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Abstract

A systematic review of the literature (1965–2022) and meta-analysis were undertaken to compare the school readiness skills of children participating in public pre-kindergarten (pre-K) or Head Start. Seven quasi-experimental studies met the inclusion criteria for the meta-analysis and 38 effect sizes were analyzed. Results indicated no reliable meta-analytic effect in relation to children's school readiness skills overall nor in relation to language, mathematics, or social-behavioral skills specifically. A small, positive meta-analytic effect favoring public pre-K compared to Head Start participation was found in relation to children's emergent literacy skills (Hedges' $g = 0.17$). Strategies are discussed to further equate the benefits of public pre-K and Head Start programming by facilitating greater cross-sector collaboration.

Keywords: Head Start; pre-K; school readiness

Introduction

Established in 1965, the federal Head Start program is the nationwide early childhood education (ECE) program for preschool age children from low-income backgrounds in the United States. In recent decades, children who qualify for Head Start have experienced increased access to other types of ECE programs that are funded and administered by state governments, local municipalities, and/or local education agencies—commonly referred to as public pre-kindergarten (pre-K) programs (Clifford et al., 2005). Today, public pre-K and Head Start are the primary providers of ECE programming, serving 37% and 7% of all 4-year-old children, respectively (Friedman-Krauss et al., 2020).[1]

Both programs are designed to prepare children to succeed in school by promoting the school readiness skills thought to be foundational for school success. However, the two programs differ along important dimensions. Thus, a key policy question has concerned the extent to which public pre-K or Head Start programs are more effective at promoting children's development of school readiness skills (e.g., "Are disadvantaged 4-year-olds better served by Head Start or by state-funded pre-K programs?"; Gormley et al., 2010, p. 397). This question is especially important given the difference between Head Start's "comprehensive" approach to ECE (i.e., an approach that encompasses education, health, nutrition, and family support services) and public pre-K's predominant focus on instruction related to early learning skills, particularly in academic content areas (e.g., Gormley et al., 2010; Jenkins et al., 2016; Jenkins et al., 2018). Understanding the differential benefits of public pre-K and Head Start continues to be relevant

[1] A majority of public pre-K programs maintain similar income eligibility criteria as Head Start, including public-school based Title I pre-K programs as well as 54% of states and territories that administer targeted pre-K programs (Friedman-Krauss et al., 2020). However, it is unclear exactly what proportion of children served by public pre-K programs nationally would also qualify for Head Start.

today as efforts to expand access to high-quality ECE programming remains a policy priority for many local, state, and federal policymakers (e.g., Guarino, 2021).

Published studies comparing the school readiness skills of public pre-K and Head Start participants have yielded mixed findings. However, to date, these findings have not been systematically synthesized. The current study undertook a systematic review of the research and meta-analysis to aggregate findings across studies comparing public pre-K and Head Start program participation—focusing on findings related to children's school readiness skills in academic and social-behavioral domains. The similarities and differences between Head Start and public pre-K are first discussed, followed by the systematic review and meta-analyses of relevant studies. The findings could be used to guide future decision-making regarding ECE program expansion and quality improvement.

Head Start

Since its inception, the federal Head Start program has been a comprehensive preschool program that provides center-based education as well as health, nutrition, and social support services to 3- and 4-year-old children and their families. Children primarily qualify to participate based on income eligibility criteria (i.e., a family income at or below the federal poverty level) as well as disability status (i.e., if the child has a designated disability). Head Start is characterized by a "whole child" approach to education (Zigler et al., 1993), as indicated by its federal mandate "to promote the school readiness of low-income children by enhancing their cognitive, social, and emotional development" ("Improving Head Start for School Readiness Act of 2007," 2007). Head Start is also characterized by a *two-generation* approach that views parents as their child's primary teachers. Moreover, in addition to providing social support services directly to

parents, Head Start staff encourage parents to become active participants in their child's education and work to incorporate parent input into many aspects of the classroom curriculum.

In terms of the program's scope, Head Start serves roughly 900,000 children annually in every U.S. state and territory, in farmworker camps, and in tribal communities (Barnett & Friedman-Krauss, 2016). Despite the enormous scale of the program, Head Start relies on a common set of performance standards that all grantees are required to meet. Specifically, the Head Start Program Performance Standards outline the operational requirements that all Head Start grantees must follow to ensure uniformity in program services provided to children and families (www.eclkc.ohs.acf.hhs.gov). Head Start also engages in regular quality monitoring and program improvement activities. For example, beginning in 1997, the U.S. Administration for Children and Families commissioned several rounds of the Family and Child Experiences Survey (FACES), which provides nationally representative descriptive information on the characteristics, experiences, and development of Head Start children and families, as well as the characteristics of the Head Start programs and staff who serve them. More recently, the 2007 reauthorization of the federal Head Start Act mandated additional steps to improve the quality of Head Start programming, including (a) the requirement for at least half of all Head Start teachers to hold a bachelor's degree in ECE or a related field and (b) the establishment of the Head Start Designation Renewal System (DRS), which is an accountability system of review to determine if Head Start grantees are delivering services of sufficiently high quality to meet the program standards ("Improving Head Start for School Readiness Act of 2007," 2007).

Public Pre-K

Public pre-K programs are funded and administered by state governments, local municipalities, and/or local education agencies. The provision of publicly funded pre-K

programs began during the 1960's and then proliferated during the 1990's after President George H. W. Bush announced "readiness to begin kindergarten" as one of six national education goals in his 1990 State of the Union Address (Rose, 2010). Today, low-income children have greater access to public pre-K programs than ever before. During the 2018-19 program year, pre-K programs across 44 states, the District of Columbia, and Guam served a combined total of 1,866,772 children between 3- and 4-years of age (Friedman-Krauss et al., 2020). Most pre-K programs are implemented in classrooms located in public elementary schools, but many also include classrooms in Head Start programs or other community child care centers.

Each pre-K program establishes its own performance standards, so it is not surprising that programs vary widely. The Boston pre-K program, for example, is considered to be one of the highest-quality programs that offers full-day care, evidence-based curricula, masters-trained certified teachers, and implementation monitoring—with evidence of large impacts on child outcomes (Weiland & Yoshikawa, 2013). In contrast, the least rigorous programs according to the National Institute of Early Education Research (NIEER) offer less than 20 hours of care per week, either require no curricula or do not require an evidence-based curricula, allow teachers to have only a high-school degree, and provide little monitoring (Friedman-Krauss et al., 2020).

Comparing Public Pre-K and Head Start Programming

There are differences in the scope and quality of services provided by public pre-K and Head Start programs across states and municipalities. Many factors may be driving this heterogeneity between programs, including factors related to program eligibility, program focus, and program quality standards.

Program Eligibility

In terms of eligibility, some public pre-K programs are targeted for children from low-income families, while other programs serve children from a wider range of family economic backgrounds or offer universal eligibility to all children. Targeted pre-K program typically have higher income eligibility requirements than Head Start, with some programs enrolling children with family incomes twice the federal poverty level threshold required by Head Start. In states and municipalities that offer universal pre-K programs, classrooms may be comprised of children from an even wide range of family economic backgrounds. Some argue that universal programs will produce better outcomes for children from low-income backgrounds through mechanisms such as greater opportunities for peer-learning (Barnett, 2011). Indeed, there is some evidence to suggest that children from low-income backgrounds make greater test-score gains when participating in universal pre-K programs as opposed to targeted pre-K programs (Cascio, 2019), while other studies found very little difference in the quality or test score gains of children in targeted vs. universal programs (Dotterer et al., 2013). To the extent that universal pre-K programs provide more economically diverse classrooms, then interactions with more advantaged peers are likely one of the mechanisms by which preschool children from low-income backgrounds make greater gains (Reid & Ready, 2013; Schechter & Bye, 2007) or show higher levels of skill development on average (Justice et al., 2011; Mashburn et al., 2009).

