Abstract Title Page

Title: Effects of After-School Programs on Attendance and Externalizing Behaviors with Primary and Secondary School Students: A Systematic Review and Meta-Analysis

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Background / Context:

Over the past two decades, the number and types of after-school programs (ASPs) have increased substantially as a result of increased federal and private spending and because ASPs are perceived to provide wide-ranging and far-reaching benefits to students, families, schools and the public (Mahoney et al., 2009). Research on effects of ASPs, however, has produced a body of ambiguous evidence. Several reviews and two meta-analyses have been conducted examining the outcomes of ASPs (see Apsler, 2009; Durlak et al., 2010; Fashola, 1998; Hollister, 2003; Lauer et al., 2006; Roth et al., 2010; Scott-Little, Hamann, & Jurs, 2002; Zief et al., 2006), yielding mixed and inconclusive results for the effects of ASPs on attendance or externalizing behavior outcomes. Prior reviews, however, are limited by the quality and methods employed to conduct the reviews (e.g., did not use systematic methods, employed a narrative approach, did not assess quality of included studies). In addition, most reviews are outdated; the two most recently published reviews concluded the search for studies in 2007 (Durlak et al., 2010; Roth et al., 2010). As the number of studies of ASPs conducted since 2007 has increased, and synthesis methods have advanced, it seems timely for an updated systematic review and meta-analysis of ASPs to examine the extent to which the outcome research has advanced and examine the effects of ASPs using contemporary studies and techniques.

Purpose / Objective / Research Question / Focus of Study:

The purpose of this systematic review and meta-analysis is to synthesize the available evidence on the effects of after-school programs with at-risk primary and secondary students on school attendance and externalizing behavior outcomes. The specific questions guiding this review were: 1) What are the effects of ASPs on school attendance with at-risk students who attend an ASP compared to at-risk students who do not attend an ASP? 2) What are the effects of ASPs on externalizing behavioral outcomes with at-risk students who attend an ASP compared to at-risk students who do not attend an ASP? 3) Are there study, participant or program characteristics that moderate effects of ASPs?

Setting:

Studies included in this review were conducted in any setting that housed an ASP (e.g., school, community organization, church). Due to significant differences in educational systems around the world, this review was limited to studies conducted in the United States, Canada, United Kingdom, Ireland, and Australia.

Population / Participants / Subjects:

Published and unpublished studies conducted between 1980 and May, 2014 were eligible for inclusion if they examined the effects of an ASP with primary or secondary school students who were considered “at-risk” defined as: (1) performing below grade level or having low scores on academic achievement tests; (2) attending a low-performing or Title I school; (3) having characteristics associated with risk for lower academic achievement, such as low socioeconomic status, racial- or ethnic-minority background, single-parent family, limited English proficiency, or a victim of abuse or neglect; or (4) engaging in high-risk behavior, such as truancy, running

away, substance use, or delinquency (adapted from Lauer et al., 2006). To be included in the review, studies must have employed an experimental or quasi-experimental design examining effects of an ASP against a comparison group (wait-list or no intervention, treatment as usual, straw-man, or alternative interventions) and reported baseline measures of outcome variables or covariate adjusted posttest means. Studies must have measured either school attendance or externalizing behaviors (broadly defined as any acting out or problematic behavior, including but not limited to disruptive behavior, substance use, or delinquency) to be included.

Intervention / Program / Practice:

Interventions included in this review were ASPs defined as an organized program supervised by adults that occurred during after-school hours within the regular school year. Interventions that operated solely during the summer, occurred during school hours, or were solely mentoring or tutoring services were excluded from this review. Mentoring and tutoring programs, while often occurring after school, are not generally classified as an after-school program and have been synthesized as separate types of interventions (see DuBois et al., 2011; Ritter et al., 2009; Tolan et al., 2013).

Research Design:

Systematic review methodology, following the Campbell Collaboration procedures and guidelines (Campbell Collaboration, 2014), was used for all aspects of the search, retrieval, selection, and coding of published and unpublished studies meeting study inclusion criteria. Meta-analysis was used to quantitatively synthesize results across studies.

Data Collection and Analysis:

Information Sources. Several sources were used to identify eligible published and unpublished studies between 1980 and May, 2014. Eight electronic databases were searched. Keyword searches within each electronic database included variations of "after-school program" and (evaluation OR treatment OR intervention OR outcome). The full search strategy for each electronic database is available from the authors. Potential reports were also sought by searching several research registers and internet sites; hand-searching reference lists of prior reviews and articles identified during the search; and contacting experts via email for potentially relevant published and unpublished reports.

