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A Meta-analysis of the Effects of Dropout Prevention Programs on School Absenteeism

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Abstract This study reports findings from a systematic review and meta-analysis of literature examining the effects of school dropout prevention and intervention programs on students' school absenteeism outcomes. The meta-analysis synthesized 74 effect sizes measuring posttest differences in school absenteeism outcomes for youth enrolled in dropout prevention programs relative to a comparison group. Although results from randomized controlled trials indicated significant beneficial program effects, findings from quasi-experimental studies indicated no significant beneficial or detrimental effects. Examination of study characteristics suggested that dropout programs may have beneficial effects on school absenteeism among primarily male samples, and younger samples. Although no single type of intervention program was consistently more effective than others, vocational oriented and supplemental academic training programs showed some promise. However, the inconsistency in results and the possibility of small study bias mean the quality of evidence in this literature is low; at this time there is not enough evidence to conclude that dropout prevention programs have a universal impact on youth's school absenteeism outcomes.

Keywords Dropout prevention · Meta-analysis · School absenteeism · School attendance · Truancy

In a global marketplace, education has critical importance as a primary factor in allowing young adults to enter the workforce and advance economically. To receive the full benefits of education, students must be present and engaged in school, yet absenteeism rates in the United States remain high and relatively stable. Given the negative academic and social consequences associated with school absenteeism, there is a large body of literature evaluating the effectiveness of prevention programs aimed at reducing absenteeism. Furthermore, the strong relationship between school absenteeism and school dropout has prompted research on dropout prevention programs that focus on absenteeism as an intervention target and potential change-agent. Although school dropout prevention programs can be effective at reducing dropout (Wilson et al. 2011), it is unclear whether they might also have effects on other outcomes such as absenteeism. In an era of scarce economic resources, it is important to understand whether dropout prevention programs may influence other related problems such as absenteeism. To further explore this issue, we take a subset of studies from a larger systematic review and meta-analysis of dropout prevention programs and examine the effects of those dropout prevention programs on absenteeism outcomes among youth.

In the United States, school absenteeism is relatively common, and rates have remained stable since 1994 (NCES 2006). In 2005, an estimated 19 % of 4th graders and 20 % of 8th graders were absent from school at least 3 days in the past month. The proportion of 4th graders missing at least five days of school in the past month was lower (7 %), but this nonetheless amounts to a large number of children missing

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significant school time. In fact, being absent from school five days a month amounts to missing out on a quarter of a student's potential educational time. Compounded over time, children with excessive absences are exposed to less instructional time at school and can fall behind on school work. Absenteeism thus prevents children from taking full advantage of their educational opportunities. Poor school attendance is also troubling because of its correlation with a host of other negative outcomes, such as antisocial behavior and delinquency, substance use, and other risky behaviors (Henry and Huizinga 2007).

Given the long-term detrimental consequences associated with school absenteeism, it is not surprising that researchers and practitioners have developed numerous prevention programs explicitly aimed at reducing absenteeism (see NCSE 2011). Prevention programs aimed at reducing absenteeism encompass a diverse range of intervention modalities such as individual counseling, peer counseling, family therapy, behavioral management, case management services, or tutoring services. One recent systematic review and meta-analysis of indicated interventions to reduce chronic school absenteeism concluded that, on average, such programs are effective in reducing absenteeism (Maynard et al. 2012; see also Sutphen et al. 2010).

Why School Dropout Programs May Influence Absenteeism

Several scholars have posited that school absenteeism may best be understood within the context of school engagement, such that there is a continuum of school engagement ranging from full engagement to school dropout, with absenteeism located somewhere along that continuum. The social mechanisms behind this school engagement continuum are complex, but nonetheless implicate school absenteeism as a harbinger of school dropout. For instance, Finn's (1989) work outlines two models describing the developmental process associated with school dropout: one is a frustration-self-esteem model, which identifies a cyclic relationship between poor performance, lowered school engagement or attachment due to frustration, and withdrawal and eventual dropout; and, the second is a participation-identification model that links school participation and belonging to increased engagement, and eventual school completion. Prominent in both of these models is the concept of engagement, identified by Finn (1989) and others as a critical factor in understanding both the process of dropout and its relationship to absenteeism (e.g., Christenson et al. 2001; Fredricks et al. 2004).

Empirical research has indeed established that there is a strong association between school absenteeism and school dropout (Battin-Pearson et al. 2000). A striking example of this comes from the Beginning School Study (Alexander et al. 2001), which found that high school dropouts had an average of 6 more absences in first grade compared to those who later graduated from high school, compared to 16 more absences per year during middle school, and 33 more absences per year during their 9th year in school.

Although school dropout rates in the United States vary by calculation method, state, ethnic background, and socioeconomic status, national education goals for school completion are unmet and the number of students who drop out is considerable (Cataldi et al. 2009). For instance, across all states, the percentage of freshman from the class of 2005–2006 who did not graduate from high school in the expected four years ranges from 13.1 % to 44.2 % and averages 26.8 %. The status dropout rate, or percentage of individuals in a certain age range who are not in high school and have not earned a diploma or credential, is slightly lower. In October 2007, the proportion of non-institutionalized 18–24 year olds not in school without a diploma or certificate was 8.7 %. Status dropout rates are much higher for racial/ethnic minorities (21.4 % for Hispanics and 8.4 % for Blacks vs. 5.3 % for Whites). In general, males are more likely to be dropouts than females (9.8 % vs. 7.7 %), but teenage pregnancy and parenthood are particularly strong risk factors for young women (Dalton et al. 2009). In fact, only about 50 % of American teen mothers receive a high school diploma by age 22 (Perper et al. 2010). Event dropout rates, or single year dropout rates for high school students, show that students from low-income households drop out of high school more frequently than those from more advantaged backgrounds (8.8 % for low-income vs. 3.5 % for middle income and 0.9 % for high income students).