Program Focus

While Head Start is federally mandated to provide a comprehensive array of services (i.e., education, health, nutrition, and family support services; "Improving Head Start for School Readiness Act of 2007," 2007), many public pre-K programs do not maintain this emphasis (e.g., Gormley et al., 2010). Indeed, data from a nationally representative survey showed that Head

Start classrooms provided more comprehensive services in the areas of developmental/health screening, meals, and social services compared to public pre-K classrooms (Gilliam, 2008). Moreover, in 2019, only 62% of state-funded pre-K programs required the provision of vision, hearing, and health screening and referrals for children (Friedman-Krauss et al., 2020), while all Head Start centers were federally mandated to provide these services.

Instead, public pre-K programs often focus on promoting early academic skills. This may be the case because public pre-K classrooms are frequently located in public schools (e.g., an estimated 59% of state-funded pre-K classrooms were located in public schools compared to 17% of Head Start classrooms during the in the 2002-2004 school years; Gilliam, 2008). Moreover, pre-K classrooms based in public schools appear to rely on whole group instruction and focus on teaching basic educational skills to a greater degree than Head Start (Bassok et al., 2016).

Program Quality

Although all ECE programs are subject to the same state licensing standards (e.g., standards related to health, safety, and teacher-child ratios), public pre-K and Head Start programs can vary along other important dimensions of program quality. All Head Start classrooms are subject to the Head Start Program Performance Standards. Alternatively, the standards for public pre-K programs vary widely across states and localities—with some public pre-K programs maintaining standards that either exceed or fall short of Head Start's Program Performance Standards. For example, the National Institute of Early Education Research (NIEER) provides an annual rating of quality standard benchmarks for each state-funded pre-K program. Head Start met nine out of ten NIEER benchmarks in 2019 (as determined by the authors), and only eleven pre-K program met as many or more standards than Head Start.

Ratings of state-funded pre-K programing varied widely (Friedman-Krauss et al., 2020). Four state-funded pre-K programs met all ten benchmarks, and states with long established pre-K programs met most benchmarks (e.g., Georgia and Oklahoma met 8 and 9 benchmarks, respectively). Alternatively, some state pre-K programs met few benchmarks (e.g., Florida and North Dakota both met 2 benchmarks; Friedman-Krauss et al., 2020). Head Start's Program Performance Standards also extend beyond those covered by NIEER, including standards related to health and nutrition, developmental screenings, and family support services. Therefore, it is important to note that public pre-K programs may also differ from Head Start along these other important dimensions of program quality.

Several studies have compared specific measures of program quality between public pre-K and Head Start classrooms, documenting mixed evidence of higher- and lower-levels of quality between sectors depending on the measure being considered. First, with regard to teacher qualifications, teachers in public pre-K programs have often reported higher levels of educational attainment in national studies (Bassok et al., 2016; Coley et al., 2016; Nguyen et al., 2018) and in a state with higher pre-K performance standards (Henry et al., 2006). For example, based on nationally representative data of children from low-income backgrounds, 79% of public-school based pre-K teachers reported having a BA or greater compared to 43% of Head Start teachers (Coley et al., 2016).[2] Conversely, in a separate national study, Head Start teachers reported having more preservice coursework, ongoing training, a higher proportion of Child Development Associate credentials, as well as more years of professional experience (Bassok et al., 2016).

Comparisons of classroom instruction are also somewhat mixed. Although Creative Curriculum and High/Scope have been the most frequently used curricula in both Head Start and

[2] Note that these study data were collected prior to Head Start's current requirement for at least 50% of teachers to hold a bachelor's degree.

pre-K classrooms (Clifford et al., 2005; Hulsey et al., 2011), the ways in which teachers implement instruction based on these curricula may differ between programs. For example, analyses of nationally representative data show that pre-K teachers reported spending more time in whole group instruction (Bassok et al., 2016). Alternatively, public pre-K and Head Start teachers reported similar rates of child-selected activities as well as reading and math activities (Bassok et al., 2016).

Direct observations of classroom instruction also offer mixed findings. A study of classrooms in Tulsa, Oklahoma—a locality with strong pre-K performance standards—found that public-school based pre-K teachers spent more time in math instruction, while Head Start teachers spent more time in activities focused on children's interests and backgrounds, and no reliable differences were found in relation to literacy, writing, science, or art instruction (Phillips et al., 2009). A more recent study of classrooms in Tulsa, Oklahoma also found that pre-K compared to Head Start children experienced more exposure to math as well as literacy instruction, which, for math instruction, was also found to be higher-quality (Johnson et al., 2022). Alternatively, no reliable differences in reading and math instructional quantity and quality were found between state-funded pre-K and Head Start teachers' in a multi-state study conducted in a variety of states that ranged from having low to high pre-K performance standards (Nguyen et al., 2018). Finally, public pre-K and Head Start classrooms might differ along other important dimensions of classroom quality. Two studies have examined differences in an observational measure of classroom structural and process quality (i.e., the ECERS-R), with Head Start classrooms showing higher ratings in one study of nationally representative data (Bassok et al., 2016), but lower ratings compared to state-funded pre-K classrooms in separate multi-state study (Nguyen et al., 2018). In that same multi-state study, Head Start teachers also

showed lower scores on an observational measure of sensitivity, harshness, and detachment (i.e., the Arnett Caregiver Interaction Scale; Arnett, 1989). In sum, there are differences between public pre-K and Head Start programs related to program eligibility, focus, and quality standards may influence the relative benefit of children's participation in one program compared to the other—an issue that warrants further consideration.

Head Start and Public Pre-K Program Effectiveness

A substantial body of research has examined the effectiveness of Head Start and is generally suggestive of favorable program effects in relation to child outcomes at school entry (Shager et al., 2013). A previous meta-analysis by Shager et al. (2013) reviewed research into the short-term effects of Head Start on children's development in cognitive and academic domains of school readiness. This meta-analysis documented a positive meta-analytic average effect (Hedges' $g = 0.27$) based on findings from 57 Head Start evaluation studies conducted between 1965 and 2002—including the national randomized study of Head Start (Puma et al., 2010). This effect was comparable to meta-analytic effects of early childhood interventions more broadly ($g = 0.23$; Camilli et al., 2010) as well as educational interventions in elementary school ($g = 0.33$; Hill et al., 2008).

Despite these favorable findings, the benefit of Head Start participation appears to vary depending on the alternative type of ECE arrangement to which Head Start is compared (i.e., the counterfactual condition). In their meta-analysis, Shager et al. (2013) considered variability in the meta-analytic effect of Head Start between studies that had an *active* or a *passive* counterfactual condition. An active counterfactual condition was defined as one in which children experienced other forms of center-based ECE, while a passive counterfactual condition was defined as one in which children received no alternative center-based ECE. Shager et al.

(2013) found a large, statistically significant meta-analytic effect among studies with a passive counterfactual ($g = 0.31$), but a smaller, non-significant meta-analytic effect among studies with an active counterfactual ($g = 0.08$). This finding highlights a need for research to further consider the effectiveness of Head Start in comparison to specific types of alternative center-based ECE programming, such as public pre-K.

