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Academic Benefits From Parental Involvement Are Stratified By Parental Socioeconomic Status: A Meta-analysis

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SYNOPSIS

Objective. The present study critically evaluates the assumption that parental involvement benefits students' achievement regardless of their socioeconomic status (SES). ***Design***. A meta-analysis of 98 studies published 2000-2017 examines if patterns of associations between 11 specific parental involvement variables and the academic achievement of K-12 students vary with parental SES as measured by educational level. ***Results***. Results showed that (1) six specific aspects of parental involvement, namely parental academic expectations, parental support for child learning, parent-child discussion of school matters, parental participation in school governance and events, parent and child reading together, and parental emphasis on education, were positively associated with student achievement; (2) subtle forms of parental involvement were most strongly associated with student achievement, followed by home- and school-based involvement; (3) parental learning support at home, parental academic emphasis, and parent-teacher communication had stronger association with the achievement of students whose parents were more educated; (4) parent-teacher communication and parental academic emphasis for college-educated parents did not additionally benefit student achievement when compared to these involvement activities for parents with at most Grade-12 education; and (5) parental involvement was more strongly associated with the linguistic achievement of students with highly educated parents. ***Conclusions.*** These results provide evidence that some benefits of parental involvement are stratified by familial SES.

Keywords: home involvement; school involvement; socioeconomic status; SES; student achievement.

INTRODUCTION

Policymakers, school leaders, and teachers in many education systems often espouse the need for parents to work with schools and be involved in their children's learning. The rhetoric for parental involvement assumes that parents can and should support the rigorous demands of the school curriculum and assessment, thereby enhancing school-family communication, alleviating student disciplinary problems, and contributing to student achievement (Carpenter, Young, Bowers, & Sanders, 2016). Not surprisingly, the expectations for parents' involvement in their children's education have motivated a substantive body of research examining the relation between parental involvement and student achievement (Castro et al., 2015; Hill & Tyson, 2009; Jeynes, 2007; Tan, 2018; Wilder, 2014). However, the focus of research has been largely limited to examining the levels and pattern of involvement of different parents, notably those from different SES backgrounds (Hornby & Lafaele, 2011; Malone, 2017; Wang, Deng, & Yang, 2016). Studies in this line of inquiry have sometimes found that parents from lower-SES backgrounds fail to be as involved as parents from more advantaged social milieux (Hornby & Lafaele, 2011; Malone, 2017; Wang et al., 2016). Accordingly, many researchers propose that policymakers and school leaders and teachers can do more to facilitate the extent of involvement of parents from lower-SES backgrounds.

However, it is not reasonable to expect all parents to be involved in the same manner because of their different access to resources. Furthermore, and perhaps more importantly, it remains to be ascertained if the benefits from parental involvement accrue equally for students from different SES families. Therefore, the present study takes the field forward by asking the critical question of whether parental involvement benefits the achievement of students from lower- and higher-SES families differently.

The moderating effects of SES (vis-à-vis other variables) in the parental involvement-student achievement relation are the focus in the present study because of continuing SES-related achievement gaps (Hanushek, Peterson, Talpey, & Woessmann, 2019) despite policymakers' and educators' efforts to involve parents in student learning, and increased societal awareness of the importance of parental involvement. Indeed, Hanushek and colleagues' (2019) analysis of four datasets on student assessments of mathematics, reading, and science achievement using nationally representative samples of adolescent students born between 1954 and 2001 showed that the achievement of students from the top 10% of families remained at approximately 1 standard deviation (equivalent to three to four years of learning) above that of peers from the bottom 10% of families across cohorts.

The specific objectives of the present study are to unravel for students from different-SES families (measured by parental educational attainment) the (1) specific aspects of parental involvement that differentially benefit their achievement and (2) subject areas where parental involvement has the greatest impact. Importantly, the present study critically evaluates the assumption that parental involvement benefits children from lower-SES families as much as it does children from higher-SES families. It employs meta-analysis to synthesize diverse findings from quantitative studies on the relation-between parental involvement and student achievement in the extant knowledge base.

Different Aspects of Parental Involvement

Researchers have focused on different aspects of parental involvement (Epstein, 1995; Lareau, 2003). For example, Epstein (1995) promulgated six categories of parental involvement, namely parenting to create a conducive home environment for children, maintaining regular two-way communication with schools, volunteering to support school activities, helping children to

learn at home, participating in school decision-making, and collaborating with the community-at-large. Lareau (2003) found that parental involvement is manifested in the way parents communicate with their children, intervene in schools to negotiate for more provisions to accommodate their children's learning needs, and organize their children's life to maximize the latter's learning.

The emerging research consensus is that parental involvement comprises both overt and subtle aspects (Castro et al., 2015; Hill & Tyson, 2009; Jeynes, 2010; Tan, 2018; Wilder, 2014). Overt manifestations include parental home and school involvement. Parents may be involved at home by discussing learning and school-related issues with their children, supervising their children's homework completion and monitoring their children's learning, engaging their children in learning activities at home, and reading together with their children. For school involvement, parents may engage teachers to discuss their children's learning and participate in school activities. Besides home and school involvement, parents may also be involved in more indirect and subtle ways, as exemplified by their emphasizing the value of education and holding high expectations of their children's academic achievement.

Parental Involvement and SES

Parental involvement and SES may be inextricably related in two ways. First, the level and pattern of involvement may vary with parents' SES for various reasons (Jeynes, 2011). The first reason is that high-SES parents may be academically and occupationally successful because of their personal drive and determination which may also eventuate in higher levels of parental involvement (Crane, 1996). Second, these parents endorse the education system that benefits them, so they may be more involved to help their children succeed in the same system (Portes & MacLeod, 1996). Third, children from high-SES families are more likely to have two parents and

to have parents with more time available to be involved (Jeynes, 2002a, b). Fourth, high-SES parents have the economic means to purchase educational resources that they can use to support their children's learning (Stevenson & Stigler, 1992). Fifth, parents may attain higher educational levels and occupational status because they want their children to be more successful academically, so these parents tend to be more involved (Grayson, 1999).

