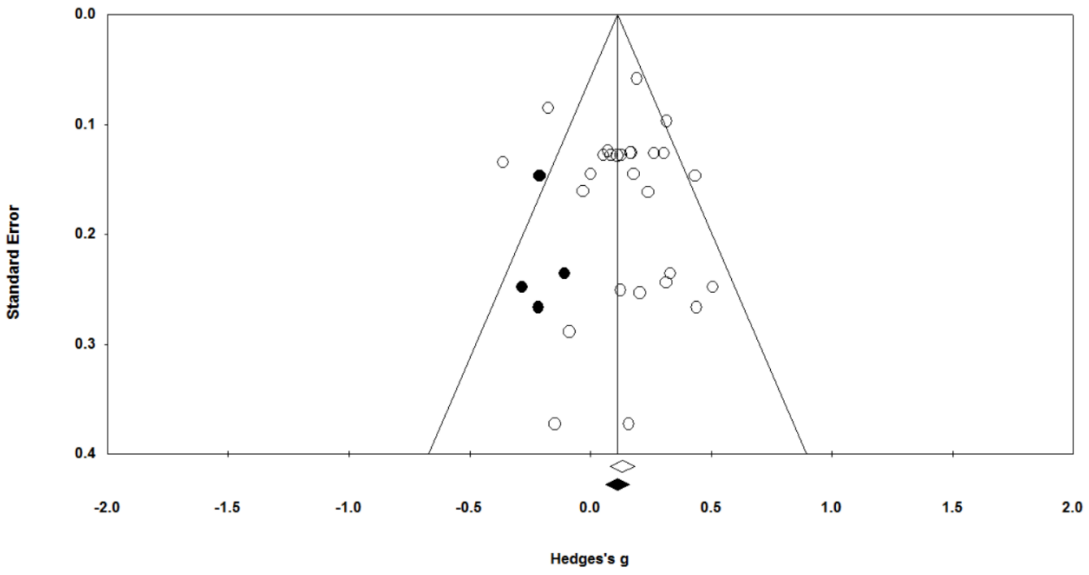

Figure 3.1 Funnel plot for internalizing and internalizing outcomes

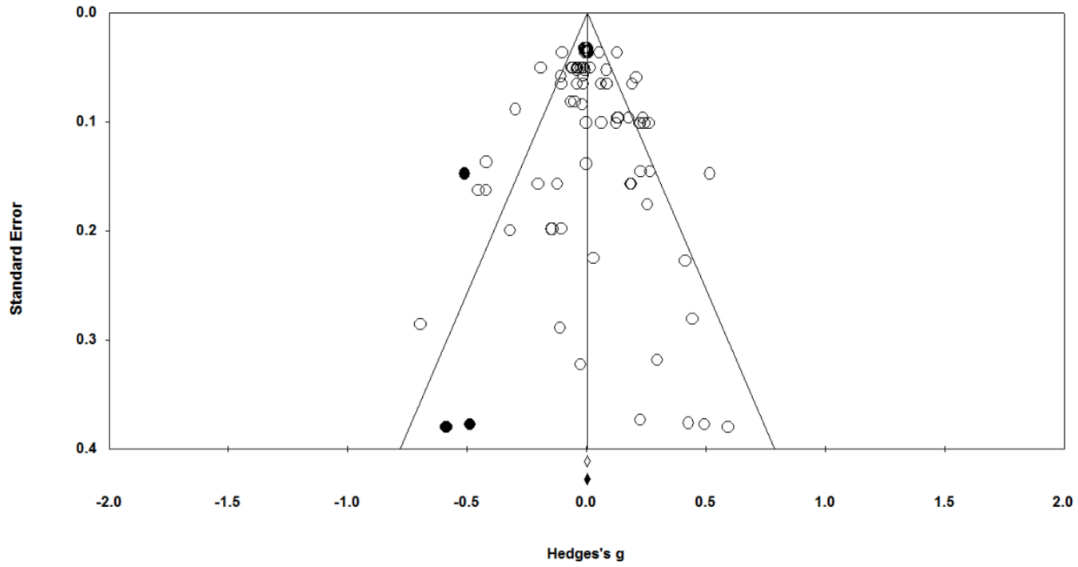

Figure 3.2 Funnel plot for internalizing and externalizing outcomes

Chapter 4: Discussion

The current study reviewed the previous studies, which investigated the effectiveness of school-based mental health programs delivered by teachers on internalizing and externalizing outcomes and the factors that may moderate effects of those interventions with quantitative meta-analysis approach.