Considerable evidence also suggests that pre-K programming improves school readiness skills, especially early literacy and math skills (Phillips et al., 2017). The strongest evidence of pre-K effects on school readiness skills comes from a random assignment study of the Tennessee Voluntary Pre-K Program, which documented many favorable effects on gains in children's language (Cohen's $d = 0.19$), emergent literacy ($d = 0.23$–0.28), and mathematics ($d = 0.16$–0.20), but not social-behavioral skills during the pre-K year (Lipsey et al., 2018). Similarly, a study by Barnett et al. (2018) documented favorable effects of pre-K participation on children's skills in language ($d = 0.24$), emergent literacy ($d = 1.10$), and mathematics ($d = 0.44$) at kindergarten entry based on aggregated effects from eight separate regression discontinuity design studies of state-funded pre-K programs, with notably large effects on children's emergent literacy skills. However, none of these studies provide direct evidence of public pre-K effectiveness in comparison to Head Start. Rather, they demonstrate favorable pre-K effects in comparison to children who participated in a variety of alternative ECE arrangements.

The Current Study

Public pre-K and Head Start are the primary providers of ECE programming for 4-year-old children from low-income backgrounds. Independent studies have documented the benefits of children's participation in both program types, as well as differences in the features offered by each program. While several studies have been undertaken to directly compare public pre-K and

Head Start participation, these individual studies offer mixed results and, to date, no effort has been made to aggregate and generalize findings across studies. The aim of the current study was to examine the effect of children's participation in publicly funded pre-K compared to Head Start in relation to children's school readiness skills. A systematic review of the extant literature and meta-analysis of data from relevant research studies were undertaken to aggregate and generalize findings across studies. Studies that contrasted public pre-K and Head Start participation were the focus, and their results were combined to ask whether either group outperformed the other in each domain school readiness (i.e., a two-tailed hypothesis tests with $\alpha = 0.05$). We chose to frame Head Start participation as the reference group in our study because it was the first publicly funded ECE program for children from low-income backgrounds in the U.S.

This study extended previous research in at least three ways. First, this was the first meta-analysis to contrast the two the primary providers of ECE programming for children from low-income backgrounds. Second, the systematic review of literature spanned research published *during* and *after* the time frame considered for a previous meta-analysis of Head Start effects by Shager et al. (2013). Third, the current meta-analysis considered child outcomes in both academic *and* social-behavioral domains of school readiness, while the latter was not considered in the previous meta-analysis. Moreover, research into the effectiveness of Head Start should consider children's skill development in both domains. This is especially important given that both Head Start and pre-K are mandated to focus on promoting academic skills, while Head Start is federally mandated to provide a whole child education as well as health, nutrition, and social support.

Method

A systematic review of the literature was conducted to consider empirical research comparing the outcomes of public pre-K and Head Start participants—focusing on outcomes related to children's school readiness skills in academic and social-behavioral domains of development. The procedure for conducting the systematic review is detailed below, which follows recommendations and best practices outlined by Liberati et al. (2009) and Shea et al. (2007). Based on the results of this systematic review, studies were coded and included in the meta-analysis.

Literature Search

The literature search was conducted on August 6, 2022 using ERIC, Academic Search Premier, and PsycInfo. The search terms used to identify records for this review were "Head Start or Head-Start" and "pre-k or pre-kindergarten or prekindergarten." The record source types included academic journals, reports, books, and dissertations. The date range for the literature search was 1965 through 2022. Additional forward and ancestral searches were conducted, which included manually searching the websites of several policy institutes (e.g., RAND, Mathematica, NIEER), state and federal departments (e.g., U.S. DHHS), as well as the reference lists of identified records.

Record Screening and Inclusion Criteria

After conducting the literature search, the identified records were screened in three steps. First, records were excluded based on duplicates and title screening. Second, records were excluded based on abstract screening. Third, records were excluded based on full-text screening. Verification was conducted on all records screened at the full-text level. A detailed account of the records included or excluded from the meta-analysis was kept. Information from the screened

records was included in the meta-analysis if the following criteria were met: *Record type criteria*: (1) records were written in English and (2) records reported on original empirical research studies; *Preschool group criteria*: (3) studies examined a group of preschool age children who participated in Head Start; (4) studies examined a group of preschool age children who participated in publicly funded pre-K programming, including a state-funded and/or public school-based pre-K program (e.g., Title I), while studies were excluded if the group was also comprised of non-public pre-K participants (e.g., children who attended other types of non-publicly funded center-based preschool programs); *Child outcome criteria*: (5) studies reported information to index the effect of public pre-K participation in comparison to Head Start participation in relation to one or more child outcome measures related to language, emergent literacy, mathematics, or social-behavioral skills; (6) child outcome measures assessed children's school readiness skills, and therefore, were administered prior to kindergarten entry or during the fall of kindergarten; (7) children's language, emergent literacy, and mathematics skills were assessed via standardized assessments, while children's social-behavioral skills were assessed via parent-report and/or teacher-report; *Analytic design criteria*: (8) studies implemented statistical control to account for selection bias between public pre-K and Head Start participation (e.g., covariate adjustment; propensity score matching; regression discontinuity).

Summary Measures

Relevant information was collected from the studies that met the inclusion criteria for this meta-analysis. This information was double coded and checked for 100% accuracy. The following information was used to calculate the Hedges' *g* standardized mean difference effect sizes (Hedges, 1981) in order to index the effect of Head Start participation in comparison to public pre-K participation: (a) standardized regression coefficients and standard errors or (b)

adjusted group mean differences, standard errors, and sample sizes for the Head Start and pre-K groups. Hedges' *g* effect sizes were coded such that positive values indicated that public pre-K participants outperformed Head Start participants and negative values indicated that public pre-K participants underperformed Head Start participants.

Meta-Analysis

A series of meta-analysis models were estimated to examine the meta-analytic effect across studies comparing public pre-K to Head Start participation. Analyses were conducted using the *metaSEM* package in the *R* statistical platform (Cheung, 2015). Five separate models were estimated to examine the meta-analytic effect on (1) children's school readiness skills overall as well as in the separate domains of (2) language (e.g., expressive and receptive language/vocabulary), (3) emergent literacy (e.g., letter and word identification), (4) mathematics (e.g., counting and basic calculation), and (5) social-behavioral skills (e.g., prosocial skills and problem behaviors). A multi-level random effects model was estimated for the overall model as well as the language, emergent literacy, and social-behavioral models to account for the nesting of effect sizes within studies, because two or more effect sizes were reported per study in these domains (Cheung, 2019). However, a single-level random effects model was estimated for the mathematics effects, because only one mathematics effect size was reported per study.

Results

Record Selection

A summary of the process and results of the record screening is illustrated in Figure S1. A total of 984 records were identified through the database search; 794 records remained after duplicate records were removed and titles were screened. A total of 211 records remained after

abstracts were screened. At the level of full text screening, 204 records were excluded because the reported studies did not conduct a direct comparison of Head Start and public pre-K participants (188 records), did not consider school readiness outcomes (i.e., longer-term outcomes were considered; 6 records), the reported coefficients in the study were not statistically adjusted for selection bias between the Head Start and public pre-K groups (8 records), and same or similar information was reported in a separate record (2 records). Seven studies with 38 effect sizes met the inclusion criteria for the meta-analysis and are summarized in Tables 1 & 2. As noted by Valentine et al. (2010), only two studies are needed in order to conduct a meta-analysis. While the inclusion of more studies can serve to enhance the generalizability of any meta-analysis, the application of meta-analytic techniques even with few studies is more transparent and/or are more likely to draw valid conclusions compared to other synthesis that don't rely on such techniques (Valentine et al., 2010).