As with school absenteeism, dropping out of school before completing the normal course of secondary education greatly undermines the economic and social opportunities associated with education, and is linked to adverse personal and social consequences. According to the National Dropout Prevention Center/Network (2009), school dropouts in the United States earn an average of $9,245 a year less than those who complete high school, have unemployment rates almost 13 percentage points higher than high school graduates, are disproportionately represented in prison populations, are more likely to become teen parents, and more frequently live in poverty. The consequences of school dropout are even worse for minority youth, further exacerbating the economic and structural disadvantages they face.

Given the theoretical and empirical links between school absenteeism and school dropout, an important question is whether dropout prevention programs may also be effective in reducing absenteeism. The growing body of dropout prevention research has increasingly begun to focus on the effects of dropout prevention programs on absenteeism, treating absenteeism not only as a target of the intervention

and potential change-agent, but also as a proximal outcome of the interventions. To our knowledge, the only systematic review addressing this topic to date has been that of Klima et al. (2009), which reviewed 22 truancy and dropout prevention programs. They found significant program effects on outcomes related to students' "presence at school," which included attendance and enrollment outcomes. Given the small number of studies identified in that review, the authors were necessarily limited in their ability to examine comparative effects by programs types, or ability to examine whether study or participant characteristics may have influenced those effects.

Our own work (Wilson et al. 2011) has focused on the effects of dropout interventions on school dropout outcomes, and has identified a much larger literature base of experimental and quasi-experimental studies of dropout interventions than any previous review (e.g., ICF & NDPC/N 2008; Klima et al. 2009; Lehr et al. 2003). Our systematic review found dropout intervention programs to be significantly effective in reducing school dropout, although among the great variety of intervention strategies in the review, none stood out as dramatically more effective than another and nearly all program strategies produced average positive effects on dropout. Given that different strategies produced similar results, we concluded that school administrators and policymakers should consider ease of implementation and cost when selecting programs. It follows, further, that decision makers might consider program effects on other important outcomes, including absenteeism, when selecting from among program strategies. However, we did not examine school absenteeism outcomes in that review, so it is still unclear whether and how dropout prevention programs may influence school absenteeism, as well as school dropout outcomes.

The current study was motivated by this gap and presents results from our larger systematic review and meta-analysis of the experimental and quasi-experimental literature on the effects of school dropout prevention and intervention programs, by focusing on those programs that included middle- and high-school students and outcomes indexing absenteeism from school as well as dropout. Specifically, this study addresses the following research questions:

1. What effects do dropout prevention/intervention programs have on students' school absenteeism, attendance, and/or truancy (hereafter, "absenteeism") outcomes?

2. Is there a relationship between dropout and absenteeism outcomes for dropout studies that measure both? That is, are program effects on absenteeism associated with program effects on dropout?

3. How do the effects of dropout interventions on absenteeism outcomes vary across participant samples with different gender, racial/ethnic, and age profiles?

4. How do the effects of dropout interventions on absenteeism outcomes vary according to setting, dosage, implementation, and program type; and thus what characteristics can be used to define those programs most likely to be effective in practice settings?

Methods

Protocol and Registration

This study analyzes data collected as part of a larger systematic review and meta-analysis examining the effectiveness of prevention and intervention programs on school dropout outcomes (Wilson et al. 2011). The review protocol and systematic review for the larger project are available at: http://campbellcollaboration.org/lib/project/158/.

Eligibility Criteria and Search Strategy

To be eligible for inclusion in the current review, studies were required to meet several eligibility criteria. First, studies were required to involve a dropout prevention or intervention program, broadly defined as an intervention that involved actions performed with the explicit expectation that it would reduce school dropout, increase high school graduation, or increase school enrollment (i.e., staying in school). Eligible interventions could be school-based, school-affiliated, or community-based. Eligible studies had to involve participant populations of school-aged youth, defined as pre-K to 12th grade (approximately ages 4–18), or the equivalent in schools with other grade structures, though few studies of dropout interventions involve elementary age students. General population samples were eligible, as were samples from populations broadly at risk due to socioeconomic disadvantage or other risk factors (e.g., poor attendance). Studies comprised entirely of specialized populations (e.g., students with mental disabilities) were not eligible. Eligible studies were required to use either experimental research designs (RCTs), or quasi-experimental research designs (QEDs) that provided enough pretest or baseline risk information with which to calculate pre-intervention group equivalence effect sizes. Eligible studies were required to have at least 10 participants in each of the intervention and control conditions. Further, to be eligible for inclusion in the review of program effects on absenteeism, studies were required to assess intervention effects on at least one outcome variable that represented school absenteeism (e.g., school attendance, absences, truancy) in addition to at least one outcome variable measuring school dropout. Finally, in order for the research to be applicable to contemporary students, eligible studies were required to be published in 1985 or later. Studies could have been published in any language and conducted in any country.