In addition to SES being a predictor of parental involvement, the impact of involvement on student achievement may be moderated by parents' SES. This line of inquiry has not been systematically investigated but there are three reasons why SES may moderate the parental involvement-student achievement relation. First, compared to their less privileged peers, high-SES parents may conceive their role as an active contributor to their children's achievement (e.g., supplementing teachers' efforts in schools) and be more confident about their contributions to their children's achievement (Whitaker & Hoover-Dempsey, 2013; Yamamoto, Holloway & Suzuki, 2016). The higher level of motivation may enhance the effectiveness of their involvement, especially at home (Park & Holloway, 2013; Walker, Ice, Hoover-Dempsey, & Sandler, 2011). The second reason relates to parents' perceptions of their children's schools including whether they are positive toward the school, whether teachers welcome their involvement, and whether they have access to school resources to support their involvement (Hoover-Dempsey et al., 2005; Park & Holloway, 2018; Whitaker & Hoover-Dempsey, 2013). Relative to less-advantaged peers, high-SES parents may have more positive experiences engaging teachers and are more likely to be approached by schools to support their children's learning by virtue of their familiarity with the school system. Their positive interactions with schools may boost the efficacy of their involvement, especially in schools (Park & Holloway, 2013; Walker et al., 2011). A third way to understand the moderating effect of parents' SES on

the parental involvement-student achievement relation is to invoke the conceptual apparatus of "habitus" and "hysteresis" in cultural capital theory (Bourdieu, 1977, 1986, 1990). Habitus refers to dispositions, values, perceptions, knowledge, and skills that are valued by teachers in schools (Bourdieu, 1986). It represents the incorporation of school expectations and demands in parents' predispositions and propensities, and is exemplified by pro-learning values and attitudes, proclivities for academic pursuits, and the acquisition of academic competencies and skills in parents. More specifically, parental involvement is conceived as a process by which parents benefit their children's achievement by transmitting their worldviews, attitudes, and preferences (i.e., habitus) to their children. Teachers may perceive students demonstrating these characteristics as being more capable (Bourdieu, 1986). It follows then that, on the one hand, children from higher-SES families may find it easier to internalize the requisite habitus from their parents to succeed academically (Bourdieu, 1977, 1986, 1990). On the other hand, despite the best parental intentions, children from disadvantaged families may experience the "hysteresis effect" when their habitus is misaligned with that of teachers (Bourdieu, 1977), and therefore fail to reap the benefits of parental involvement. Therefore, despite the same amount of parental involvement efforts, high-SES students may benefit more from parental involvement than low-SES peers.

Gaps in Previous Meta-analyses

Previously published meta-analyses of parental involvement do not present a comprehensive picture of the pattern of relation between different parental involvement variables and student achievement for two reasons. First, most meta-analyses did not examine a comprehensive gamut of parental involvement variables. For example, many did not examine parental attitudes toward education (Castro et al., 2015; Fan & Chen, 2001; Jeynes, 2005, 2007;

Wilder, 2014). A notable exception is Hill and Tyson (2009) who examined academic socialization comprising parental "attitudes and expectations about school and education and conveying the enjoyment of learning, which reflects parental socialization around the value and utility of education" (p. 741). Other meta-analyses focused on only specific parental involvement variables, such as involvement with homework (Patall et al., 2008), home tutoring (Erion, 2006), and parent-child reading (Senechal & Young, 2008). The omission of different variables in these studies risks understating the true contribution of parental involvement to student achievement, especially subtle aspects of parental involvement for lower-SES families.

Second, most meta-analyses did not test for the moderating effects of SES. Patall et al. (2008) and Senechal and Young (2008) were exceptions, but they examined only specific aspects of parental involvement (homework involvement and parent-child reading respectively). Furthermore, these studies reported different patterns of results; parental involvement in children's homework being less associated with student achievement for higher-SES parents in Patall et al. (2008) versus no moderating SES effects for family literacy involvement in Senechal and Young (2008). Some meta-analyses examined other variables that were related to SES, such as ethnicity (e.g., European Americans tended to be characterized by higher SES when compared to African Americans in the United States), but results were inconsistent. For example, Fan and Chen (2001) reported negligible moderating effects of ethnicity in the parental involvement-student achievement relation, and Hill and Tyson (2009) found stronger parental involvement effects for European American as compared to African American parents.

The Present Study

The present study addresses these knowledge gaps by examining the main effects of various aspects of home-based, school-based, and subtle forms of parental involvement variables

on student achievement and ascertaining how these effects are moderated by SES as measured by parental education. SES has been measured traditionally using indicators including parental educational attainment, parental occupational prestige, and family income (Sirin, 2005). However, only parental education is used as a measure of SES because there is meta-analytic evidence that parental education is the most predictive indicator of student achievement when compared to occupational prestige or income (Sirin, 2005). Furthermore, the three SES indicators are correlated (e.g., higher levels of educational attainment enables individuals to earn more; Hauser & Warren 1997). Sirin's (2005) meta-analysis showed that parental education, occupation prestige, and income were very closely associated with student achievement at *r*s = .30, .28, and .29 respectively.

The limitation of relying on only parental education to measure SES is that it may not fully capture parents' access to other resources beyond human capital (e.g., social resources via parents' professional networks or financial resources via parents' income) that is implied in the SES construct (Mueller & Parcel, 1981). Another commonly used measure of SES is family income, but there are challenges in comparing income levels across studies either because there are different countries involved (income is commonly reported in nominal instead of purchasing power parity terms) or because studies for the same country are conducted in different time periods (nominal, not real, income is reported). Therefore, only parental education is used as a SES indicator for meaningful comparisons across studies in the present study.

METHOD

Meta-analysis was employed to analyse empirical findings across published studies that examined the relation between parental involvement and student achievement. The technique

enables effects in individual studies to be converted into a common metric—the effect size—that can be compared across studies (Glass, 1976).