Overall, the pooled effect size on internalizing outcomes are positively significant whereas pooled effect size on externalizing outcomes. The results is constant to Weisz, Hawley, and Doss (2004) study that reported more significant treatment effects for internalizing outcomes than those for externalizing outcomes. Several previous studies, however, reported that interventions are effective with both internalizing and externalizing outcomes (Durlak, et. al., 2011), and additional reviews that found structured interventions delivered by teachers were particularly effective with externalizing behavior such as aggression (Lipsey et. al. 2003). The reason why the dissimilar results could be inclusion criteria for primary studies. For example, the current study focused on teacher delivered interventions while other studies investigated school mental health interventions across a greater variation of study designs and service providers. The results of current study could provide the effectiveness of school-based mental health programs especially delivered by teacher rather than mixture of various types of school-based mental health programs.

In terms of type of interventions, both of internalizing and externalizing outcomes were significant effectiveness under the combinations of various types of program. In addition, even though the intervention only including social skill intervention did not

significant effectiveness on internalizing outcomes, the all combination interventions for internalizing outcomes included social skill interventions. Because the internalizing and externalizing problems are typically related and occur at the same time, if the program included cognitive-behavioral intervention as well as social-skill intervention, more flexible program curriculum can be used depending on conditions of participants.

According to the results of current study, the classroom level intervention had larger effects on internalizing outcomes. The finding support other reviews that indicated teacher-delivered in classroom is effective (e.g. Durlak, et. al. 2011; Stormont et al., 2011; Franklin et. al. 2012; Paulus, et al. 2016). In the analysis, 22 out of 24 studies reported that they used manualized curriculums. Past literature has also emphasized the importance of studying implementation factors such as training and supervision because they are critical to the success of teachers (Barnes, et. al. 2014; Frey, et. al. 2011). Even though interventions in the classroom had larger group size that may less focus on individual, structured manuals and intimacy between students and teacher had more effectiveness on internalizing outcomes. On the other hand, the small group had negative effects on externalizing outcomes. It might be because of two reason: smaller number of effect sizes included in the small group category and characteristics of students participated small group intervention. First, as reported, the number of effect sizes on small group intervention for externalizing outcomes was 10 thus the results could be sensitive the magnitude of effect sizes included. Second, the school based mental therapy with small group is typically aimed at students who had externalizing problem distinctly.

Therefore, program could be hard to support the students within restricted duration of interventions.

In terms of duration of intervention, finding the treatment duration being a significant moderator agrees with both the general psychotherapy literature and the school mental health service literature. The general psychotherapy literature (e.g. Malan, 1963; Martin, Garske, & Davis, 2000) has long established that short-term psychotherapies (mostly from four to six sessions) are as effective as long-term ones for various reasons. Two most acknowledged reasons include, first, the common factor effects (e.g. Wampold, & Zac, 2015) which argues that any psychotherapy works because of a strong therapeutic alliance rather than other factors such as a psychotherapy's theoretical orientation, duration, and other factors. From the common factor perspective, a short-term psychotherapy can be as effective as long-term ones if a therapeutic relationship can be built quickly at the early stage of intervention. A second reason that has been argued in favor of short-term therapy is the post-treatment effect (Sifneos, 1992). It has been argued that patients would, through an internalized therapeutic dialogue and other mechanism learned from short-term therapy, achieve therapeutic gains on their own after the termination. From this perspective, short-term therapy might even have greater effects than long-term ones because clients no longer depend on their therapists for therapeutic gains but have more control of their own.