Study Characteristics

The seven studies were published as journal articles between 2006 and 2022. Six of the seven studies considered samples of children who participated in public pre-K or Head Start within a seven year period between 2001 (Henry et al., 2006) and 2007 (Jenkins et al., 2016). One of the seven studies included a more modern cohort of children in preschool during the 2017-18 school year (Johnson et al., 2022). Full sample sizes ranged from 307 to 2,150 child participants. Head Start and public pre-K participation was identified using administrative records in four studies (Henry et al., 2006; Jenkins et al., 2016; Johnson et al., 2022; Nguyen et al., 2018), using preschool provider and director reports verified with parent report in one study (Johnson et al., 2018), and using parent report in two studies (Lee et al., 2014; Zhai et al., 2011).

Study Context

Three studies included samples of children within a single-state context and four studies included multi-state samples. The three single-state studies were conducted in Georgia (Henry et al., 2006) and Tulsa, Oklahoma (Jenkins et al., 2016; Johnson et al., 2022), which have universal programs that were identified as "exemplary" programs by NIEER as early as 2002 (Barnett et al., 2003). The four multi-state studies were drawn from three datasets. The study by Zhai et al. (2011) was based on data from the Fragile Families and Child Wellbeing Study (FFCWS), which included a diverse sample of urban children from low-income families living in 18 major metropolitan cities. Studies by Lee et al. (2014) and Johnson et al. (2018) relied on data from the nationally representative ECLS–B.[3] Finally, the study by Nguyen et al. (2018) was based on data from the PCER curriculum intervention study, in which the analytic sample relied on study participants in four states, including California, New York, Texas, and Virginia.[4] In order to account for variation in public pre-K programming across states or locales, two of these four studies controlled for state of residence (i.e., Johnson et al., 2018; Nguyen et al., 2018), one study controlled for city of residence (i.e., Zhai et al., 2011), and the other study controlled for urbanicity and region of residence (Northeast, Midwest, South, or West; Lee et al., 2014).

Study Analytic Design

All seven studies relied on quasi-experimental research designs applied to samples of children whose families either self-selected into Head Start or public pre-K programs. The analysis methods included regression-discontinuity design, propensity score matching,

[3] It was not possible to determine exactly which states participants were drawn from in the FFCWS and ECLS–B studies because of the statistical adjustment applied to the analytic samples, which makes it unlikely that the proportions of children per state for the analytic samples correspond to the reported proportions of children per state in the original sampling frames.

[4] Analyses by Nguyen et al. (2018) only relied on study sites in the PCER study that implemented content-specific curricula (i.e., the intervention group) and included Head Start and pre-K classrooms only.

propensity score weighting, difference-in-differences, covariate adjustment, or some combination of the latter. Specifically, Henry et al. (2006) used propensity score matching in combination with propensity score weighting based on child, family, and county-level socio-demographic covariates as well as limiting the sample of public pre-K participants to those individuals who were eligible for government assistance; Zhai et al. (2011) used propensity score matching based on child and family socio-demographic covariates as well as pre-test covariates related to children's developmental skills; Lee et al. (2014) used propensity score matching based on child and family socio-demographic covariates in combination with regression covariate adjustment based on pre-test covariates related to children's developmental skills; Jenkins et al. (2016) used an age cutoff regression discontinuity design in combination with propensity score weighting and regression covariate adjustment based on child and family socio-demographic covariates as well as a restricted sample of four-year-old Head Start and public pre-K participants who had previously participated in Head Start at age three; Johnson et al. (2018) used regression covariate adjustment based on child and family socio-demographic covariates as well as pre-test covariates related to children's developmental skills; Nguyen et al. (2018) used propensity score weighting in combination with regression covariate adjustment based on child and family socio-demographic covariates and pre-test covariates related to children's developmental skills; and Johnson et al. (2022) used propensity score weighting in combination with a difference-in-differences design based on child and family socio-demographic covariates and a pre-trend analysis period comprised of children's developmental skills at during the age 3 school year and at the beginning of the age 4 school year, as well as a restricted sample of four-year-old Head Start and public pre-K participants who had previously participated in Head Start at age three. For the analysis sample in each study, the Head Start and pre-K groups were

compared along key child and family background characteristics (e.g., poverty status, maternal education, child gender, and child race; see Table 2).

Study Outcome Measures

The study outcome measures are summarized in Table 3.[5,6] Children's language skills were assessed in four studies, with reported effect sizes nested within one of the four studies. Children's emergent literacy skills were assessed in all seven studies, with reported effect sizes nested within three of the seven studies. Children's mathematics skills were assessed in six studies, with no reported effect sizes nested within studies. Children's social-behavioral skills were assessed in six studies, with reported effect sizes nested within five of the six studies.

Meta-Analysis Results

This meta-analysis found a non-significant effect of public pre-K participation compared to Head Start participation in relation to children's school readiness skills overall (g = 0.08, SE = 0.06, p = .14; see Table 4) and in relation to each domain of children's school readiness skills, including analyses of language (g = 0.16, SE = 0.13, p = .23; see Figure S2), mathematics (g = 0.08, SE = 0.11, p = .46; see Figure S3), and social-behavioral skills (g = 0.00, SE = 0.07, p = .97; see Figure S4) when compared in separate meta-analyses. In contrast, public pre-K participants outscored Head Start participants in relation to children's emergent literacy skills (g = 0.17, SE = 0.08, p = .035; Figure S5).

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[5] Nguyen et al. (2018) provided the authors with coefficients for the effect of Head Start in comparison to pre-K based on propensity score weighted regression models that exclude teacher characteristics (which were included in their published analyses), but retained all other covariates (baseline achievement scores, child family background characteristics, family background characteristics, site/grantee fixed effects, and missing dummy variables). Nguyen et al. (2018) provided these coefficients for the three individual measures that comprised their *language and literacy skills* composite (i.e., PPVT-III, WJ III Letter-Word ID, and WJ III Spelling), their Mathematics composite, and their Social Skills composite.

[6] For the Johnson et al. (2022) study, this meta-analysis only considered effect estimates relevant to child outcomes measured at the spring of the 4-year-old year timepoint. Although effect estimates were also reported for child outcomes measured at the fall of the kindergarten timepoint, the spring 4-year-old timepoint was more proximal to program participation.

Sensitivity Analyses

We conducted follow-up sensitivity analyses to test whether the difference between public pre-K and Head Start was moderated by study context. Three single-state studies were conducted two contexts with universal pre-K programs deemed to have the highest performance standards according to NIEER (Georgia and Tulsa, Oklahoma; Barnett et al., 2003). The sensitivity analysis asked whether the skill difference between public pre-K and Head Start participants was larger in those single-state studies compared to the other studies conducted in multi-state contexts, which largely included targeted pre-K programs that were also considered to be lower quality by NIEER. No evidence of moderation emerged in relation to children's school readiness skills overall (g = 0.17, SE = 0.10, p = .10) nor in relation to each domain of school readiness skills, including language (g = 0.31, SE = 0.29, p = .28), emergent literacy (g = 0.08, SE = 0.17, p = .64), mathematics (g = 0.08, SE = 0.24, p = .74), or social-behavioral skills (g = 0.19, SE = 0.18, p = .29). These findings suggest that the meta-analytic effect was not reliably different between studies conducted in single-state or multi-state contexts or, presumably, in comparisons between Head Start and universal pre-K versus comparisons between Head Start and largely targeted pre-K programs.

Discussion

The current study conducted a systematic review of the literature and meta-analysis to examine whether children participating in public pre-K or Head Start programs differed in their school readiness skills shortly after program exit. Our findings suggest that the benefits public pre-K participation and Head Start participation were largely comparable in terms of enhancing children's school readiness skills. However, our findings also provide some suggestive evidence

that public pre-K participation can provide an enhanced benefit to children's emergent literacy skills in comparison to Head Start.