Identification of Studies

A broad search of quantitative studies examining the relation between cultural capital (including parental involvement) and student achievement published 2000-2017 was performed. This date range provided continuity to previously published meta-analyses; Jeynes (2005) covered the years 1974-2000, Jeynes (2007) covered 1972-2002, Hill and Tyson (2009) covered 1985-2006, and Castro et al. (2015) covered 2000-2013 in their meta-analyses. This date range also made the present study feasible in view of the rapidly increasing number of studies published in the last few years that needed to be analysed. For example, the number of studies returned in preliminary searches of five databases (Academic Search Complete, British Education Index, ERIC, Family & Society Studies Worldwide, TOC Premier) employing the same set of keywords used in the present study increased exponentially from 1,528 in 1990 to 5,604 in 2010. The voluminous corpus of studies available poses great challenges to endeavours seeking to cover all studies ever published.

Multiple computer databases, namely Academic Search Complete, American Doctoral Dissertations, British Education Index, Digital Dissertation Consortium, ERIC, Family & Society Studies Worldwide, Open Access Theses and Dissertations, and TOC Premier, were used. Search terms in abstracts included combinations of keywords related to (1) cultural capital (e.g., “cultural capital”, “objectified”, “institutionalized”, “embodied”, “habitus”, “parent involvement”, “home involvement”, “school involvement”, “reading”, “parent expectations”, “parent education”) and (2) student achievement (e.g., “achievement” “performance”, “results”, “attainment”, “course grade”, “test”, “school”). This broad search identified 588 studies. The

computer search was complemented by a physical search of additional studies from previously published review articles and known primary studies of cultural capital (including parental involvement). This physical search identified an additional 166 studies.

Selection of Studies

For the purposes of the present analysis focusing on parental involvement, the studies identified were included if they (1) examined the relation between parental involvement and student achievement in languages, mathematics, science, or some composite of these and/or other academic subjects; (2) reported effects sizes that can be compared by conversion to a common metric (see Lipsey & Wilson, 2001, for examples) to enable effects sizes to be computed; (3) examined K-12 students in its sample; and (4) were written in English. Parental involvement in these studies could be measured using any of the 11 variables that have been commonly examined in previous meta-analyses (Castro et al., 2015; Fan & Chen, 2001; Hill & Tyson, 2009; Jeynes, 2005, 2007; Patall et al., 2008; Senechal & Young, 2008; Wilder, 2014). These variables comprised (1) four home-based involvement variables (parent-child academic discussions on learning and school, parental supervision of children, parental support of their children's learning at home, parent-child reading together); (2) two school-based involvement variables (parental communication with teachers regarding their children's learning, parental participation in school activities); (3) two subtle parental involvement variables (parental emphasis of the importance of education to their children, parental academic expectations of their children); and (4) three composite variables (two or more home involvement variables, two or more school involvement variables, two or more home/school involvement variables).

Studies were excluded if they (1) reported results from program evaluations or experiments (as these did not represent naturally occurring parental involvement settings) or (2)

pertained to students with special educational needs (as these students might require special parental involvement foci) or from religious schools (as these students might respond differently to parental involvement when compared to secular school students).

This set of inclusion and exclusion criteria resulted in 651 studies being excluded, mostly because these studies examined cultural capital variables unrelated to parental involvement (e.g., home educational resources, cultural participation, children's participation in extra-curricular activities) instead of the 11 parental involvement variables described above. Five other studies were excluded because they used the same datasets. The final set of studies remaining for the meta-analysis was 98 (Table 1).

Coding Procedure

A formal coding scheme was developed to record substantive and methodological details about the studies (Table 2). This scheme comprised four categories. First, the identification section coded data on author(s), publication year, study title, and study type. The demographics section coded data on student gender and age/grade levels and parental education. The methodology section coded data on the research design and name of the study/database used. The effect size section coded data on the parental involvement and student achievement variables (including effect sizes and sample sizes).

Coding was done in three stages. First, the authors each coded a common subset comprising approximately 40% of the 98 studies. They then discussed and clarified the results of the coding in three meetings at various stages of the meta-analysis project. The purpose of this coding exercise was to clarify understanding the variables used in the studies to inform the final coding for all studies. Next, the first author coded the remaining 60% of the studies. Finally, a doctoral student coded approximately one-third of these studies (20 studies). The inter-rater

reliabilities (Cohen's, 1960, kappa) between the first author and this student for the coding of the 20 studies were deemed "substantial" to "almost perfect" (e.g., see McHugh's, 2012, interpretation), ranging from .76 for the classification of students' grade levels to 1.00 for the classification of parental involvement variables, parental education, and research design variables.

Calculating Effect Sizes

Most effect sizes reported in the studies were Pearson's correlation coefficients (97 studies); one study reported means/standard deviations which were converted to Pearson's correlations using the Lipsey and Wilson's (2001) formula. All correlations were then converted to Fisher's *z*-scores and weighted by the inverse of their variance in Comprehensive Meta-Analysis (V3). The weighting enabled effect sizes from larger-sample studies, which had larger study reliability, to be given greater weight than those from smaller-sample studies (Lipsey & Wilson, 2001).

To ensure that each unit of analysis should only contribute one effect size (Lipsey & Wilson, 2001), the average effect size was computed from (1) studies containing data on various aspects of the same parental involvement variable (e.g., solicited and unsolicited parental assistance with children's homework) and (2) studies containing data on different components in a single subject (e.g., reading fluency and comprehension). To maximize the validity of data coded, effect sizes involving (1) child/teacher-reported, instead of parent self-reported, parental involvement data (to minimize self-serving bias) and (2) parental involvement data measured at the earliest time point and student achievement measured at the last time point in longitudinal studies (to strengthen, though not conclude, causal inference) were coded wherever possible. To maximize the variety of information that could be analysed, effect sizes related to (1) data from

subsamples instead of the entire sample; (2) data on specific, instead of overall, parental involvement variables; and (3) data on specific subjects, instead of overall achievement, were coded wherever possible.