Study Selection and Data Extraction. Titles and abstracts of the studies found through the search procedures were screened for relevance by one author. Documents that were not obviously ineligible or irrelevant based on the abstract review were retrieved in full text and screened by one author using a screening instrument. Following initial screening, potentially eligible studies were further reviewed by two authors to determine final inclusion. Any discrepancies between authors were discussed and resolved through consensus and, when needed, a third author reviewed the study.

Studies that met inclusion criteria were coded using a coding instrument comprised of five sections: 1) source descriptors and study context; 2) sample descriptors; 3) intervention descriptors; 4) research methods and quality descriptors; and 5) effect size data. The data extraction instrument, available from the authors, was pilot tested by two authors and

adjustments to the coding form were made. Two authors then independently coded all data related to moderator variables (i.e., study design, grade level, contact frequency, control treatment, program type, and program focus), risk of bias (Cochrane Collaboration's Risk of Bias Tool; Higgins et al., 2011) and effect size calculations. Discrepancies between the two coders were discussed and resolved through consensus. Descriptive data related to study, sample and intervention characteristics were coded by one author, with 20% of the studies coded by a second author. Inter-rater agreement on descriptive items was 92.3%. If data were missing from a study, every effort was made to contact the study author to request the missing data; we received additional data from four authors.

Statistical Procedures. We calculated the standardized-mean difference, correcting for small-sample bias using Hedges *g* for each outcome included in the review. To control for pre-test difference between the intervention and control conditions, we subtracted the pre-test effect size from the post-test effect size (Lipsey & Wilson, 2001). The variance was calculated for each effect size, adjusting for the number of effect sizes in the study (Hedges et al., 2010). Robust variance estimation (RVE), was used to synthesize the effect sizes. Unlike traditional meta-analysis, RVE allows for the inclusion and synthesis of all estimated effect sizes simultaneously (Hedges et al., 2010; Tanner-Smith & Tipton, 2013). RVE models each of the effect sizes, eliminating the need to average or select only one effect size per study. The result of the analysis is random-effects weighted average, similar to traditional syntheses, but including all available information. Of note, we chose to conduct separate meta-analyses for the attendance and behavioral outcomes, given their divergent latent nature. Finally, we estimated the heterogeneity and attempted to model it. Higgins and Thompson (2002) suggested the calculation of I^2, which quantifies the amount of heterogeneity beyond sample differences. Given sufficient heterogeneity, we conducted moderator analyses; we limited the number of moderators to decrease the probability of spurious results (Authors, *in press*). In total, we used six *a priori* determined variables: age (i.e., elementary, middle, or mixed), amount of program contact (i.e., weekly, 3-4 per week, or daily), control group type (i.e., wait list, treatment as usual, straw-man, or alternative intervention), study design (i.e., random or non-random), program type (i.e., National or other), and program focus (i.e., academic, non-academic, or mixed). We used the R package robumeta (Fisher & Tipton, 2014) to conduct all analyses.

Findings / Results:

Twenty-four studies reported in 31 reports were included in the review (See Figure 1 for study search and selection Flow Chart, Table 1 for summary of included studies, Table 2 for study and sample characteristics of included studies and Table 3 for intervention characteristics of Included Studies).

(Please insert Tables 1, 2, & 3 here)

(Please insert Figure 1 here)

Attendance. A total of 16 studies including 16 effect sizes were synthesized to capture the effects of the interventions on students' attendance. The results of the synthesis indicated a very small, non-statistically significant treatment effect ($g = 0.04$, 95% C.I. = -0.02, 0.10; see Figure 2). The homogeneity analysis indicated a moderate degree of heterogeneity ($\tau^2 = .002$, $I^2 = 66.67\%$). Only five moderator analyses were conducted because the "program focus" variable did not include sufficient variability (i.e., all but 1 study used a mixed approach). As presented in Table 4, the results of the moderator analyses did not reveal significant differences ($p > .05$).