These largely null findings can be viewed in a broader context of findings suggesting that children attending center-based preschool programs show similar gains in their school-readiness skills. For example, a previous meta-analysis by Shager et al. (2013) reported non-significant differences between children participating in Head Start or other center-based preschool programs in relation to cognitive/academic outcomes. Similarly, careful probing of results from the Head Start Impact Study indicated that positive Head Start effects on vocabulary were isolated to comparisons of control children without center-based care, not children with other types of center-based care (Feller et al., 2016). Our findings extend beyond these previous studies by focusing specifically on public pre-K as the counterfactual condition compared to Head Start. We also consider multiple domains of children's school readiness outcomes, including language, emergent literacy, math, and social-behavioral skills.

In this study, we found one reliable difference between public pre-K and Head Start participants in relation to children's emergent literacy skills. This finding can be discussed in the context of findings from other descriptive studies highlighting differences between the programs. For example, public pre-K teachers have reported spending more time in whole group instruction as well as higher levels of educational attainment compared to Head Start teachers (e.g., Bassok et al., 2016). These factors might lead public pre-K teachers to spend more time in literacy instruction, which is typically the focus of whole group instruction. Therefore, perhaps it is not so surprising that emergent literacy skills of public pre-K participants were found to be higher than those of Head Start participants in this meta-analysis. It could also be the case that public pre-K programs were more focused on enhancing children's literacy outcomes during this period

of time, given that there were several nationwide early reading initiatives being implemented in public schools (e.g., Early Reading First; Russell et al., 2007). Moreover, public pre-K classrooms were more likely than Head Start classrooms to be located in public schools during that time period (Gilliam, 2008). However, it is important to note that several studies found no reliable differences between pre-K and Head Start classrooms in terms of the quantity and/or quality of literacy instruction (Bassok et al., 2016; Nguyen et al., 2018; Phillips et al., 2009).

The emergent literacy skill difference found between public pre-K and Head Start participants should also be qualified by evidence of Head Start's favorable effects when compared to children who experience home-based child care arrangements during preschool (Carr et al., 2022; Lee et al., 2014; Zhai et al., 2011). For example, a reanalysis of data from the Head Start Impact Study found large emergent literacy effects in comparison to children in parental care ($\beta = 0.46$) and relative/non-relative care arrangements ($\beta = 0.72$; Zhai et al., 2014). There is also evidence of rapid fadeout in pre-K program effects on literacy skills after children transition to elementary school. Numerous studies have documented initially positive short-term effects on children's emergent literacy skills at the end of pre-K that fade out as early as kindergarten. This includes studies of pre-K program effects in Boston, MA (McCormick et al., 2021; Weiland et al., 2021), Tennessee (Lipsey et al., 2018), and North Carolina (Burchinal et al., 2022; Carr et al., 2021; Peisner-Feinberg et al., 2020). Moreover, the type of emergent literacy skills assessed across the seven studies included in this meta-analyses are only precursors to more advanced literacy skills (e.g., Carr et al., 2020). It is possible that short-term ECE program effects on children's skill development related to complex and unconstrained domains of development (e.g., language and mathematical reasoning) are necessary in order to carry forward into longer-term effects in later grades (McCormick et al., 2021).

Finally, in follow-up moderation analyses, we failed to find sufficiently larger differences favoring public pre-K over Head Start in studies conducted in contexts with high-quality, universal pre-K programs compared to nationally representative and multi-state studies in contexts with generally lower-quality (and largely targeted) pre-K programs. Although some have speculated that universal programs will produce better outcomes than targeted programs (Barnett, 2011), our results did not support this hypothesis in relation to children's school readiness skills.

Implications for Cross-Sector Competition and Collaboration

Historically, interactions between public pre-K and Head Start programs have been characterized by both competition and collaboration. In the context of nation-wide efforts to expand access to ECE programming, greater efforts should be made to reduce competition and promote collaboration between the two sectors. Such efforts might serve to further equate the benefits of public pre-K and Head Start programming. Encouraging findings from qualitative research suggests that cross-sector collaboration can led to more comprehensive and higher-quality services in public pre-K and Head Start programs (Wrobel, 2012), but cross-sector collaboration may be infrequent (Mowrey & King, 2019).

At times, early childhood stakeholders have perceived of public pre-K and Head Start programs as "parallel, if not opposing forces" (Zigler et al., 1993, p. 27). Indeed, research suggests that the expansion of public pre-K programs has resulted in negative consequences for Head Start, including declines in the proportion of teachers with higher levels of education (Bassok, 2010) as well as declines in the proportion of 4-year-old children served in Head Start—with increasing numbers of younger children being served (Bassok, 2012). It is possible

that the effectiveness of Head Start programming may suffer as a consequence of public pre-K program expansion and cross-sector competition.

Alternatively, there are many ways in which cooperation and collaboration can exist between public pre-K and Head Start programs. For example, cross-sector collaboration can take the form of blended or braided funding between programs (Gonzalez & Caronongan, 2021). Additionally, many states have chosen to supplement Head Start funds in order to pay for additional Head Start slots and/or support for quality improvement (Friedman-Krauss et al., 2020). However, the blending/braiding of funding in Head Start centers appears to be limited, with only 3% of children enrolled in Head Start programs nationwide being funded by a source other than the U.S. Administration for Children and Families (Office of Head Start, 2019).

Cross-sector collaboration could also take place without the direct exchange of financial resources. For example, public pre-K and Head Start teachers may benefit from participating in joint trainings and professional development. These collaborations may be facilitated by a provision in the Every Student Succeeds Act (Section 2101, 4, B, xvi), which allows local education agencies to use funds to support joint professional development between early childhood educators and public school teachers. Additionally, Head Start-State Collaboration Offices now exist in nearly every state to facilitate collaborations between Head Start and public pre-K programs at the state and local level. Qualitative evidence suggests that cross-sector collaboration can led to skill building among program staff and, in turn, the provision of more comprehensive and higher-quality services for children and families (Wrobel, 2012). For example, a partnership between the public-school pre-K and the Head Start programs in Tulsa, Oklahoma enabled the local Head Start program to employ only lead teachers with a BA degree

at time when Head Start programs nationally were not required to employ lead teachers with a BA degree (Gormley et al., 2010).

Implications for Future Research Comparing Public Pre-K and Head Start

Continued research should be undertaken to compare public pre-K and Head Start programming. Based on the results of this systematic review and meta-analysis, future studies could be guided by the following recommendations. First, future research could provide better attention to context. Comparisons of public pre-K and Head Start will likely vary depending on the quality standards of the pre-K programs included in the study. Unfortunately, the four multi-state studies included in this meta-analysis did not provide sufficient detail to understand exactly what proportion of pre-K children in their samples resided in which state contexts, nor did those studies provide sufficient information on the quality or pre-K programming in those contexts. For example, in studies based on the ECLS-B, there was no information reported on the proportion of public pre-K participants that were drawn from each state context, nor which states were included in the analytic samples (Johnson et al., 2018; Lee et al., 2014). Therefore, it is not possible to know if these studies included public pre-K participants in states with higher or lower rated pre-K programs. Additionally, the ECLS-B relied on parent-report to identify whether children attended pre-K, so it is possible that these studies included some children who did not actually attend public pre-K. Finally, most studies focused on public school-based pre-K and excluded some children who attended pre-K in non-public school settings. Focusing on public school-based pre-K may not be representative of pre-K in many states that provide pre-K slots in child care centers located outside of public schools. Future research may continue to draw on national data to investigate this issue in more detail than was possible in our study. Such studies should examine the extent to which the sampling frame adequately reflects variability in pre-K

seen programming nationwide. Doing so may allow for comparisons of public pre-K and Head Start participants that reflect the wide variability in pre-K program quality standards across contexts.