Random Effects Models

The random-effects, as opposed to fixed-effect, model was employed in the analysis because (1) it does not require the strict assumption that all effect sizes analysed are from the same underlying population; (2) it enables generalization of results beyond the studies analysed; and (3) results from the random-effects and fixed-effect models will be identical even if the observed variance in effect sizes across studies is solely attributable to random sampling errors (Cooper & Hedges, 1994; Hedges & Vevea, 1998). The variation among effect sizes was analysed using the *Q* test of homogeneity (Hedges & Olkin, 1985). A nonsignificant test result means that the observed variation among effect sizes is attributable to random sampling errors and that the effect sizes belong to a common underlying population. A significant *Q* test result means that the observed variation cannot be accounted by sampling errors and that the effect sizes belong to different underlying populations.

Moderator Effects

SES moderator effects were tested by meta-regressing parental involvement effect sizes on parental education, controlling for student age (or grade levels) and gender, subject areas, and study design whenever possible (e.g., having enough effect sizes relative to the number of covariates). Parental education was used as an indicator for parental SES because it was the most widely reported variable (in 46 studies) in the corpus of studies reviewed for the present meta-analysis as compared to other indicators of SES, such as parental occupation (9 studies) or family income (34 studies). Student gender was included as a covariate because previous studies

showed mixed results with regard to whether boys or girls benefit differentially from parental involvement (Tan, 2017b). For example, Phillipson's (2009) study in Hong Kong showed that parental educational expectations for 5^{th}-6^{th} grade children were positively associated with students' mathematics achievement for both boys and girls, whereas parental home and school involvement were not related to their children's mathematics achievement for either boys or girls. However, Zadeh, Farnia, and Ungerleider's (2010) study of first-grade students showed that parental responsiveness and learning stimulation mediated the effects of maternal education on boys' mathematics achievement, whereas learning stimulation, variety in experiences, and modeling of social maturity mediated maternal education effects for mathematics achievement for girls. Students' grade levels were also included as a covariate in the meta-analysis because children's developmental needs change as they grow up, curricular expectations and educational aims vary for different grade levels, and parents may experience increasing difficulty to coach their children at higher grade levels (Bassok, Latham, & Rorem, 2016; Castro et al., 2015; Fan & Chen, 2001; Hill & Tyson, 2009). Indeed, meta-analyses by Castro and colleagues (2015) and Fan and Chen (2001) reported that students' educational stages and age respectively moderated the association between parental involvement variables and student achievement. The research design of studies was included as a covariate because parental involvement may take time to have an impact on student learning. Therefore, compared to cross-sectional studies, longitudinal studies may be more likely to detect significant effects.

Publication Bias

A common concern in meta-analyses is the presence of publication bias in studies (Lipsey & Wilson, 2001; Polanin, Tanner-Smith, & Hennessy, 2016). This means that studies with significant effects are more likely to be published than those with nonsignificant effects. This

problem may arise for many reasons (Hedges, 1992). First, some researchers focus on reporting significant results and do not report nonsignificant results adequately. Second, some journals may accept articles reporting significant results. This editorial bias eventuates in more significant results being published, the third reason contributing to publication bias.

The funnel plot of standard errors by effect sizes (Figure 1) showed that (1) studies with different standard errors were included in the meta-analysis and (2) studies with greater standard errors (i.e., studies with smaller sample sizes) were distributed on both sides of the mean effect size. These two indicators showed that there was no evidence of publication bias among the studies analysed.

RESULTS

Effect Sizes

There were 355 effect sizes (correlations) ranging from -.55 to .62 from 132 independent samples in 98 studies (Table 3). The mean effect size for the random effects model was .14, with a 95% confidence interval of .11 to .16, and it was significantly different from zero, $p < .01$. The mean effect size was small to medium in magnitude, according to Cohen's (1988) and Rosenthal's (1996) rules of thumb (*r*s = .10, .30, .50, and .70 for small, medium, large, and very large effect sizes respectively). The sample sizes for the effect sizes ranged from 32 to 55,327 students, with a mean of 2,271. The total sample size was 806,359 students.

Effect sizes for 11 variables measuring home-based, school-based, and subtle forms of parental involvement were also examined. Results showed that eight were significantly different from zero at the .05 or .01 levels. These variables were, in descending order of effect sizes, parental academic expectations of their children ($k = 41$, effect size or ES = .28), parental provision of support for child's learning ($k = 30$, ES = .17), parent-child discussion of school

matters and learning issues (k = 18, ES = .15), parental participation in school governance and events (k = 21, ES = .14), parent and child reading together (k = 15, ES = .11), parental emphasis on education (k = 20, ES = .11), general parental home involvement (k = 17, ES = .08), and general parental school involvement (k = 29, ES = .07). When the individual variables were grouped into home, school, or subtle forms of involvement, results showed that subtle parental involvement (k = 56, ES = .23) had a larger effect size than home-based (k = 85, ES = .10) or school-based parental involvement (k = 58, ES = .08).

Moderator Analyses

Next, meta-regressions were performed to examine whether parental education moderated the effect sizes for individual parental involvement variables and for different subject domains with students' gender and grade levels and research design (cross-sectional versus longitudinal) included as covariates in the models. Low parental education (i.e., < Grade 9), cross-sectional study design, boys, and kindergarten were used as reference categories for parental education, research design, student gender, and students' grade levels, respectively, in all models except in cases where there were no such categories.

Individual parental involvement variables. Parental education moderated the effect sizes for some parental involvement variables (Table 4). Specifically, compared with parents with less than Grade 9 education, effect sizes for parental home support were higher for parents who had at least a Bachelor's degree (medium ES difference of $\beta = 0.39$). Similarly, compared with parents with less than Grade 9 education, effect sizes for parental communication with teachers were higher for more educated parents with up to Grade 12 education (medium ES difference of $\beta = 0.41$). Additionally, there were "ceiling effects" for parent-teacher communication in that the effect size (ES difference of $\beta = -0.11$; p = .33) for the most highly

educated parents (Bachelor's degree and above) did not differ from that for the least educated parents (less than Grade 9 education).

Results for parental emphasis on education indicated that, relative to parents with less than Grade 9 education, effect sizes of involvement effects for parents with Grade 9-12 education (medium ES difference of $\beta = 0.41$) were greater than those for parents with a least a Bachelor's degree (small ES difference of $\beta = 0.17$). The results suggested ceiling effects in that, although students benefited from parental academic emphasis, the magnitude of this benefit did not increase additionally in the case of college-educated as compared to parents with Grade 9-12 education.