Studies were identified from 1985 to January 2010 using a variety of sources including electronic databases such as the Australian Education Index, British Education Index, Canadian Education Index, Dissertation Abstracts International, Education Abstracts, ERIC, and PsycINFO. Several other research registers and organization websites were searched in an attempt to locate grey literature, including the American Evaluation Association library, Canadian Evaluation Society Grey Literature Database, CERUK Plus website, National Dropout Prevention Center/Network website, and the OpenSIGLE library. Bibliographies of all screened and eligible studies were also screened for potentially relevant reports, and a topical expert in the field was consulted to identify other unpublished or ongoing studies (see Wilson et al. 2011 for additional details on the search strategy). This extensive search yielded a total of 74 eligible studies of dropout prevention programs that measured program effects on student absenteeism outcomes, reported between 1985 through 2009.

Statistical Procedures

The primary outcomes of interest in this meta-analysis were measured with standardized mean difference effect size statistics (*d*) calculated as the post-intervention difference in absenteeism outcomes for the intervention and control groups, divided by their pooled standard deviation (Lipsey and Wilson 2001). For the absenteeism effect sizes, Cox transformations were used to estimate standardized mean difference effect sizes from dichotomous outcomes (Sanchéz-Meca et al. 2003). All effect sizes were calculated such that positive values indicated better results (i.e., lower absenteeism) for the intervention group than the comparison group. Effect sizes were also adjusted with the small-sample correction factor to provide unbiased estimates of effect size (*Hedges' g*). The school dropout effect sizes used to address the second research question were indexed with the logged odds ratio effect size, then reported back in the odds ratio (*OR*) metric for ease of interpretability.

All analyses were weighted using random effects inverse variance weights to ensure that each effect size's contribution was proportionate to its statistical precision (Lipsey and Wilson 2001). Only one effect size per participant sample was included, to ensure the statistical independence of effect size estimates included in the analysis.[1] An examination of the effect size distribution identified a small number of effect size and sample size outliers with the potential to distort the analysis; these were Winsorized to the corresponding lower/upper fence values of their respective distributions. These adjustments ensured that such studies did not exercise a highly disproportionate influence on the results. Finally, a small number of studies were missing data on method, participant, or treatment variables used in the final analyses; missing values were imputed using an expectation-maximization (EM) algorithm in SPSS.

We used standard meta-analytic procedures to estimate the overall random effects mean effect size and estimate heterogeneity statistics, and employed bivariate meta-regression models to examine potential effect size moderators and residual heterogeneity statistics. Funnel plots, Egger's regression test, and Duval and Tweedie's trim and fill method were used to assess the possibility of publication bias (see Rothstein et al. 2005).

Results

As we shall discuss in more detail below, the average effect size from the studies using randomized (RCT) designs was substantially different from the average effect size from studies using quasi-experimental designs (QEDs). In addition, there were some differences in the student characteristics and the types of programs evaluated using the different research designs. Because research design might have been confounded with these and other coded (or un-coded) study characteristics, we elected to present all results separately for the two types of research designs.

Evidence from Randomized Controlled Trials

Descriptive Statistics Table 1 summarizes the method, participant, and intervention characteristics of the 74 studies included in the review, with results from the 24 RCTs in the left panel and results from the 50 QEDs in the right panel. As shown in the left panel of Table 1, the average year of publication was 1993 for the RCTs, and all but one study were conducted in the United States. Almost half of the RCT studies were reported in technical reports published by research firms or governmental agencies; the rest were reported in dissertations, journal articles, books, or book chapters. An average pretest effect size measuring intervention and comparison groups' equivalence at baseline on absenteeism or risk variables was close to zero at .07, indicating baseline equivalence between the intervention and control groups. The average participant sample in the RCT studies was comprised of approximately equal proportions of males and females, and primarily non-White students. Students were an average age of 14 and in 8th grade. Approximately 50 % of the interventions were delivered in

[1] A handful of studies included two or more measures of absenteeism (e.g., number of absences and number of tardies); in those cases we chose explicit measures of school absences over measures of attendance or tardies. Because many studies also reported multiple follow-ups on the same outcome, we chose the first effect size that could be calculated after the end of intervention. In some cases with lengthy (multi-year) program durations, effect sizes were only available while students were still enrolled in the intervention program; in these cases, we chose the last effect size that occurred during the intervention.

Table 1 Descriptive Statistics of Study Characteristics, by Type of Study Design (n=74)