These conceptual debates have been supported by the empirical literature as well. Baldwin and colleagues (2009) examined the relationship between treatment dosage and the rate of change of 4,676 patients and discovered that small doses of treatment were

related to relatively fast rates of change, whereas large doses of treatment were related to slower rates of change. Similar empirical evidence was found among younger populations. A study (Andrade et al., 1999) discovered that children receiving substantial amounts of treatment showed no better mental health outcomes than those receiving negligible amounts of treatment. A meta-analytic review of school-based intervention (Durlak et al., 2011) reported that intervention duration was significantly and negatively associated to skill outcomes of children.

The observation measured negative effectiveness of the intervention whereas the self-report survey measured significant positive effects of the intervention for internalizing outcomes. Because the internalizing problem (e.g., depression and anxiety) is hard to observe rather than externalizing outcomes (e.g., aggressive behavior), the results from observation measurement for internalizing outcomes could underestimate the effectiveness of interventions. Also, as similar to the results of group size for externalizing outcomes, the results might be sensitive the effect sizes included because the number of effect sizes in observation measurement for internalizing is only three effect sizes.

Even though current study could provide the relevant information and evaluation for the school-based teacher delivered interventions by meta-analytic approach, there are several limitations of current study. First, there will be studies that should be included in the meta-analysis but not be included. Also, the current study was not able to conduct several moderator analyses such as follow-up results of the interventions because of lack of information from primary studies thus future research is needed. Second, the meta-

analysis method used also made it necessary to limit several studies because it was not possible to calculate effect sizes based on the statistical techniques used in the individual studies. Although there were some studies reporting multiple effect sizes using related outcomes for the same sample, which introduces dependence into the resulting effect sizes, we had to ignore that dependence in our synthesis. The reason for this is that other statistical procedures that better handle within-study dependence [e.g., robust variance estimation (RVE; Hedges et al., 2010)] require much larger sample sizes for unbiased recovery of parameters such as 40 studies and 5 effect sizes per study.

References

* indicates articles included in this review.

Amaral, G., Geierstanger, S., Soleimanpour, S., & Brindis, C. (2011). Mental Health Characteristics and Health-Seeking Behaviors of Adolescent School-Based Health Center Users and Nonusers. *Journal of School Health, 81*(3), 138-145.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Anderson-Butcher, D., & Ashton, D. (2004). Innovative models of collaboration to serve children, youths, families, and communities. *Children & Schools, 26*(1), 39-53.

Andrade, A. R., Lambert, W., & Bickman, L. (1999). Dose effect in child psychotherapy: Outcomes associated with negligible treatment. *Journal of American Academy Child and Adolescent Psychiatry, 39*(2), 161 – 168.

Baldwin, S. A., Berkeljon, A., Atkins, D. C., Olsen, J. A., & Nielsen, S. L. (2009). Rates of change in naturalistic psychotherapy: Contrasting dose-effect and good-enough level models of change. *Journal of Consulting and Clinical Psychology, 77*(2), 203 – 211.

Bain, R. M., & Diallo, A. F. (2016). Mental health services in school-based health centers: Systematic review. *The Journal of School Nursing: The Official Publication of the National Association of School Nurses, 32*(1), 8.

Barnes, T., Smith, S., & Miller, M. (2014). School-based cognitive-behavioral interventions in the treatment of aggression in the United States: A meta-analysis. *Aggression and Violent Behavior, 19*(4), 311-321.

* Benner, G. J., Nelson, J. R., Sanders, E. A., & Ralston, N. C. (2012). Behavior intervention for students with externalizing behavior problems: Primary-level standard protocol. *Exceptional Children, 78*(2), 181 – 198.

Berzin, S. C., O'Brien, K. H. M., Frey, A., Kelly, M. S., Alvarez, M. E., & Shaffer, G. L. (2011). Meeting the social and behavioral health needs of students: Rethinking the relationship between teachers and school social workers. *Journal of School Health, 81*(8), 493-501.

* Botvin, G. J., Griffin, K. W., Diaz, T., & Ifill-Williams, M. (2001). Preventing binge drinking during early adolescence: One- and two-year follow-up of a school-based preventive intervention. *Psychology of Addictive Behaviors, 15*(4), 360 – 365.