In contrast to results for parental home support, parent-teacher communication, and parental academic emphasis, the association between other parental involvement variables and student achievement was not moderated by parental education. These variables comprised parent-child academic discussions, parent-child reading, parental participation in school activities, and parental academic expectations.

Among the different covariates included in the meta-regressions, results showed that, compared to kindergarteners *per se*, effect sizes for parental home support were greater for K-6 students (small ES difference of $\beta = 0.23$). The other covariates were not significant at the .05 level.

Achievement domains. Examining the moderation effects of parental education on relations between parental involvement and student achievement for different subjects showed that, compared to less educated parents, effect sizes for students' linguistic achievement were higher if parents were more educated (Table 5). For example, effect size differences increased from medium ($\beta = 0.39$) for parents with at least Grade 9 education to large ($\beta = 0.50$) for parents

with at least a Bachelor's degree. In addition, effect sizes for linguistic achievement were larger for longitudinal (vis-à-vis cross-sectional) studies (small ES difference of $\beta = 0.25$) and for studies with samples including boys and girls (large ES difference of $\beta = 0.54$) as compared to those samples with boys only. There were no parental education moderation effects for mathematics or general achievement at the .05 level. The moderating effect for science achievement was not examined because there was only one effect size for this subject.

DISCUSSION

The present meta-analytic study extends past research focusing on the nature and levels of parental involvement for parents from different SES backgrounds and the omnibus effects of parental involvement on student achievement ignoring parents' SES. Results from the present study showed that many specific parental involvement variables were significantly related to student achievement. These variables were parental academic expectations, parental support for child's learning, parent-child discussion of school matters, parental participation in school governance and events, parent and child reading together, and parental emphasis on education. Comparison of the effect sizes also indicated that subtle forms of parental involvement were most strongly associated with student achievement, followed by home- and school-based involvement.

Involvement of Less-Educated Parents

All students, regardless of their parents' education, benefited from many aspects of parental involvement, such as parental academic expectations, parent-child academic discussions, parent-child reading, and parental participation in school activities. These results built on those reported in past meta-analytic research which generally found that, compared with school-based involvement, parental expectations and specific aspects of home-based

involvement (e.g., parent-child discussions of school matters, parental encouragement of child's reading) were more strongly related to student achievement than others (Castro et al., 2015; Fan & Chen, 2001; Jeynes, 2005, 2007; Wilder, 2014). Indeed, previous studies pursuing these lines of inquiry showed that parents from higher-SES backgrounds were sometimes more involved than peers from lower-SES backgrounds, especially in more visible aspects of school-based involvement (Hornby & Lafaele, 2011; Malone, 2017; Wang et al., 2016).

Previous studies suggest that less-educated parents are as keen as more-educated parents in supporting their children's learning (Hartas, 2015; Herrold & O'Donnell, 2008; Malone, 2017; Ryan, Casas, Kelly-Vance, Ryallas, & Nero, 2010; Sy, Rowley, & Schulenberg, 2007). Children of less-educated parents can benefit from higher levels of parental academic expectations (as the results from the present study suggest) via perhaps more home-based than school-based involvement. For example, lower-SES parents may also expect their children to complete high school and pursue higher education (Herrold & O'Donnell, 2008) although they may be more involved in the privacy of their home than in the public-school arena. Holloway, Rambaud, Fuller, and Eggers-Pkirola's (1995) study found that low-SES mothers were focused on preparing their children to excel in schools. The mothers were also receptive to expert advice from teachers as long as it helped to achieve their learning goals for their children. Schools can foster the involvement of less-educated parents by providing professional development programs to shape teachers' proclivities about parental involvement. These programs can focus on enhancing teachers' efficacy so that teachers can be sufficiently confident to invite parents to be involved, shaping teachers' beliefs about parents' efficacy in helping their children learn, and educating teachers about effective parental involvement practices (Hoover-Dempsey, Walker, Jones, & Reed, 2002).

Parental academic expectations and home involvement. Parental academic expectations for their children had the largest effect size when compared to other specific parental involvement variables. Parental expectations emanate from parents' conception and generation of educational possibilities for their children (Bourdieu, 1990). There is evidence that these parental conceptions of "probable" futures, encapsulated in their academic expectations, are better predictors of their children's academic outcomes than their conceptions of "like-to-be" futures for their children (Harrison & Waller, 2018; Markus & Nurius, 1986, p. 966).

Parental academic expectations of their children may affect the latter's achievement via four mechanisms (Yamamoto & Holloway, 2010). First, children may internalize their parents' valuation of achievement. Second, parental expectations may shape children's perceptions of their academic abilities and self-efficacy. Third, parents with higher levels of academic expectations may be more involved in their children's learning. Last, teachers may be more motivated to facilitate learning in children whose parents have higher academic expectations. Less-educated parents can "actualize" their expectations by feeling more responsible for their children's development, scheduling more learning activities for their children, being more assertive in securing benefits for their children from schools, and providing more books for their children to read at home (Bodovski & Farkas, 2008).

Schools can work closely with these parents to enhance the latter's capacity for effective involvement. This requires communicating that parental involvement is pivotal to their children's learning, sharing with parents specific ways in which they can be involved, educating parents about how and why involvement can impact student learning, familiarizing parent with specific curricular goals, giving parents feedback on the effects of their involvement, and supporting parent-teacher networks in schools (Hoover-Dempsey et al., 2005).

Parental participation in school activities. The lower propensity for less-educated parents to be formally involved in school is often attributed to the plethora of barriers they must surmount (Hornby & Lafaele, 2011; Malone, 2017; Wang et al., 2016). These barriers include time and resource constraints and communication challenges with teachers. Consequently, some parents resort to deferring to teachers as experts in their children's education (Crozier, 1999). Schools can foster the school involvement of these parents by creating a welcoming school climate, empowering teachers by prioritizing improving family-school relations, learning from parents their goals and perspectives on their children's learning, offering myriad opportunities for parents to be involved, and creating opportunities for school personnel and parents to co-attend student-centered events at school (Hoover-Dempsey et al., 2005).