(Please insert Figure 2 here)
(Please insert Table 4 here)

Externalizing behaviors. Sixteen studies, including 49 effect sizes, were synthesized to capture effects of interventions on externalizing behavior (mean n of effect sizes = 2.58, Min = 1, Max = 10). Most of the effect sizes measured disruptive behavior or delinquency (n = 39, 79.6%) and the rest measured substance use (n = 10, 20.4%). We chose to pool all measures of externalizing behaviors rather than separate drug or alcohol usage from other externalizing behaviors to allow for greater statistical power and because moderator analysis indicated no significant differences in effects of interventions between substance use and other externalizing behavior outcomes (t = 0.84, p = 0.47). The results of the meta-analysis indicated a small, non-significant effect (g = 0.11, 95% C.I. = -0.05, 0.28; See Figure 3). The homogeneity analysis indicated a high degree of heterogeneity (τ^2 = .03, I^2 = 79.74%). As such, we conducted moderator analyses using all six variables. Results of the moderator analyses did not reveal significant differences (p > .05; see Table 5).

(Please insert Figure 3 here)
Please insert Table 5 here)

Conclusions:

ASPs receive overwhelming positive support and significant resources; however, the overall lack of rigorous studies assessing effects of ASPs and the lack of significant effects of ASPs on attendance and externalizing behaviors found in this review, along with discrepant findings of prior reviews, provide some impetus for us to reconsider the purpose of ASPs and the way ASPs are designed and implemented. For school attendance, the evidence from this review converges with prior quantitative and narrative reviews. Simply, ASPs have not demonstrated significant effects on school attendance (Durlak et al., 2010; Zief et al., 2006). Similar to findings related to effects on attendance, the present review's findings point to non-significant effects of ASPs on externalizing behavior. Although the present results support findings of Zief et al.'s (2006) review, the conclusions offered by other prior reviews on behavioral outcomes have been more positive (Durlak et al., 2010; Scott-Little et al., 2002). The contrast between our findings and the more positive findings from prior reviews likely stems from several factors (e.g., methodological and statistical procedures and inclusion criteria).

The evidence on ASPs to date is fraught with methodological shortcomings, limiting conclusions that can be drawn about the effects of ASPs. ASPs seem to be expected to affect numerous outcomes, but attempt to do so without being intentional in the program elements and mechanisms they implement by using empirical evidence or theories of change in program design to affect those outcomes. It is clear that if our priority is to spend limited resources to provide supervision and activities for youth after school, we should also be investing in studying and implementing programs and program elements that are effective and grounded in empirical evidence and theory. Improving the design of the programs as well as the evaluations of ASPs to examine specific elements and contexts that may affect outcomes could provide valuable information to realize the potential of ASPs.

Appendices

Appendix A. References

References are to be in APA version 6 format.

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

Appendix B. Tables and Figures

Table 1

Summary of Included Studies

1st Author (year)	Program Name	At-Risk Identifier	Program Type	Program Focus	Weekly Contact[a]	N	Grade Level[b]	Study Design	Outcomes	Inclusion in Past Reviews
Arcaira (2010)	Citizen Schools	High minority	National	Academic	Not specified	870	2	QED	EB: Suspensions; AT: Attendance	None
Biggart (2013)	Doodle Den	Struggling readers, low-income	Local	Academic	4	621	1	RCT	EB: Teacher reported ADHD Scale	None
Blumer (2010)	Pathways	History of high-risk behavior	Local	Non academic	4	37	4	QED	EB: CAFAS	None
Foley (2001)	Virtual Y	High % low income and minority	Local	Mixed	Not specified	5915	1	QED	AT: Grade 4 attendance	Durlak et al.
Frazier (2013)	Project NAFASI	High % minority and low income	Local	Non academic	5	127	4	QED	EB: Aggression	None
Gottfredson (2010)	All Stars	High % minority and low income	Local	Non Academic	4	447	2	RCT	EB: Last month drug use, disruptive behavior, aggression, delinquency	None
Gottfredson (2004)	Maryland After School Community Grant	High crime areas	Local	Non Academic	4	349	4	QED	EB: Delinquency, rebellious, drug use	Durlak et al.