* Botvin, G. J., & Griffin, K. W. (2006). Preventing youth violence and delinquency through a universal school-based prevention approach. *Prevention Science, 7*(1), 403 – 408.

* Brown, E. C., Low, S., Smith, B. H., & Haggerty, K. P. (2001). Outcomes from a school-randomized controlled trial of steps to respect: A bullying prevention program. *School Psychology Review, 40*(3), 423 – 443.

* Cappella, E., Hamre, B., Kim, H. Y., Henry, D. B., Frazier, S. L., & Atkins, M. S. (2012). Teacher consultation and coaching within mental health practice: Classroom and child effects in urban elementary schools. *Journal of consulting and Clinical Psychology, 80*(4), 597 – 610.

* Chaplin, T. M., Gillham, J. E., Reivich, K., Elkon, A. G. L., Samuels, B., Freres, D. R., … Seligman, M. E. P. (2006). Depression prevention for early adolescent girls: A pilot study of all girls versus co-ed groups. *Journal of Early Adolescence, 26*(1), 110 – 126.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences, 2nd Ed.* New York: Academic Press.

Cooper, H., Hedges, L. V., & Valentine, J. C. (2009). The handbook of research synthesis and meta-analysis, 2nd Ed. New York: Russell Sage Foundation.

* Crean, H. F., & Johnson, D. B. (2013). Promoting alternative thinking strategies (PATHS) and elementary school aged children's aggression: Results from a cluster randomized trial. *American Journal of Community Psychology*, *52*(1), 56 – 72.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., and Schellinger, K. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82,* 474-501.

Eiraldi, R., Power, T. J., Schwartz, B. S., Keiffer, J. N., McCurdy, B. L., Mathen, M., & Jawad, A. F. (2016). Examining effectiveness of group cognitive-behavioral therapy for externalizing and internalizing disorders in urban schools. *Behavior modification*, *40*(4), 611-639.

* Eron, L., Huesmann, R., Spindler, Guerra, N., Henry, D., Tolan, P., & VanAcker, R. Metropolitan Area Child Study Research Group (2002). A cognitive-ecological

approach to preventing aggression in urban settings: Initial outcomes for high-risk children. *Journal of Consulting and Clinical Psychology, 70*(1), 179 – 194.

* Fonagy, P., Twelow, S. W., Vernberg, E. M., Nelson, J. M., Dill, E. J., Little, T. D., & Sargent, J. A. (2009). A cluster randomized controlled trial of child-focused psychiatric consultation and a school systems-focused intervention to reduce aggression. *Journal of Child Psychology and Psychiatry, 50*(5), 607 – 616.

Franklin, C. G., Kim, J. S., Ryan, T. N., Kelly, M. S., & Montgomery, K. L. (2012). Teacher involvement in school mental health interventions: A systematic review. *Children and Youth Services Review, 34*(5), 973-982.

* Frey, K. S., Hirschstein, M. K., Snell, J. L., Edstrom, L. V. S., MacKenzie, E. P., & Broderick, C. J. (2005). Reducing playground bullying and supporting beliefs: An experimental trial of the steps to respect program. *Developmental Psychology, 41*(3), 479 – 491.

Frey, A., Lingo, A., Nelson, C.M. (2011). Positive behavior support and response to intervention in elementary schools. 397-433

*Gillham, J. E., Reivich, K. J., Freres, D. R., Chaplin, T. M., Shatte, A., Samuels, B., … Seligman, M. E. P. (2007). School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency Program. *Journal of Consulting and Clinical Psychology, 75*(1), 9 – 19.

* Gillham, J. E., Reivich, K. J., Brunwasser, S. M., Freres, D. R., Chajon, N. D., Kash-MacDonald, V. M., … Seligman, M. E. P. (2012). Evaluation of a group

cognitive-behavioral depression prevention program for young adolescents: A randomized effectiveness trial. *Journal of Clinical Child & Adolescent Psychology, 41*(5), 621 – 639.

Glass, G. V. (1976). Primary, secondary, and meta-analysis of research. *Educational Researcher, 5*(10), 3–8.