	Randomized designs		Non-randomized QEDs		Range
	n=24		*n*=50		
	Mean	SD	Mean	SD	
General study characteristics					
Publication year†	1993	4.01	1995	6.89	1985–2009
Conducted in the United States (1=yes)	0.96	0.20	1.00	0.00	0–1
Journal publication (1=yes)*	0.04	0.20	0.44	0.50	0–1
Technical report (1=yes)	0.54	0.51	0.40	0.49	0–1
Dissertation (1=yes)*	0.42	0.50	0.16	0.37	0–1
Method characteristics					
Attrition rate for intervention group	0.19	0.18	0.18	0.20	0–0.84
Average pretest/equivalence effect size	0.07	0.30	−0.08	1.46	−3.58–5.29
Effect size used adjusted data (1=yes)	0.50	0.51	0.40	0.49	0–1
Transformed odds ratio (1=yes)	0.54	0.51	0.40	0.49	0–1
Absence outcome (1=yes)	0.71	0.46	0.56	0.50	0–1
Participant characteristics					
Percent male	0.52	0.15	0.47	0.15	0–1
Percent White	0.23	0.23	0.28	0.27	0–1
Average age (years)**	14.19	1.31	15.23	1.42	11–17.63
Average U.S. grade level*	8.20	1.57	9.04	1.77	4.84–12.60
Intervention characteristics					
Independent evaluator	3.67	0.87	3.74	0.60	1–4
Delivered in classroom (1=yes)	0.50	0.51	0.60	0.49	0–1
Delivered outside classroom (1=yes)	0.29	0.46	0.20	0.40	0–1
Intervention duration (days)**	52.82	41.13	90.64	64.94	0.57–260
Frequency of intervention contact	4.21	1.47	4.20	1.28	1–6
Implementation problems (1=yes)	0.54	0.51	0.52	0.50	0–1

QED quasi-experimental design. Significance levels are for tests of differences in means/proportions by type of study design

†$p<.10$

*$p<.05$

**$p<.01$

school classroom settings, and the average duration of the dropout prevention programs was 53 days.

Mean Effect Size To address the first research question and assess the effect of dropout prevention programs on students' absenteeism, we calculated the overall random effects mean effect size. The mean effect size *g* for the 24 RCT studies was .23 ($p<.01$, 95 % CI [.09, .38]), suggesting that dropout prevention programs had a significant positive effect on students' absenteeism relative to comparison conditions.

Correlation Between Dropout and Absenteeism To address the second research question, we examined the relationship between the absenteeism and dropout outcomes from the 24 RCTs. Recall that all studies of dropout prevention programs included here were required to report both absenteeism and dropout outcomes, which allowed us to determine if studies which had effects on attendance had commensurate effects on dropout. The average standardized mean difference effect size for the absenteeism outcomes was .23 and the average odds ratio effect size for school dropout outcomes was 1.34 ($p<.05$, 95 % CI [1.13, 1.59]), indicating that dropout prevention programs showed significantly lower absenteeism and dropout rates than comparison conditions. However, the bivariate correlation between the absenteeism effect sizes and school dropout effect sizes from the 24 RCT studies was relatively small at $r=.13$. Dropout prevention programs that had larger effects on school dropout did not strongly evidence correspondingly large reductions in absenteeism, though the 24 RCT studies tended to exhibit positive outcomes on both absenteeism and dropout.

Moderator Analysis Heterogeneity statistics indicated there was heterogeneity in the absenteeism effect sizes in the RCT studies ($\tau^2=.07$; $Q=82.37$, $p<.001$; $I^2=72.08$ %). So to address the last two research questions, we estimated a

series of non-nested bivariate regression models to examine whether various methodological, participant, or intervention characteristics could explain this observed heterogeneity.[2]

Table 2 presents bivariate meta-regression coefficients and standard errors along with residual heterogeneity statistics. As shown in Table 2, one methodological characteristic exhibited a significant bivariate relationship with the RCT effect sizes: the pretest equivalence between the treatment and control groups. Namely, when the intervention groups were at higher risk than the comparison conditions for attendance or dropout problems at baseline, intervention effects were larger. The pretest equivalence effect size measure accounted for approximately 35 % of the potentially explainable heterogeneity in the RCT effect sizes. Among the RCT studies, effect sizes measured on school absence outcomes (versus attendance, truancy, or tardies) had significantly smaller mean effect sizes, although this variable did not account for any appreciable amount of the potentially explainable heterogeneity in the effect sizes.

The bottom section of Table 2 indicates that none of the measured intervention characteristics (setting, duration, frequency, implementation) exhibited a significant relationship with the absenteeism among the RCT studies. However, gender composition of the sample was associated with effect sizes in the RCT studies (b=1.22, p=.02, 95 % CI [.19, 2.25], β=.43), such that programs were more effective in improving absenteeism among samples with greater proportions of male participants. To help illustrate this effect, the left panel in Fig. 1 presents predicted mean effect sizes and 95 % confidence intervals across varying levels of the gender composition of the samples for the RCT studies. The black line represents the predicted mean effect size across varying levels of gender sample compositions, with 95 % confidence intervals for those predicted effects in the gray bands. The horizontal red line indicates a standardized mean difference of 0, indicating no significant difference between the intervention and control groups. Figure 1 therefore shows that in the RCT studies, dropout prevention programs with 50 % or more male participants were effective in decreasing school absenteeism.

To further explore variation in intervention effects, we turn to an examination of the variation in program effects across different types of dropout prevention programs. Table 3 includes descriptions of the types of prevention programs represented in the data, along with the number of program types present in the studies. The right side of Table 3 presents random effects mean weighted effect sizes and confidence intervals for absenteeism outcomes across different types of programs. As shown in Table 3, for most of the types of dropout prevention programs, the mean effect size within program type was not significantly different from zero in the RCT studies. The exceptions to this were the supplemental academic training ($\overline{g} = .38, p = .03$, 95 % CI$[.03, .73]$) and vocational/employment oriented programs ($\overline{g} = .84, p = .00$ 1, 95 % CI$[.41, 1.28]$), both of which exhibited significant beneficial effects on absenteeism outcomes.