Hirsch (2011)	After School Matters	High % minority and low income	Local	Mixed	4	535	3	RCT	EB: Alcohol, drug use, risky intercourse, steal < $50, Steal > $50, suspension, sell drugs, carry weapon, fights gang activity; AT: attendance	None
James-Burdumy (2005, 2007, 2008)	21st CCLC	High % Minority	National	Not specified	5	2288	1	RCT	EB: Suspensions; AT: Absences	Apsler Durlak et al. Roth et al.
James-Burdumy (2005, 2008)	21st CCLC	High % Minority	National	Not specified	4	3831	2	QED	EB: Student-reported disciplinary referrals, teacher reported discipline; AT: Absences	Apsler Durlak et al. Roth et al.
LaFrance (2001)	Safe Haven	High % minority and history of arrest	Local	Mixed	5	241	4	QED	AT: Attendance	None
Langberg (2007)	Challenging Horizons	"Below basic" on standardized tests	Local	Academic	4	48	2	RCT	EB: Parent CGI; Parent IRS; Teacher IRS	None
Le (2011)	Roosevelt Village Center	High % minority and immigrant	Local	Mixed	5	338	2	QED	EB: Truancy; delinquency; arrest	None
Molina (2008)	Challenging Horizons	ADHD diagnosis	Local	Non Academic	3	20	2	RCT	EB: Parent-externalizing; Adolescent-delinquency, maladjustment	None
Nguyen (2007)	21st CCLC	Low income and academic achievement	National	Mixed	4	28169	4	QED	EB: Disciplinary referrals, suspensions; AT: Absences	None

Oyserman (2002)	School to Jobs	High % minority and low-income	Local	Non Academic	2	206	2	QED	EB: Self-report referrals; AT: Attendance	Durlak et al.
Paschtel-Temple (2013)	21st CCLC	Low academic achievement	National	Mixed	3	66	2	QED	EB: Disciplinary referrals; AT: Absences	None
Prenovost (2001)	After School Learning and Safe Neighborhoods Partnership	High % minority, LEP[2]	Local	Mixed	5	1358	2	QED	AT: Absences	Durlak et al. Lauer et al. Roth et al.
Schinke (2000)	Boys and Girls Club	Low-income	National	Mixed	5	188	4	QED	EB: Behavioral incidences; AT: attendance	None
Sibley (2004)	21st CCLC	High % low-income and minority	National	Not specified	Not specified	78	1	QED	EB: Discipline referrals; AT: Attendance	None
Smeallie (1997)	Tutorial Club	Academic failure	Local	Mixed	3	62	2	RCT	AT: Attendance	Lauer et al.
Tebes (2007)	Positive Youth Development Collaborative	High % minority	Local	Non Academic	Not specified	304	4	QED	EB: Alcohol, marijuana, other drug use	Durlak et al.
Weisman (2003)	Maryland After School Community Grant	High % minority	Local	Mixed	4	1068	4	QED	EB: Rebellious behavior; delinquency; drug use; AT: days absent	Durlak et al. Zief et al.
Welsh (2002)	The After School Corporation	High % minority and low-income	Local	Not specified	5	68214	4	QED	AT: Attendance	Lauer et al. Scott-Little et al.

Table 2

Study and Sample Characteristics

Characteristic	N (%)	Characteristic	N (%)
Mean age[1]	11.7	**Predominant Race**	
Free or reduced lunch[2]	78.4%	Caucasian	4 (16.7%)
Percent male[3]	52.5%	African American	11 (45.8%)
Grade level		Hispanic	1 (4.2%)
Elementary	4 (16.7%)	Asian	1 (4.2%)
Middle school	10 (41.7%)	Not reported	7 (29.2%)
High school	1 (4.2%)	**Publication Year**	
Mixed	9 (37.5%)	1990–1999	1 (4.2%)
Research Design Type		2000–2009	15 (62.5%)
RCT	7 (29.2%)	2010–2014	8 (33.3%)
QED	17 (70.8%)	**Publication Type**	
Control Group Condition		Journal	11 (45.8%)
Nothing or Waitlist	17 (70.8)	Dissertation or Thesis	5 (20.8%)
Treatment as Usual	3 (12.5%)	Government Report	3 (12.5%)
Specific Treatment	4 (16.7%)	Other Report	5 (20.8%)
Sample Size		**Country**	
1-150	7 (29.2%)	United States	23 (95.8%)
151-300	3 (12.5%)	Ireland	1 (4.3%)
301-600	5 (20.8%)	Australia	0 (0%)
601 and greater	7 (29.2%)	Canada	0 (0%)
		United Kingdom	0 (0%)

Note: [1]Reported in 12 studies; [2]Reported in 10 studies; [3]Reported in 22 studies