Gleser, L. J., & Olkin, I. (2009). Stochastically dependent effect sizes. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.) (2009). *The Handbook of Research Synthesis and Meta-analysis.* New York, NY: Russell Sage Foundation.

Han, S. S., & Weiss, B. (2005). Sustainability of teacher implementation of school-based mental health programs. *Journal of Abnormal Child Psychology, 33*(6), 665-679.

* Hecht, M. L., Marsiglia, F. F., Elek, E., Wagstaff, D. A., Kulis, S., Dustman, P., & Miller-Day, M. (2003). Culturally grounded substance use prevention: An evaluation of the keepin' it R.E.A.L. Curriculum. *Prevention Science, 4*(4), 233 – 248.

Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research Synthesis Methods, 1*(1), 39 – 65.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis.* San Diego, CA: Academic Press.

Hoagwood, K. E., Olin, S. S., Kerker, B. D., Kratochwill, T. R., Crowe, M., & Saka, N. (2007). Empirically based school interventions targeted at academic and mental health functioning. *Journal of emotional and behavioral disorders, 15*(2), 66-92.

* Holt, L. J., Bry, B. H., & Johnson, V. L. (2008). Enhancing school engagement in at-risk, urban minority adolescents through a school-based, adult mentoring intervention. *Child & Family Behavior Therapy, 30*(4), 297 – 318.

IBM SPSS Statistics [computer program]. (2015). Version 23.0. Chicago, Illinois: SPSS Inc.

* Iovannone, R., Greenbaum, P. E., Wang, W., Kincaid, D., Dunlap, G., Strain, P. (2009). Randomized controlled trial of the Prevent-Teach-Reinforce (PTR) tertiary intervention for students with problem behaviors: Preliminary outcomes. *Journal of Emotional and Behavioral Disorders, 17*(4), 213 – 225.

Kearney, C. A. (2016). *Managing School Absenteeism at Multiple Tiers: An Evidence-Based and Practical Guide for Professionals*. New York: Oxford University Press.

Kelly, M. S. (2008). *The domains and demands of school social work practice: A guide to working effectively with students, families and schools*. New York: Oxford University Press.

Konstantopoulos, S., & Hedges, L. V. (2009). Analyzing effect sizes: Fixed-effect models. In H. Cooper, L.V. Hedges, & J. Valentine (Eds.). (2009). The handbook of research synthesis and meta-analysis, 2nd Ed. New York: Russell Sage Foundation, pp. 279-293.

* Leff, S. S., Gullan, R. L., Paskewich, B. S., Abdul-Kabir, S., Jawad, A. F., Grossman, M., … Power, T. J. (2009). An initial evaluation of a culturally adapted social problem-solving and relational aggression prevention program for urban African-

American relationally aggressive girls. *Journal of Prevention & Intervention in the Community*, *37*(4), 260 – 274.

* Leff, S. S., Waasdorp, T. E., Raskewich, B., Bullan, R. L., Jawad, A. F., MacEvoy, J. P., …, Power, T. J. (2010). The preventing relational aggression in schools everyday program: A preliminary evaluation of acceptability and impact. *School Psychology Review*, *39*(4), 569 – 587.

* MAGSRG Study. The Metropolitan Area Child Study Research Group. (2007). Changing the way children "think" about aggression: Social-cognitive effects of a preventive intervention. *Journal of Consulting and Clinical Psychology, 75*(1), 160 – 167.

Malan, D. H. (1963). *A study of brief psychotherapy.* New York: A Plenum/Rosetta Edition.

Martin, D. J., Garske, J. P., & Davis, K. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *68*(3), 438 – 450.

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., ... & Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(10), 980-989.

* Metz, A. E., Fuemmeler, B. F., & Brown, R. T. (2006). Implementation and assessmet of an empirically validated intervention program to prevent tobacco use among

African-American middle-school youth. *Journal of Clinical Psychology in Medical Settings, 13*(3), 229 – 238.

* Murray, C., & Malmgren, K. (2005). Implementing a teacher-student relationship program in a high-poverty urban school: Effects on social, emotional, and academic adjustment and lessons learned. *Journal of School Psychology, 43*, 137 – 152.