Additionally, future research could utilize a *place-based* approach that focuses on specific states or municipalities (Chaudry et al., 2017). Such a place-based approach would be best suited for states or municipalities with well-established pre-K programs offering services that differ considerably from those services offered by Head Start (e.g., public pre-K programs with universal eligibility). Among the seven studies included in this meta-analysis, three studies were conducted in contexts with high-quality, universal pre-K programs—including Georgia (Henry et al., 2006) and Tulsa, Oklahoma (Jenkins et al., 2016; Johnson et al., 2022). This led the authors to suspect that public pre-K quality experienced by children in these studies may have been higher than the national average. However, our sensitivity analyses did not find evidence that program comparisons of school readiness outcomes in these three studies differed from comparisons in the other multi-state studies.

Second, future studies should examine if variability in program quality differentiates the benefits of one program compared to the other. While the Head Start Program Performance Standards exist to promote uniformity in the quality of services provided by individual Head Start grantees across the country, the program quality standards of public pre-K programs vary widely across states and municipalities (Friedman-Krauss et al., 2020). Moreover, while some public pre-K programs maintain quality standards that are similar to *or* more stringent than Head Start's Program Performance Standards, most public pre-K programs have lower-quality standards. Therefore, future research should examine if program quality differentiates program effects.

Third, future research should compare public pre-K and Head Start program participants along other domains of child functioning (e.g., approaches to learning; scientific reasoning; perceptual, motor, and physical development; child health) and parent engagement. These are key targets of Head Start (U.S. Department of Health and Human Services, 2015), but only one relevant outcome was assessed in one of the seven studies included in this meta-analysis (i.e., health; Henry et al., 2006). Future research on these outcomes may shed light on how the benefits of public pre-K and Head Start program participation compare along these important dimensions of child and family functioning that may lead to success in school.

Finally, future studies may be amenable to randomized trials, in which applicants would be randomly assigned to either a public pre-K or Head Start program within a locality. Previous randomized studies of public pre-K programs (Lipsey et al., 2018; Peisner-Feinberg et al., 2019; Weiland et al., 2019) and Head Start (Abbott-Shim et al., 2003; Puma et al., 2010) have been undertaken. However, to date, no studies have randomly assigned children to either public pre-K or Head Start. Random assignment may be feasible in localities that offer a common application system for pre-K and Head Start programs.

Limitations

Several limitations to this study should be noted. First, it was not possible to account for variability in the quality standards of the individual pre-K programs considered across the studies in our meta-analysis. However, it is possible that studies included in this meta-analysis compared public pre-K and Head Start in states where public pre-K programming was of higher-than-average quality. For example, three of the studies included in this meta-analysis were conducted in Georgia or Tulsa, Oklahoma, which are contexts with long established, high-quality pre-K programs. Although Head Start programs nationally are required to meet the Head Start Program

Performance Standards, there is much greater variability in the quality standards of pre-K programs across the U.S.—with most public pre-K programs maintaining standards that are less rigorous than Head Start standards. It is unknown to what extent the studies included in this meta-analysis examined public pre-K programming in states with better or worse standards, but the inclusion of studies based in Georgia and Tulsa, Oklahoma led the authors to believe that the quality of public pre-K programming experienced by children across studies in this meta-analysis may have been higher than average. As previously discussed, future research should be undertaken to examine if variability in program quality differentiates the effect of public pre-K compared to Head Start.

Second, six of the seven studies included in this meta-analysis considered children who participated in public pre-K or Head Start between 2001 and 2007, which may not adequately represent program effects for more modern cohorts of program participants, because important changes to Head Start and public pre-K programming may have occurred after this time period. For example, research has documented improvements in Head Start program quality between 2006 and 2014 (Aikens et al., 2016). These improvements may be related to changes mandated by the 2007 reauthorization of the federal Head Start Act, including the added requirement for 50% of Head Start teachers to hold a bachelor's degree as well as changes related to the establishment of the Head Start Designation Renewal System ("Improving Head Start for School Readiness Act of 2007," 2007). However, one study was undertaken during the 2017-18 school year, and that study shows a similar pattern of findings to what is reported in our meta-analysis (i.e., Johnson et al., 2022).

Third, it is possible that the blending or braiding of funding between Head Start and public pre-K programs could have resulted in children identified as public pre-K participants

being enrolled in Head Start classrooms in these studies. However, in 2008, only 2% of children enrolled in Head Start programs nationwide were funded by a source other than the U.S. Administration for Children and Families (Office of Head Start, 2008). Moreover, six of the seven studies included in our meta-analyses were undertaken prior to 2008 (i.e., between 2001 and 2007). Although one study was undertaken during the 2017-18 school year, that study clearly distinguished between Head Start and pre-K participants based on administrative records (i.e., Johnson et al., 2022). This suggests a very low likelihood of dual Head Start and pre-K participation among the children included in the seven studies considered in our meta-analysis.

A fourth limitation concerns the different analysis strategies used in each study. While each study employed rigorous statistical methods to adjust for potential sources of selection bias between Head Start and pre-K program participants, it is not possible to assume that selection bias was fully accounted for in these quasi-experiments. A fifth limitation concerns the different measures of language, literacy, mathematics, and social-behavioral skills used across studies. Although some measures were consistent across studies, there were differences in the measures used. A sixth limitation of our study concerns the lack of child health, physical development, and parent engagement outcomes—an important omission given that Head Start is comprehensive preschool program that provides whole child instruction, health, nutrition, family engagement, and other social services to children and families. However, only one study included in this meta-analysis reported on child health related outcomes, while no studies reported on parent engagement outcomes. Finally, although steps were taken in order to reduce the likelihood of relevant articles being omitted from the systematic review, it is still possible that some articles were mistakenly omitted.

Conclusion

The current systematic review and meta-analysis documented evidence to suggest that the benefits of public pre-K and Head Start program participation were not reliably different in relation to children's school readiness overall and specifically in relation to language, mathematics, and social-behavioral skills. However, public pre-K participants were found to outperform Head Start participants in terms of emergent literacy skills by a small margin. These findings are qualified by robust evidence to suggest that Head Start participation has favorable effects on children's emergent literacy skills in comparison to children who participate in informal child care programming (Carr et al., 2022; Lee et al., 2014; Zhai et al., 2011). Based on our findings we advocate for strategies to reduce competition and promote collaboration between the public pre-K and Head Start sectors. We also advocate for continued research comparing the effectiveness of public pre-K and Head Start programming. This research could provide better attention to the context under which public pre-K and Head Start programs are compared, and could examine if variability in program quality differentiates the benefits of one program compared to the other.

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Table 1

Study Overview

Citation	Study Name	Study Context	Analytic Method	Public Pre-K Auspice	*N*		Number of Effect Sizes			
					Head Start	Public Pre-K	Language	Emergent Literacy	Mathematics	Social-Behavioral
Henry et al. (2006)	Georgia Pre-K Study	Georgia	PSM/PSW	Mixed	106	201	2	3	1	3
Zhai et al. (2011)	FFCWS	Multi-state (Urban)	PSM [a]	Public School	339	339	1	1	0	4
Lee et al. (2014)	ECLS–B	Multi-state	PSM/CA [a]	Public School	1150	1000	1	1	1	3
Jenkins et al. (2016)	Tulsa Pre-K Study	Tulsa, Oklahoma	RDD/PSW/CA	Public School	329	211	0	2	1	0
Johnson et al. (2018)	ECLS–B	Multi-state	CA [a]	Public School	715	529	0	1	1	3
Nguyen et al. (2018)	PCER Study	Multi-state	PSW/CA [a]	Mixed	320	450	1	2	1	1
Johnson et al. (2022)	Tulsa SEED Study	Tulsa, Oklahoma	PSW/DD [a]	Public School	201	161	0	1	1	2

Note. FFCWS = Fragile Families and Child Wellbeing Study. ECLS–B = Early Childhood Longitudinal Study–Birth Cohort. PCER = Preschool Curriculum Evaluation Research. PSM/W = Propensity score matching or weighting. CA = Covariate adjustment. RDD = Regression discontinuity design. DD = Difference-in-differences.