Involvement of More-Educated Parents

In contrast to students with less-educated parents, students whose parents were more highly educated appeared to benefit more from parental emphasis on education, parental support of children's home learning, and parent-teacher communication. These results add to the relatively undeveloped knowledge base on SES moderation effects in the parental involvement-student achievement relation. For example, if parents' ethnicity were to be used as a proxy for their SES, then results from the present study can be regarded as being congruent with Hill and Tyson's (2009) meta-analytic findings of stronger parental involvement effects for European American as compared to African American parents.

Parental emphasis on education. More highly educated parents may shape students' academic dispositions by their emphasis on education. In turn, student achievement benefits from higher levels of academic dispositions. For example, Hernandez-Martinez and Williams (2013) showed that resilient mathematics students could exercise reflexivity and agency in the transition

to new educational institutions. These students internalized study habits that were consistent with expectations of other college students (e.g., independent study, soliciting help, persistence) and subject habits that resonated with the field (e.g., appreciating beauty of mathematics), derived support from supportive families for healthy aspirations to succeed, learned lessons on resilience from prior difficult schooling, and benefited from inspiring teachers at the new institutions.

Parental support of home learning. Highly educated parents also benefit their children's achievement because they have themselves been successful in the education system and therefore are able to use this proximal knowledge of the education system (rules of the game) to prepare their children for learning (Harris & Graves, 2010). To illustrate, Lareau's (2011) study showed how middle-class parents employed concerted cultivation that was consonant with the inculcation of embodied cultural capital in their children. She reported how these parents strategized on ways to let their children get ahead in life, arranged for their children to attend enrichment classes to develop the latter's talents, and taught their children on how to engage power-brokers to meet their learning needs in schools, so as to enable their children to succeed in life. Obviously, it may be easier for parents to provide home support for younger (e.g., primary school students) as opposed to older children (e.g., secondary school students), given the receptivity of younger children to parental influence and less academic demands at lower grade levels (Bassok et al., 2016).

Parent-teacher communication. Highly educated parents are more acquainted with teachers' expectations in schools (Bourdieu, 1977, 1986, 1990). Their familiarity of expectations and demands of the education system increases their propensity to engage teachers with confidence. When they communicate with their children's teachers, they more readily discuss learning and behavioural issues in the schooling and broader educational context. They may also

exude a sense of entitlement in their engagement with teachers, thereby enabling them to be more proactive in securing school resources to support their children's learning (Reay, 1998). The mobilization of school resources to support their children's learning needs culminates in higher levels of academic achievement.

Leenders, Monfrance, and Haelermans' (2019) study of parent-teacher communication showed that most teachers in their sample made an effort to develop a trusting relationship with parents. However, teachers seldom discussed with parents' reciprocal role conceptions, goals, and expectations in student learning or engaged parents in decision-making processes regarding student learning. Schools therefore may address these areas in the professional development for teachers.

Linguistic Achievement

Last, parental involvement was more strongly associated with language achievement for students whose parents were more highly educated. This finding may arise because, compared to mathematical (or scientific) learning, language mastery is more subject to subjective and stylistic factors (e.g., ways of speaking, accent, intonation) which are acquired from interactions with parents (Tan, 2017b). Highly educated parents may also find it easier to role model and teach languages than mathematics in interactions with their children.

Conclusion

Research on the association between SES and parental involvement has largely focused on examining whether the extent and nature of parental involvement varies with parents' SES. The present study advances scholarship by providing evidence that the relations between some aspects of parental involvement and student achievement may also be moderated by SES as measured by parental education. Results from the present study challenge the assumption that the

benefits of all aspects of parental involvement are uniform across parents from different social milieux. They contribute to an emerging conceptualization of the differentiated pattern and impact of parental involvement (and cultural capital more generally; Tan, 2017a, 2017b). For example, a study of secondary school parents in Hong Kong found that there was no simple relation between the nature of parental involvement and SES (Tan, 2018). Specifically, parents from higher-SES backgrounds were only more involved at home and in specific school activities, such as governance, volunteering, and attending school meetings. Surprisingly, parents from average-SES backgrounds were more likely to have engaged teachers in discussions on their child's behavior, progress, learning, and homework, and more generally, parenting and family support issues. Evidence from the present study builds on such findings on the SES-involvement relation by demonstrating that the benefits of parental involvement could also be stratified by SES.

As with all studies, results from the present study must be contextualized with a few limitations in mind. The first limitation is that the meta-analysis synthesized findings from quantitative studies only. Future studies can adopt a meta-ethnographic approach to glean insights on how and why parental involvement facilitates student learning from qualitative studies. The second limitation is that the study was premised on the assumption that all parents had access to resources needed for their involvement. However, some parents, especially those from lower-SES backgrounds, may lack the knowledge and skills to be involved in the first place (Jeynes, 2011). Future research can examine if resource availability moderates the impact of parental involvement on student achievement. The third limitation pertains to the measurement quality of the variables (e.g., parental involvement, parental education, student achievement) in

the studies analysed. Indeed, as with all meta-analyses, the quality of the results from the present study can only be as good as the data coded from the primary studies (Lipsey & Wilson, 2001).

IMPLICATIONS FOR PRACTICE, APPLICATION, THEORY, AND POLICY

There are two practical implications from the present study. The first emanates from addressing the causes for differences in specific aspects of parental involvement that students benefit from, depending on their SES backgrounds. For example, policymakers and schools can provide support and resources to families, especially lower-SES families, if the differences arise because of the lack of parental resources. Schools can work together with these students and provide extra support for their learning if the differences arise because of specific learning needs of students. The second implication is to eschew the expectation that parents must be equally involved in all aspects, especially when they have resource constraints. Rather, parents can be involved in specific aspects that will maximally contribute to their children's achievement. It may also be beneficial for schools to focus on facilitating specific aspects of parental involvement that best improve students' achievement depending on the latter's SES backgrounds.