Table 3

Intervention Characteristics

Characteristic	N (%)	Characteristic	N (%)
Settings		**Number of Treatment Sessions**	
School	13 (54.2%)	0-50	3 (12.5%)
Community-based organization	5 (20.8%)	51-100	3 (12.5%)
Mixed	3 (12.5%)	101-150	7 (29.2%)
Unsure	3 (12.5%)	151and greater	4 (16.7%)
Program Focus		Unsure	7 (29.2%)
Academic	3 (12.5%)	**Length of sessions**	
Non-academic	5 (20.8%)	1-1.59 hours	4 (16.7%)
Mixed	12 (50.0%)	2-2.59 hours	4 (16.7%)
Unsure	4 (16.7%)	3-3.59 hours	10 (41.7%)
Manual Used for Intervention		4 hours and greater	3 (12.5%)
No		10 (41.7%)	Unsure 3
(12.5%)			
Yes, for entire program	7 (29.2%)	**Weekly Contact Frequency**	
Yes, for partial treatment	6 (25.0%)	Once	1 (4.2%)
Unsure	1 (4.2%)	Twice	2 (8.3%)
Program Coverage		Three to Four	9 (37.5%)
National	7 (29.2%)	Five	8 (33.3%)
Local	17 (70.8%)	Unsure	4 (16.7%)

Table 4:

Moderator Analysis: Attendance Outcome

Moderator	Level (Effect Sizes)	Effect Size (S.E.)	95% C.I.
Age			
	Elementary (3)	.06 (.04)	-.27, .38
	Middle (7)	-.02 (.06)	-.20, .17
	Mixed (5)	.07 (.03)	-.06, .21
Contact			
	Weekly (2)	-.22 (.26)	-3.49, 3.05
	3-4x/ Week (4)	.07 (.04)	-.06, .20
	Daily (7)	-.01 (.05)	-.15, .15
Control Type			
	Wait list (13)	.01 (.03)	-.05, .08
	Treatment as usual (2)	.06 (.11)	-.15, .27
Design			
	Random (3)	.04 (.04)	-.30, .37
	Non-random (13)	.04 (.03)	-.03, .11
Program Type			
	Non-national (9)	-.01 (.05)	-.14, .12
	National (7)	.06 (.03)	-.02, .14

Notes: None of the moderator analyses revealed significant differences ($p < .05$); "program focus" moderator eliminated from the analysis due to missingness.

Table 5:

Moderator Analysis: Externalizing Behavior Outcome

Moderator	Level (Effect Sizes)	Effect Size (S.E.)	95% C.I.
Age			
	Elementary (3)	.07 (.12)	-.47, .62
	Middle (17)	.14 (.06)	-.01, .30
	Mixed (19)	.15 (.26)	-.52, .83
Contact			
	Weekly (4)	.25 (.11)	-1.17, 1.67
	3-4x/ Week (26)	.02 (.06)	-.13, .17
	Daily (13)	.21 (.26)	-.54, .95
Control Type			
	Wait list (27)	.07 (.04)	-.04, .16
	Treatment as usual (13)	.81 (.67)	-2.92, 1.77
	Straw-man (8)	-.19 (.37)	-2.16, 1.79
Design			
	Random (22)	.07 (.09)	-.23, .36
	Non-random (27)	.14 (.11)	-.10, .38
Program Type			
	Non-national (40)	.04 (.07)	-.11, .19
	National (9)	.19 (.15)	-.19, .56
Focus			
	Academic (5)	.20 (.07)	-.40, .75
	Non-academic (11)	-.04 (.26)	-1.04, .97
	Mixed (32)	.11 (.12)	-.16, .38

Notes: None of the moderator analyses revealed significant differences ($p < .05$).