[a] Studies that used pre-test covariates related to children's developmental skills

Table 2

Study Descriptive Information on Key Child and Family Background Characteristics

Citation	Poverty Status		Maternal Education		Child Gender (Male)		Child Race (African American)	
	Head Start	Public Pre-K	Head Start	Public Pre-K	Head Start	Public Pre-K	Head Start	Public Pre-K
Henry et al. (2006)	90%	90%	74% [a]	74% [a]	55%	55%	62%	62%
Zhai et al. (2011)	84%	83%	29% [a]	34% [a]	49%	52%	60%	60%
Lee et al. (2014)	96%	94%	23% [a]	22% [a]	50%	51%	29%	33%
Jenkins et al. (2016)	100%	100%	15% [a]	12% [a]	48%	48%	52%	54%
Johnson et al. (2018)	100%	100%	38% [a]	34% [a]	54%	51%	28%	26%
Nguyen et al. (2018)	3.10	3.14	12.67 [b]	12.75 [b]	52%	54%	30%	30%
Johnson et al. (2020)	$1,909	$2,125	28% [a]	26% [a]	53%	53%	35%	37%

Note. With regard to poverty status, Henry et al. (2006) reported the percent of families receiving TANF; Zhai et al. (2011) the percent of families with household incomes at or below 200% of the federal poverty line; Lee et al. (2014) reported the percent of families with incomes at or below $50,000; Jenkins et al. (2016) reported the percent of students eligible free- or reduced-price lunch; Johnson et al. (2018) reported the percent of families with household incomes at or below 185% of the federal poverty line; Nguyen et al. (2018) reported the log of household income in thousands of dollars; Johnson et al. (2022) reported monthly household income.

[a] Percent of parents with less than a high school education

[b] Average parent education, years

Table 3

Study Outcome Measures

Citation	Language	Emergent Literacy	Mathematics	Social-behavioral
Henry et al. (2006)	PPVT-III, OWLS Expressive Language	WJ III Letter-Word ID, CTOPP Elision, CTOPP Sound Matching	WJ III Applied Problems	Study specific Refusal Skills, Ethical Behavior, and Respect for Authority
Zhai et al. (2011)	PPVT-III	WJ-R Letter-Word ID		ASBI-Express Social Competence, CBCL Externalizing Problems, CBCL Internalizing Problems, CBCL Attention Problems
Lee et al. (2014)	Pre-LAS	ECLS–B Reading	ECLS–B Mathematics	Study specific Prosocial Behaviors, Conduct Problems, Hyperactivity/Inattention
Jenkins et al. (2016)		WJ III Letter-Word ID, WJ III Spelling	WJ III Applied Problems	
Johnson et al. (2018)		ECLS–B Reading	ECLS–B Mathematics	Study specific Approaches to Learning, Prosocial Behaviors, Externalizing Behaviors
Nguyen et al. (2018)	PPVT-III	WJ III Letter-Word ID, WJ III Spelling	Composite (WJ III Applied Problems & CMA-A)	Composite (SSRS Social Skills & SSRS Problem Behaviors)
Johnson et al. (2020)		WJ III Letter-Word ID	WJ III Applied Problems	Study specific Attention Regulation and Behavior Regulation

Note. Peabody Picture Vocabulary Test, 3rd edition (PPVT-III; Dunn & Dunn, 2007); Oral and Written Language Scale (OWLS; Carrow-Woolfolk, 1995); Preschool Language Assessment Scales (Pre-LAS; Duncan & De Avila, 1998); Woodcock-Johnson Psycho-Educational Battery–Revised (WJ-R; Woodcock & Johnson, 1990); Woodcock-Johnson Tests of Achievement, 3rd edition (WJ III; Woodcock et al., 2001); Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999); Early Childhood Longitudinal Study–Birth Cohort (ECLS–B; Najarian et al., 2010); Childhood Mathematics Assessment–Abbreviated (CMA-A; Klein & Starkey, 2002); Adaptive Social Behavior Inventory (ASBI) Express (Hogan et al., 1992); Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000); Social Skills Rating System (SSRS; Gresham & Elliott, 2008).

Table 4

The Meta-Analytic Effect of Public Pre-K Participation Compared to Head Start Participation

	Overall		Language		Emergent Literacy		Mathematics		Social-Behavioral	
	g	(*SE*)	*g*	(*SE*)	*g*	(*SE*)	*g*	(*SE*)	*g*	(*SE*)
Meta-analytic effect	0.08	(0.06)	0.16	(0.13)	0.17*	(0.08)	0.08	(0.11)	0.00	(0.07)

Note. Meta-Analytic Effect: 0 = Head Start, 1 = Public Pre-K. Effect sizes were indexed by Hedges' *g* standardized mean difference.
* $p < .05$