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REFERENCES

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

*Abd-El-Fattah, A. M. (2006). Effects of family background and parental involvement on Egyptian adolescents' academic achievement and school disengagement: A structural equation modelling analysis. *Social Psychology of Education, 9*, 139–157. doi:10.1007/s11218-006-0009-1

*Adamski, A., Fraser, N. J., & Peiro, M. M. (2013). Parental involvement in schooling, classroom environment and student outcomes. *Learning Environment Research, 16*, 315-328. doi: 10.1007/s10984-012-9121-7

*Alomar, B. O. (2006). Personal and family paths to pupil achievement. *Social Behavior and*

Personality, 34(8), 907-922.

*Altschul, I. (2012). Linking socioeconomic status to the academic achievement of Mexican American youth through parent involvement in education. *Journal of the Society for Social Work and Research, 3*(1), 13-30.

*Aram, D., Korat, O., & Hassunah-Arafat, S. (2013). The contribution of early home literacy activities to first grade reading and writing achievements in Arabic. *Reading and Writing, 26*, 1517-1536.

*Bacete, F.-J. G., & Remirez, J. R. (2001). Family and personal correlates of academic achievement. *Psychological Reports, 88*, 533-547.

*Baker, C. E., Vernon-Feagans, L., & The Family Life Project Investigators (2015). Fathers' language input during shared book activities: Links to children's kindergarten achievement. *Journal of Applied Developmental Psychology, 36*, 53–59. doi:10.1016/j.appdev.2014.11.009

*Banerjee, M., Harrell, Z. A. T., & Johnson, D. J. (2011). Racial/Ethnic socialization and parental involvement in education as predictors of cognitive ability and achievement in African American Children. *Journal of Youth and Adolescence, 40*, 595–605. doi:10.1007/s10964-010-9559-9

*Barnes C. (2016). The relationship between male involvement in early childhood education and student academic achievement. Unpublished doctoral dissertation, Walden University.

*Barnes, E., & Puccioni, J. (2017). Shared book reading and preschool children's academic achievement: Evidence from the Early Childhood Longitudinal Study—Birth cohort. *Infant Child Development, 26*, e2035. doi:10.1002/icd.2035

Bassok, D., Latham, S., & Rorem, A. (2016). Is kindergarten the new first grade? *AERA Open, 1*(4), 1–31. doi: 10.1177/2332858415616358

*Bodovski, K., & Farkas, G. (2008). ‘‘Concerted cultivation” and unequal achievement in elementary school. *Social Science Research, 37*, 903–919. doi:10.1016/j.ssresearch.2008.02.007

Bourdieu, P. (1977). Outline of a theory of practice. Cambridge: Cambridge University Press.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (ed.), *Handbook of theory and research for the sociology of Education* (pp. 241–258). New York, NY: Greenwood Press.

Bourdieu, P. (1990). *The logic of practice*. Stanford, CA: Stanford University Press.

*Brown, E. L., Mahatmya, L., & Vesely, C. K. (2016). Home and school influences on the behavioral and academic outcomes of low-income children of color. *Journal of Children and Poverty, 22*(2), 93-112. doi:10.1080/10796126.2016.1148673

*Butler, Y. G. (2014). Parental factors and early English education as a foreign language: A case study in Mainland China. *Research Papers in Education, 29*(4), 410-437. doi:10.1080/02671522.2013.776625

*Campbell, B. V. (2006). Parental involvement as an explanation of mathematics and reading achievement in kindergartners. Unpublished doctoral dissertation, North Carolina State University.

*Carolan, B. V. (2016). Unequal academic achievement in high school: The mediating roles of concerted cultivation and close friends. *British Journal of Sociology of Education, 37*(7), 1034-1055. doi:10.1080/01425692.2015.1013085

Carpenter, B. W., Young, M. D., Bowers, A., & Sanders, K. (2016). Family involvement at

the secondary level: Learning from Texas Borderland schools. *NASSP Bulletin, 100*(1), 47–70. doi:10.1177/0192636516648208

*Casanova, P. F., García-Linares, M. C., de la Torre, M. J., & de la Villa Carpio, M. (2005). Influence of family and socio-demographic variables on students with low academic achievement. *Educational Psychology, 25*(4), 423-435. doi:10.1080/01443410500041888

Castro, M., Exposito-Casas, E., Lopez-Martin, E., Lizasoain, L., Navarro-Asencio, E., & Gaviria, J. L. (2015). Parental involvement on student academic achievement: A meta-analysis. *Educational Research Review, 14,* 33–46. doi:10.1016/j.edurev.2015.01.002

*Chen, H.-H., Newland, L. A., Liang, Y.- C., & Giger, J. T. (2016). Mother educational involvement as a mediator between beliefs, perceptions, attachment, and children's school success in Taiwan. *Journal of Family Studies, 22*(1), 1-19. doi:10.1080/13229400.2015.1020985

*Chen, W.-B., & Gregory, A. (2010). Parental involvement as a protective factor during the transition to high school. *The Journal of Educational Research, 103*, 53–62. doi:10.1080/00220670903231250

*Cheung, C. S.-S., & Pomerantz E. M. (2012). Why does parents' involvement enhance children's achievement? The role of parent-oriented motivation. *Journal of Educational Psychology, 104*(3), 820–832. doi:10.1037/a0027183

*Clinton, J. & Hattie, J. (2013). New Zealand students' perceptions of parental involvement in learning and schooling. *Asia Pacific Journal of Education, 33*(3), 324-337. doi:10.1080/02188791.2013.786679

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, XX*(1), 37-46.

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Hillsdale, NJ: Erlbaum Associates.

Cooper, H., M., & Hedges, L. V. (Eds.). (1994). *Handbook of research synthesis*. New York, NY: Russell Sage Foundation.

Crane, J. (1996). Effects of home environment, SES, and maternal test scores on mathematics achievement. *Journal of Educational Research, 89*(5), 305–314.