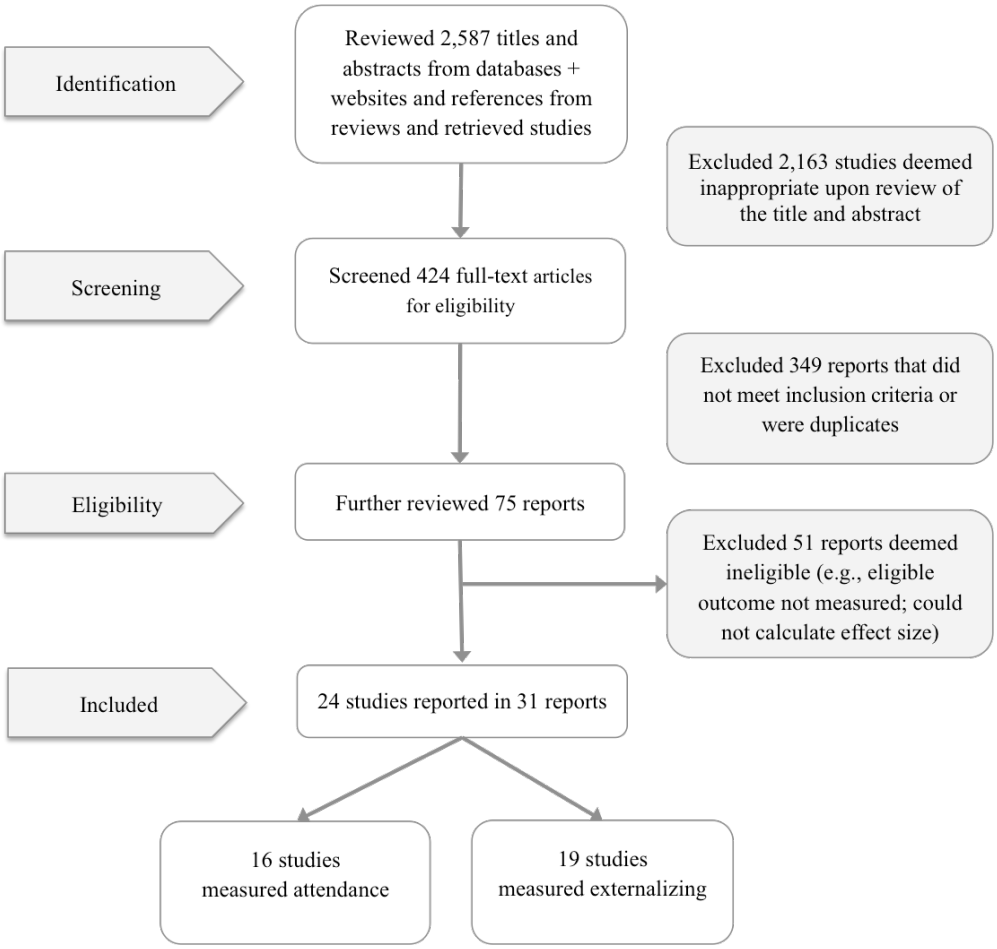

Figure 1. *Study Selection Flow Chart*

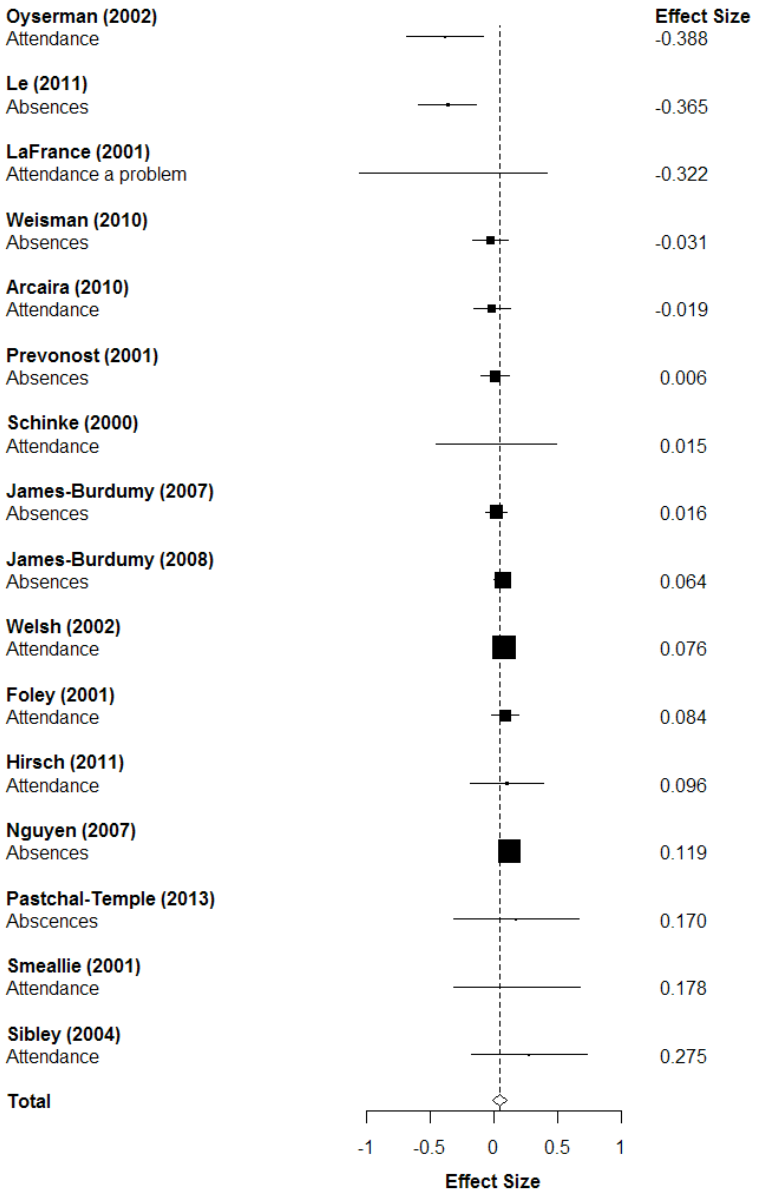