Ojio, Y., Yonehara, H., Taneichi, S., Yamasaki, S., Ando, S., Togo, F., ... & Sasaki, T. (2015). Effects of school-based mental health literacy education for secondary school students to be delivered by school teachers: A preliminary study. *Psychiatry and Clinical Neurosciences, 69*(9), 572-579.

* O'Neill, J. M., Clark, J. K., & Jones, J. A. (2010). Promoting mental health and preventing substance abuse and violence in elementary students: A randomized control study of the Michigan model for health. *Journal of School Health, 81*(6), 320 – 330.

Paulus, F. W., Ohmann, S., & Popow, C. (2016). Practitioner review: School-based interventions in child mental health. *Journal of Child Psychology and Psychiatry*. doi: 10.1111/jcpp.12584

Rajaleid, K., Nummi, T., Westerlund, H., Virtanen, P., Gustafsson, P. E., & Hammarström, A. (2016). Social adversities in adolescence predict unfavorable trajectories of internalized mental health symptoms until middle age: results from the Northern Swedish Cohort. *The European Journal of Public Health, 26*(1), 23-29.

Ringwalt, C. L., Pankratz, M. M., Jackson-Newsom, J., Gottfredson, N. C., Hansen, W. B., Giles, S. M., & Dusenbury, L. (2010). Three-year trajectory of teachers' fidelity to a drug prevention curriculum. *Prevention Science*, *11*(1), 67-76.

Rones, M., & Hoagwood, K. (2000). School-based mental health services: A research review. *Clinical child and family psychology review*, *3*(4), 223-241.

Sifneos, P. E. (1992). *Short-term anxiety-provoking psychotherapy: A treatment manual.* New York: Basic Books.

* Simonsen, B., Myers, D., & Briere III, D. E. (2011). Comparing a behavioral Check-In/Check-Out (CICO) intervention to standard practice in an urban middle school setting using an experimental group design. *Journal of Positive Behavior Interventions*, *13*(1), 31 – 48.

* Spoth, R., Randall, G. K., Shin, C., & Redmond, C. (2005). Randomized study of combined universal family and school preventive interventions: Patterns of long-term effects on initiation, regular use, and weekly drunkenness. *Psychology of Addictive Behaviors*, *19*(4), 372 – 381.

*Spoth, R. L., Randall, G. K., Trudeau, L., Shin, C., & Redmond, C. (2008). Substance use outcomes 5½ years past baseline for partnership-based, family-school preventive interventions. *Drug and alcohol dependence*, *96*(1), 57-68.

Stagman, S., & Cooper, J. L. (2010). Children's mental health; what every policymaker should know. (Policy brief). Mailman School of Public Health, National Center for Children in Poverty, Columbia University. Retrieved from: http://www.lacdcfs.org/ katiea/practices/docs/Childrens_MH.pdf

Stormont, M., Reinke, W., & Herman, K. (2011). Teachers' knowledge of evidence-based interventions and available school resources for children with emotional and behavioral problems. *Journal of Behavioral Education*, *20*(2), 138-147.

Vevea, J. L. & Woods, C. M. (2005). Publication bias in research synthesis: Sensitivity analysis using a priori weight functions. *Psychological Methods, 10*(4), 428 – 443.

Vreeman, R. C., & Carroll, A. E. (2007). A systematic review of school-based interventions to prevent bullying. *Archives of Pediatrics & Adolescent Medicine, 161*(1), 78-88.

Walmpold, B. E., & Imel, Z. E. (2015). *The great psychotherapy debate: The evidence for what makes psychotherapy work, 2nd ed.* New York: Routledge Taylor & Francis Group.

Weisz, J. R., Hawley, K. M., & Doss, A. J. (2004). Empirically tested psychotherapies for youth internalizing and externalizing problems and disorders. *Child and Adolescent Psychiatric Clinics of North America, 13*(4), 729 – 815.

Wilson, S. J., & Lipsey, M. W. (2007). School-based interventions for aggressive and disruptive behavior: Update of a meta-analysis. *American Journal of Preventive Medicine, 33*(2), S130-S143.