Publication Bias Analysis Although we included unpublished dissertations and technical reports in this meta-analysis, as with any meta-analysis, there is always the possibility of publication bias. Smaller studies tend to have significant effects less often and studies with null or negative findings are less likely to be published (Rothstein et al. 2005). Visual inspection of a funnel plot (available upon request) indicated no obvious asymmetry, providing some support against the possibility of small study bias in the RCT studies. However, there was some evidence of possible small study bias in the RCT studies based on Egger's regression test (b= 1.65, p=.078, 95 % CI [−.20, −3.51]), as well as the trim and fill analysis that resulted in a non-significant mean effect size after the trimming and filling of 5 hypothetical new studies ($\overline{g} = .08$, 95 % CI$[-.06, .21]$). Thus, there was evidence of possible small study bias in the RCT studies, which indicates that the quality of evidence in this literature is very low and any conclusions based on findings from these studies should be drawn with extreme caution.

Evidence from Quasi-Experimental Studies

Descriptive Statistics We next present results from similar analyses focused on the 50 quasi-experimental research design (QED) studies. As shown in Table 1, the average year of publication was 1995 for QEDs, and all were conducted in the United States. Less than one-half were reported in technical reports published by research firms or governmental agencies; the rest were reported in journal articles, dissertations, books, or book chapters. The average participant sample was comprised of approximately equal proportions of males and females, and primarily non-White students. Students were an average age of 15 and in 9th grade. Approximately 60 % of the dropout interventions were delivered in school classroom settings, and the average duration of the programs was 91 days.

[2] Ideally we would have used multivariate meta-regression models that adjusted for all other study characteristics in order to account for possible confounding among the moderators. However, given the relatively small number of studies and hence degrees of freedom, we instead examined each of the study level moderators in separate bivariate models. To assess the possibility of confounding we re-estimated multivariate meta-regression models that included any two study moderators with bivariate correlations>= .70, and found no substantive differences in the findings (results available upon request).

Table 2 Coefficients, Standard Errors, and Residual Heterogeneity Statistics from Bivariate Meta-Regression Models Predicting Posttest Effect Sizes, by Type of Study Design

	Randomized Designs							Non-randomized QEDs						
	n=24							n=50						
	b		se	β	τ^2_{res}	I^2_{res}	R^2_{adj}	b		se	β	τ^2_{res}	I^2_{res}	R^2_{adj}
Attrition rate	−0.35		0.38	−0.27	0.07	0.73	0.00	−0.14		0.62	−0.03	0.69	0.95	0.00
Pretest equivalence	0.54	*	0.21	0.49	0.05	0.64	0.35	0.39	*	0.06	0.65	0.38	0.93	0.44
Adjusted effect size data	−0.21		0.14	−0.38	0.07	0.72	0.05	0.02		0.25	0.02	0.69	0.95	0.00
Transformed odds ratio	−0.15		0.14	−0.22	0.07	0.70	0.04	0.05		0.25	0.03	0.69	0.95	0.00
Absence outcome	−0.28	†	0.14	−0.50	0.07	0.72	0.10	0.03		0.25	0.02	0.69	0.95	0.00
Percent male	1.22	*	0.50	0.43	0.05	0.65	0.27	−0.37		0.84	−0.07	0.69	0.95	0.00
Percent White	0.09		0.36	0.05	0.08	0.73	0.00	−0.22		0.46	−0.07	0.69	0.95	0.00
Average age	−0.02		0.05	−0.12	0.08	0.73	0.00	−0.22	*	0.08	−0.40	0.60	0.95	0.12
Independent evaluator	−0.09		0.10	−0.14	0.07	0.72	0.02	−0.16		0.21	−0.12	0.68	0.95	0.00
Delivered in classroom	−0.09		0.14	−0.17	0.08	0.73	0.00	0.10		0.25	0.07	0.69	0.95	0.00
Delivered outside classroom	−0.08		0.16	−0.11	0.08	0.72	0.00	−0.06		0.30	−0.03	0.69	0.95	0.00
Intervention duration (days)	−0.01		0.01	−0.38	0.07	0.70	0.07	−0.01		0.01	−0.11	0.69	0.95	0.00
Frequency of contact	0.07		0.05	0.36	0.07	0.71	0.03	0.11		0.10	0.21	0.67	0.95	0.01
Implementation problems	−0.05		0.14	−0.09	0.08	0.73	0.00	−0.48	*	0.24	−0.31	0.63	0.95	0.07

QED quasi-experimental design

[a] Estimates shown for each type of study design are from 14 separate bivariate meta-regression models

†$p<.10$

*$p<.05$

Mean Effect Size The overall random effects mean effect size *g* for the 50 QED studies was .03 ($p=.79$, 95 % CI [−.21, .28]), which was not significantly different from zero. Thus, the mean effect size for the 50 QED studies provided no evidence of a difference between dropout prevention programs and their comparison groups on absenteeism outcomes.