Supplemental Materials

Figure S1

Screening of Included Studies

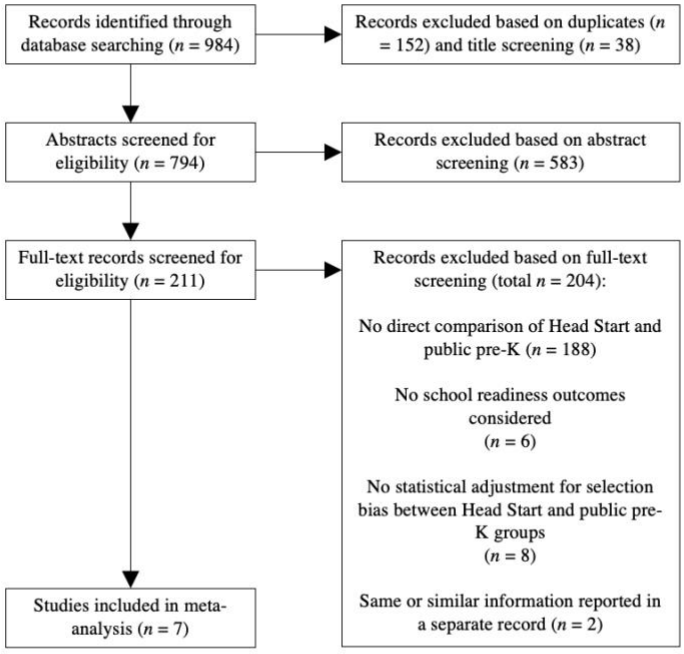


Figure S2

Forest Plot of Effect Sizes for Child Language Skills

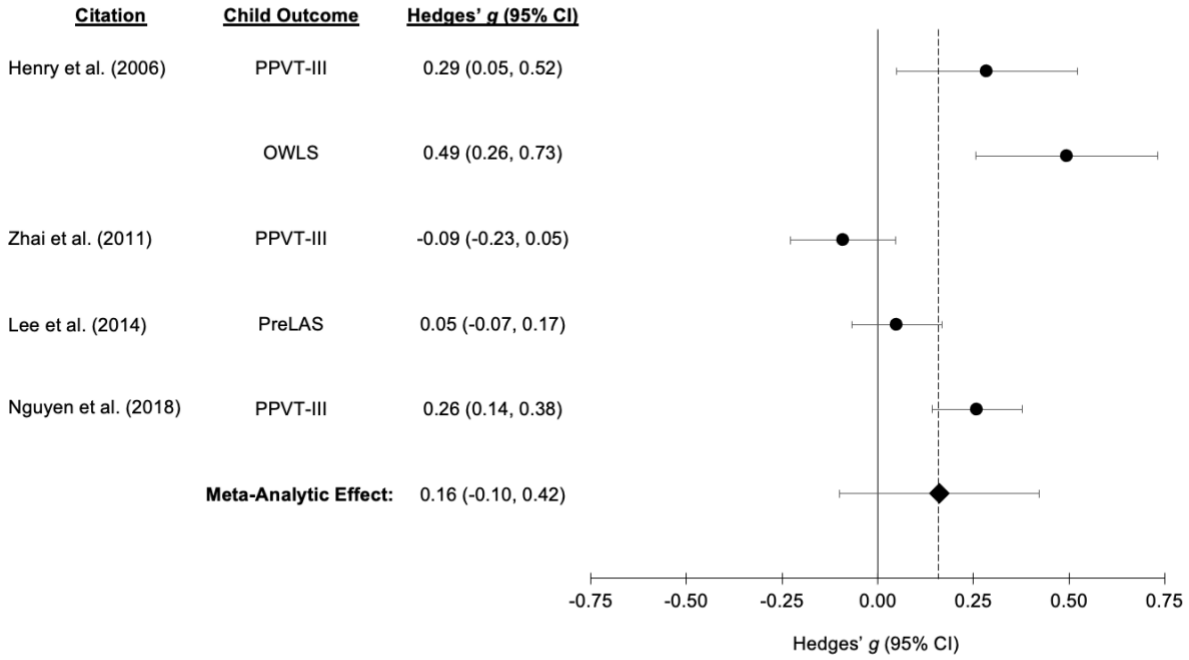


Figure S3

Forest Plot of Effect Sizes for Child Mathematics Skills

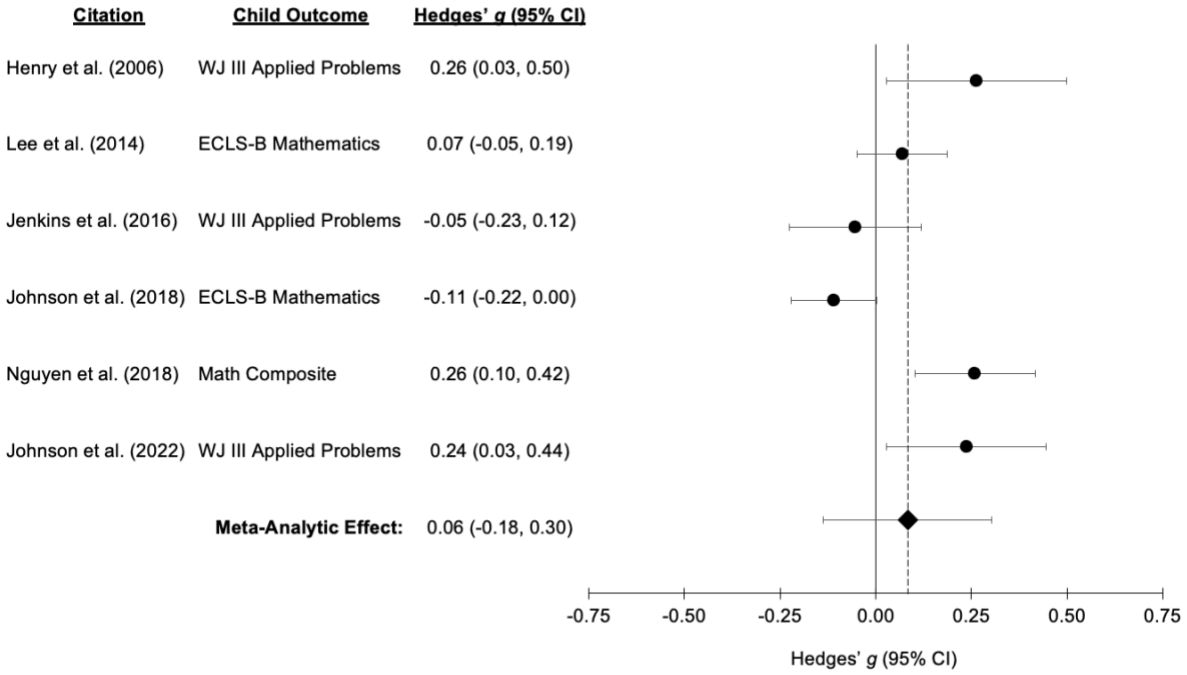
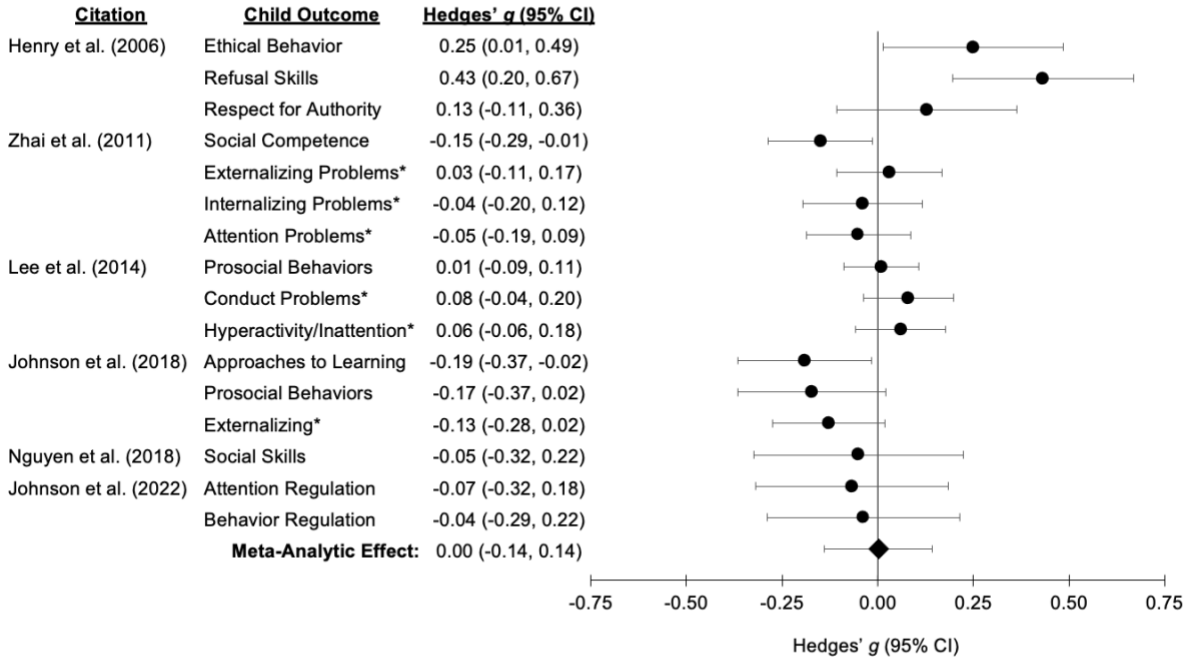


Figure S4

Forest Plot of Effect Sizes for Child Social-Behavioral Skills



Note. * = reverse coded to reflect the lack of problem behaviors.

Figure S5

Forest Plot of Effect Sizes for Emergent Literacy Skills