Figure 2. *Forest Plot: Attendance Outcomes*

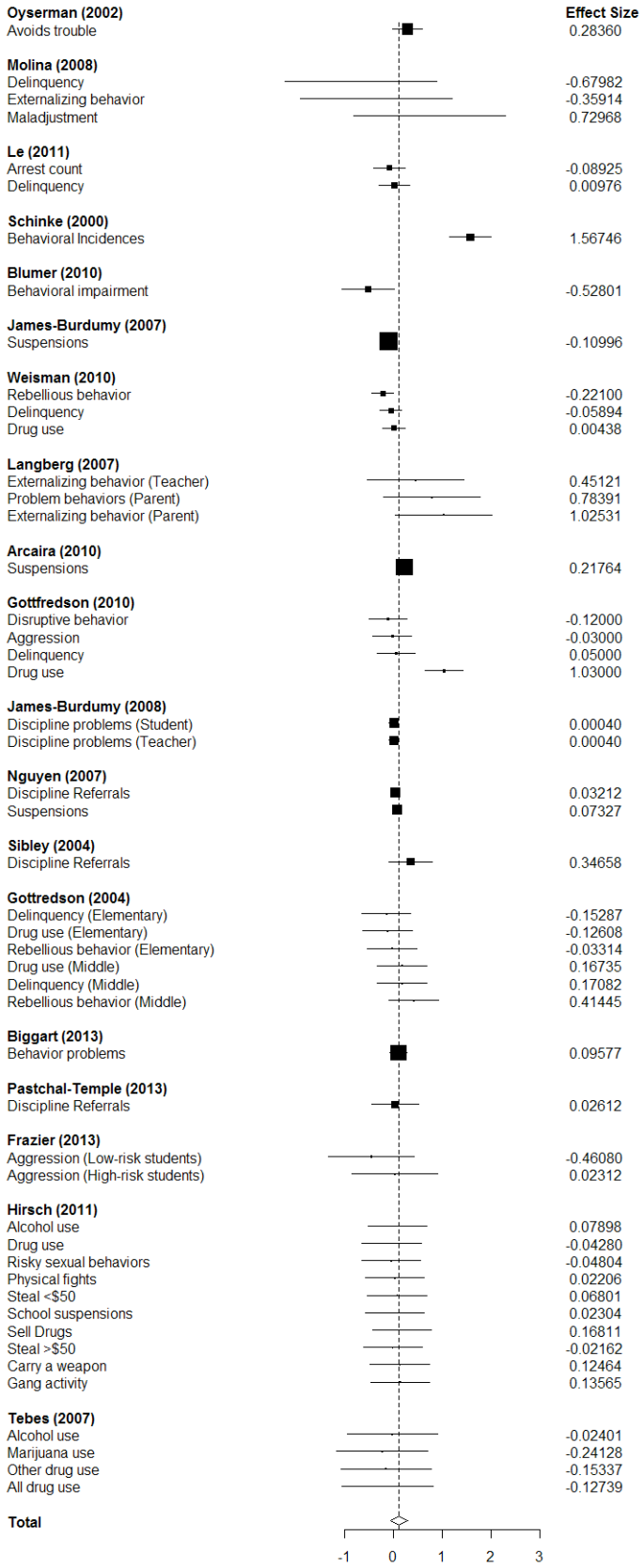

Figure 2: *Forest Plot: Externalizing Behavior Outcomes*