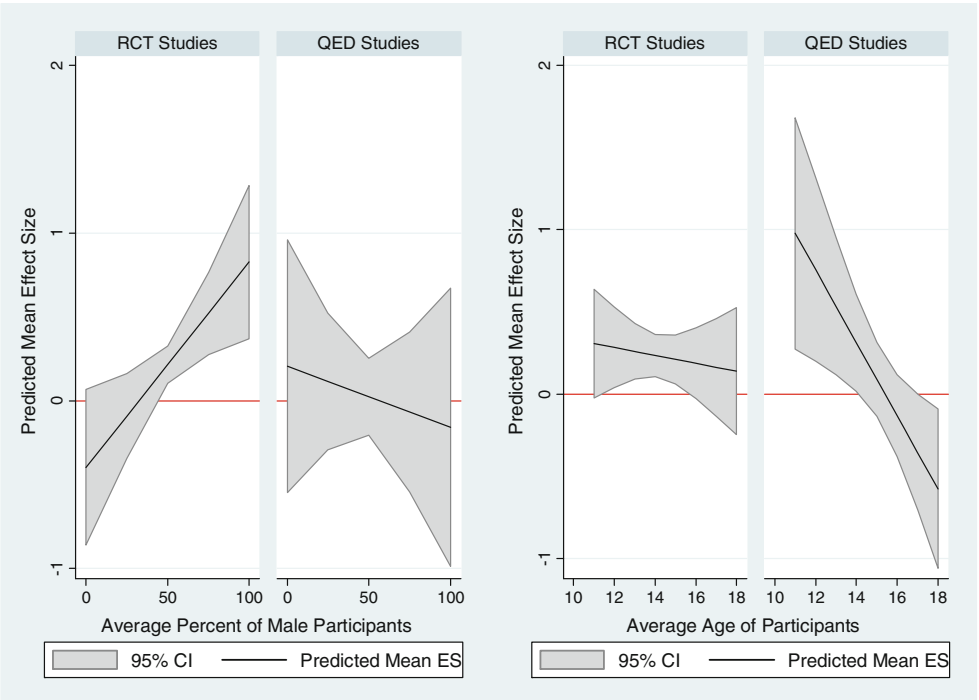

Fig. 1 Predicted mean effect sizes and 95 % confidence intervals across gender and age compositions of the intervention sample, by type of study design

Table 3 Description and Number of Dropout Prevention Program Categories, by Type of Study Design

Program type	Description	Randomized designs		Non-randomized QEDs	
		n	$\bar{g}$ (95 % CI)	*n*	$\bar{g}$ (95 % CI)
School/class restructuring	Small learning communities, block schedules, career academies, small class size	7	0.12 (−0.01, 0.26)	25	0.15 (−0.11, 0.41)
Supplemental academic training	Remedial education, tutoring, homework assistance	5	0.38 (0.03, 0.73)	3	0.44 (−1.70, 2.58)
Mentoring, counseling	Adult mentors or trained counselors focusing on career/work and/or students' personal issues	0	–	6	−0.18 (−0.44,−0.09)
Alternative school	Schools designed to provide educational and other services to students whose needs aren't adequately addressed in traditional schools	2	0.08 (−0.19, 0.34)	3	−0.47 (−1.63, 0.68)
Cognitive behavioral/ skills training	Generally oriented toward improving self-esteem or attitudes about school, or preventing drug use	1	0.00 (−0.30, 0.30)	4	0.40 (−0.29, 1.10)
Attendance monitoring/ financial rewards	Monitoring and services to increase attendance; some offer financial incentives	3	0.20 (−0.03, 0.43)	1	−0.39 (−1.02, 0.23)
Vocational/ employment oriented	Coursework, internships, or employment oriented toward work or career interests	2	0.84 (0.41, 1.28)	2	0.61 (−2.06, 3.28)
Multi-service package	Large, comprehensive programs; often included academic, vocational, & case management	1	−0.21 (−0.42, 0.00)	1	−0.20 (−0.36,−0.04)
Other	Case management; child care services; college-oriented programming; community service; recreational, residential services for homeless	3	0.44 (−0.21, 1.09)	5	−0.51 (−1.46, 0.45)

QED quasi-experimental design

Correlation Between Dropout and Absenteeism To address the second research question, we next examined the relationship between the absenteeism and dropout outcomes from the 50 QED studies. The average standardized mean effect size for the absenteeism outcomes was .03, and the mean odds ratio effect size for school dropout outcomes from the same 50 quasi-experiments was 1.67 ($p<.05$, 95 % CI [1.18, 2.36]). The bivariate correlation between the absenteeism and school dropout effect sizes across the 50 QEDs was relatively moderate at $r=.48$. So although the overall average effect for this group of programs on absenteeism was small and non-significant, those programs that showed greater reductions in absenteeism showed similar reductions in dropout.

Moderator Analysis Heterogeneity statistics indicated substantial variability in the absenteeism effect sizes from the QED studies ($\tau^2=.68$; $Q=1018.96$, $p<.001$; $I^2=95.19$ %), so we again used bivariate meta-regression models to examine study characteristics that may have been associated with that heterogeneity. As shown in Table 2, the pretest equivalence between treatment and control groups had a significant relationship with the absenteeism effect sizes, such that studies with more dissimilar groups at baseline showed larger intervention effects.

In terms of the participant characteristics of the samples, studies with younger participant samples had significantly larger intervention effects in the QED studies ($b=-.22$, $p=.009$, 95 % CI [−.39, −.06], $\beta=-.40$). This is illustrated in the right panel of Fig. 1, which shows that in the QED studies the predicted mean effect size was positive and significant among younger participant samples (i.e., ages 11–14), but there was no significant effect among older participant samples. These results must be interpreted with caution given the uncertainty in some of these estimates due to the small number of studies across certain age ranges, but they are still suggestive in showing possible variation in intervention efficacy for different age students.

The bottom section of Table 2 shows that the one intervention characteristic that was a significant effect size moderator for QED studies was whether or not the study had obvious or possible implementation problems ($b=-.48$, $p=.046$, 95 % CI [−.96, −.01], $\beta=-.31$), such that QED studies with possible implementation problems reported significantly smaller effects sizes than those with no apparent problems. Nonetheless, the mean effect sizes for QED studies with and without implementation problems were not significantly different from zero (95 % CIs [−.54, .13] and [−.06, .61], respectively). Although implementation problems in the QED studies were associated with significantly

smaller effect sizes, the QED studies without implementation problems still did not produce significant effects on absenteeism outcomes.

Finally, the right panel of Table 3 shows the types of prevention programs represented in the QED studies. Most of the dropout prevention program types had mean effect sizes that were not statistically different from zero (school restructuring, supplemental academic training, alternative school, cognitive behavioral, attendance monitoring, and vocational programs). However, both the multi-service package programs ($\overline{g} = -.20$, 95 % CI[−.36, −.04]) and mentoring/counseling programs ($\overline{g} = -.18$, 95 % CI[−.44, −.09]) had statistically significant and negative mean effect sizes in the QED studies, indicating these programs were associated with worse absenteeism outcomes.

Publication Bias Analysis A visual inspection of a funnel plot for the QED studies (available upon request) indicated no obvious asymmetry, providing some support against the possibility of small study bias. Further, there was no evidence of small study bias from Egger's regression test (b= −.55, p=.72, 95 % CI [−3.63, 2.53]), or the trim and fill analysis, which left the results unchanged with no additional hypothetical studies trimmed and filled. Thus, there was no clear evidence of small study bias in the QED studies.

Comparing Evidence from RCT and QED Studies

Findings from the randomized (RCT) and non-randomized quasi-experimental (QED) studies were presented separately due to their heterogeneity in terms of study design, student populations, and program types. Nonetheless, it can still be informative to compare and contrast findings from the RCT and QED studies. As shown in Table 1, the RCT studies were less likely than the QED studies to be published in journal articles and more likely to be published as dissertations. Although there were no significant differences between the RCT and QED studies on method characteristics, the RCT studies included significantly younger participant samples and significantly shorter dropout prevention programs than the QED studies.

The overall mean effect sizes were notably different in the RCT and QED studies. Whereas the RCT studies indicated that dropout prevention programs led to significantly lower student absenteeism outcomes relative to comparison conditions, the QED studies provided no evidence that dropout prevention programs reduced student absenteeism. The meta-regression models presented in Table 2 show one striking similarity but also illuminate several possible reasons why there were such discrepant findings between study designs. Not surprisingly, studies in which intervention and comparison groups were more similar at baseline, regardless of study design, tended to exhibit smaller treatment effects. However, the average age of participant samples was a significant moderator of effect sizes for the QED studies but not the RCT studies. Examination of these results (as shown in the right panel of Fig. 1) indicates that the QED studies showed significant beneficial program effects with younger participants (ages 11–14) but not in older participant samples. The significant program effects in the RCT studies may therefore be due in part to the younger participant samples in those studies, whereas the null effects in the QED studies could be partly due to the fact that the QED studies had older participant samples closer to age 15—a period when dropout programs may be less effective in improving absenteeism outcomes. The discrepant findings for the RCT and QED studies could also be due in part to the different types of prevention programs in those studies. The QED studies were more likely to include program types that exhibited null or negative effects (see Table 3), so the overall lack of effect for the QED studies could be attributed to the types of programs included in those studies.

Finally, results from publication bias analyses were notably different in the RCT and QED studies. There was no strong evidence of publication bias in the QED studies, but there was possible evidence of publication bias in the RCT studies. Because only 4 % of the RCT studies were published in journal articles, it may be more appropriate to consider this small study bias (i.e., there were few RCT studies with small sample sizes that reported null or negative effects) rather than publication bias per se (given that most of the RCT studies were unpublished). Nonetheless, the possible small study bias in the RCT studies (but not the QED studies), indicates that it may be inappropriate to draw any firm conclusions from the RCT studies.

Discussion

This study reports meta-analytic findings from a systematic review and meta-analysis of the effects of dropout prevention programs on absenteeism outcomes. Because dropout programs have generally been shown to be effective at reducing school dropout, and the relationship between absenteeism and later school dropout is well-established, we sought to further examine the effects of dropout programs on absenteeism. Our intent was not to provide a test of mediation, but rather to provide evidence about other academic outcomes that dropout programs may impact. In an environment of scarce economic resources, school decision makers may want to target multiple related problems with the programs they implement and thus it is important to know whether dropout prevention programs influence other student outcomes.

As to the question of whether dropout prevention programs also reduce students' school absenteeism, results were mixed. Results from randomized control trials (RCTs) provided some evidence that dropout prevention programs may reduce absenteeism, but results from QEDs provided no evidence of a positive or negative effect. The overall mean effect size of .23 in the RCT studies was relatively modest—equivalent to increasing the average percent daily attendance rates from 85 % to 89 %, or reducing the average number of student absences in the past 6 weeks from 1.31 to .93. However, additional moderator analyses suggested that dropout prevention programs may be more effective in reducing absenteeism among primarily male participant groups. One explanation for this finding may be due to gender differences in the causes and correlates of absenteeism, and whether the programs evaluated in the RCTs addressed these gender specific risk factors. For instance, one of the main correlates of absenteeism and dropout for young women is pregnancy and motherhood and none of the programs included here had teenage pregnancy prevention as an explicit focus. Thus, the larger effects for primarily male samples could in part be due to the gender specific risk factors that may or may not have been addressed in the dropout prevention programs.

There was also some evidence that dropout prevention programs may have the largest effect on absenteeism among middle-school aged youth, although those results must be interpreted with caution given the small number of studies with younger participants. Again it is plausible that these differential effects could be due to the types of risk and protective factors addressed in the prevention programs and their developmental appropriateness for middle-school or high-school age youth. For instance, dropout prevention programs may be more effective in reducing absenteeism in younger students before they establish patterns of chronic absenteeism and truancy. It is not possible to examine this question empirically in the current study, so this finding clearly warrants additional primary research to identify the types of program strategies that are most effective with students of different ages.

Although the gender and age profiles of participant samples did correlate with the effects of dropout prevention programs on absenteeism outcomes, the racial composition of the samples did not have a significant association with intervention effects. In terms of intervention characteristics, setting, dosage, and program type also did not correlate with intervention effects. Indeed, examination of variation across different types of dropout prevention programs indicated similar (null) findings for most program types. Dropout prevention programs that focused explicitly on providing supplemental academic training or vocational or employment skills did tend to show overall positive effects in the RCT studies, but the remainder of program types often exhibited overlapping null effect sizes, or in some cases (mentoring and multi-service programs), even detrimental effects on absenteeism.

Based on the findings from this systematic review and meta-analysis, there is insufficient evidence to conclude that dropout prevention programs are effective in reducing absenteeism. There is preliminary evidence that such programs may be effective in certain populations (e.g., middle school or primarily male samples), but more high quality studies are needed to support such conclusions. Indeed, the age and gender moderators we examined in the current meta-analysis were at the aggregate sample level and therefore only provide correlational evidence. Any examination of causal impacts must be at the individual level in order to draw conclusions about comparative effectiveness for different types of students. The finding that baseline equivalence was influential for both RCTs and QEDs indicates that experimental designs do not guarantee cast-iron results. Coupled with the strongly suspected small study bias among the RCTs, we are, therefore, hesitant to draw any conclusions about the overall positive mean effect reported for them. Indeed, the mixed results for the RCT studies, along with the null findings for the QED studies suggest that dropout prevention programs may have minimal or no impact on students' absenteeism outcomes.

One of the interesting methodological findings from this review was the difference in results exhibited by RCT studies when compared to QED studies. Meta-analyses that find different results for RCT and QED studies are not uncommon, although one design does not always consistently produce larger mean effect sizes than another (see, for example, Mitchell et al. 2012 for a meta-analysis in which QEDs produced larger effects). In the current study, RCTs tended to produce larger effect sizes than QEDs. The QED studies reviewed here tended to involve samples of students who were somewhat older than the samples in the RCTs; the fact that younger age was associated with larger treatment effects in the RCTs may offer one explanation for the observed differences across study designs. This should be explored more fully with primary research that would allow for exploring possible causal relationships. Nonetheless, the differences between the two design types could also be due to small study bias in the RCTs. If there are few RCT studies with small sample sizes that report null or negative findings, this could upwardly bias the mean effect size in the RCTs. In contrast, the QED studies encompassed a range of small and large sample size studies with varying program effects (negative, null, and positive).

It should be noted that although these findings suggest dropout prevention programs may not be effective in reducing school absenteeism outcomes, it does not mean that dropout prevention programs are ineffective. These programs are indeed quite effective in reducing school dropout

rates and increasing school completion rates, which is their primary intention (Wilson et al. 2011); and prevention programs explicitly aimed at reducing absenteeism are also effective in increasing school attendance, which is their primary intention (Maynard et al. 2012). Thus, results from this study merely cast doubt on the assumption that dropout prevention programs may also decrease absenteeism, or that absenteeism is simply a point along the "dropout continuum." Although absenteeism may be correlated with school dropout, perhaps it is not the harbinger of dropout as previously theorized. Or, perhaps the attendance-as-change-agent mechanism only operates for younger students. Rather than merely focusing on dropout prevention to reduce absenteeism, other kinds of remediation may be needed in dropout prevention programs to increase engagement, attendance, or academic performance, especially among older students. Additional research focusing on the theoretical and practical differences between explicitly school dropout-focused and absenteeism-focused prevention programs may illuminate the mechanisms of change underlying these programs' effects on student school engagement, attendance, and completion. This research might focus on establishing whether a causal relationship exists between school engagement and attendance or dropout through intervention studies that measure these outcomes at several follow-up time points. In addition, future meta-analyses and primary studies could focus on identifying the types of programs that do have effects on attendance and use those as starting points for targeting school dropout.

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