Crozier, G. (1999). Is it a case of 'We know when we're not wanted'? The parents' perspective on parent–teacher roles and relationships. *Educational Research, 41*(3), 315–328. doi:10.1080/0013188990410306

*Daniel, G. R., Wang, C., & Berthelsen, D. (2016). Early school-based parent involvement, children's self-regulated learning and academic achievement: An Australian longitudinal study. *Early Childhood Research Quarterly, 36*, 168–177. doi:10.1016/j.ecresq.2015.12.016

*Deng, C., Silinskas, G., Wei, W., & Georgiou, G. K. (2015). Cross-lagged relationships b between home learning environment and academic achievement in Chinese. *Early Childhood Research Quarterly, 33*, 12–20. doi:10.1016/j.ecresq.2015.05.001

*Doctoroff, G. L.,& Arnold, D. H. (2017). Doing homework together: The relation between parenting strategies, child engagement, and achievement. *Journal of Applied Developmental Psychology, 48*, 103–113. doi:10.1016/j.appdev.2017.01.001

*Dotterer, A. M., & Wehrspann, E. (2016). Parent involvement and academic outcomes among urban adolescents: Examining the role of school engagement. *Educational Psychology, 36*(4), 812-830. doi:10.1080/01443410.2015.1099617

*Driessen, G. W. J. M. (2001). Ethnicity, forms of capital and educational achievement.

International Review of Education, 47(6), 513-538.

*Driessen, G. (2003). Family and child characteristics, child-rearing factors, and cognitive competence of young children. *Early Child Development and Care, 173*(2/3), 323-339. doi:10.1080/03004430303102

*Driessen, G., Smit, F., & Sleegers, P. (2005). Parental involvement and educational achievement. *British Educational Research Journal, 31*(4), 509-532. doi:10.1080/01411920500148713

*Dumont, H., Trautwein, U., Lüdtke, O., Neumann, M., Niggli, A., & Schnyder, I. (2012). Does parental homework involvement mediate the relationship between family background and educational outcomes? *Contemporary Educational Psychology, 37*, 55–69. doi:10.1016/j.cedpsych.2011.09.004

*Durand, T. M. (2010). Latina mothers' school preparation activities and their relation to children's literacy skills. *Journal of Latinos and Education, 9*(3), 207-222. doi:10.1080/15348431003761182

*Englund, M. M., Luckner, A. E., Whaley, G. J. L., & Egeland, B. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology, 96*(4), 723–730. doi:10.1037/0022-0663.96.4.723

Epstein, J. L. (1995). School/Family/Community partnerships: Caring for the children we share. *Phi Delta Kappan, 76*(9), 701-712.

Erion, J. (2006). Parent tutoring: A meta-analysis. *Education and Treatment of Children, 29*(1), 79-106.

*Espinosa, L. ., Laffey J. M., Whittaker, T., & Sheng, Y. (2006). Technology in the home and

The achievement of young children: Findings from the Early Childhood Longitudinal Study. *Early Education and Development, 17*(3), 421-441. doi:10.1207/s15566935eed1703_5

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*(1), 1-22. doi:10.1023/A:1009048817385

*Fernández-Alonso, R., Álvarez-Díaz, M., Woitschach, P., Suárez-Álvarez, J., & Cuesta, M. (2017). Parental involvement and academic performance: Less control and more communication. *Psicothema, 29*(4), 453-461. doi:10.7334/psicothema2017.181

*Fite, P. J., Cooley, J. L., Williford, A., Frazer, A., & DiPierro, M. (2014). Parental school involvement as a moderator of the association between peer victimization and academic performance. *Children and Youth Services Review, 44*, 25-32. doi:10.1016/j.childyouth.2014.05.0140190-7409

*Gauvain, M., Savage, S., & McCollum, D. (2000). Reading at home and at school in the primary grades: Cultural and social influences. *Early Education and Development, 11*(4), 447-463. doi:10.1207/s15566935eed1104_5

*Gilbert, L. R., Brown, C. S., & Mistry, R. S. (2017). Latino immigrant parents' financial stress, depression, and academic involvement predicting child academic success. *Psychology in the Schools, 54*, 1202–1215. doi:10.1002/pits.22067

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

*Goforth, K., Noltemeyer, A., Patton, J., Bush, K. R., & Bergen, D. (2014). Understanding

mathematics achievement: An analysis of the effects of student and family factors. *Educational Studies, 40*(2), 196-214. doi:10.1080/03055698.2013.866890

*Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *British Journal of Educational Psychology, 84*, 376–396. doi:10.1111/bjep.12039

*Graves Jr, S. L., & Wright, L. B. (2011). Parent involvement at school entry: A national examination of group differences and achievement. *School Psychology International, 32*(1), 35-48. doi:10.1177/0143034310396611

Grayson, P. J. (1999). Who goes to university and why? *Education Canada, 39*(2), 37–39.

*Gregory, A., & Rimm-Kaufman, S. (2008). Positive mother–child interactions in kindergarten: Predictors of school success in high school. *School Psychology Review, 37*(4), 499–515.

*Gutman, L. M., Sameroff, A. J., & Eccles, J. S. (2002). The academic achievement of African American students during early adolescence: An examination of multiple risk, promotive, and protective factors. *American Journal of Community Psychology, 30*(3), 367-399.

*Hammouri H. (2004). Attitudinal and motivational variables related to mathematics achievement in Jordan: Findings from the Third International Mathematics and Science Study (TIMSS). *Educational Research, 46*(3), 241-257. doi:10.1080/0013188042000277313

*Haney, M. R. (2000). Predicting reading achievement of kindergarten students based upon reading skills and variables involving language and reading development in the home. Unpublished doctoral dissertation Georgia State University.

Hanushek, E. A., Peterson, P. E., Talpey, L. M., & Woessmann, L. (2019). The achievement gap fails to close: Half century of testing shows persistent divide between haves and have-nots. *Education Next, Summer*, 8-17.

Harris, T. S., & Graves Jr, S. L. (2010). The influence of cultural capital transmission on reading achievement in African American fifth grade boys. *Journal of Negro Education, 79*, 447–457.

Harrison, N., & Waller, R. (2018). Challenging discourses of aspiration: The role of expectations and attainment in access to higher education. *British Educational Research Journal*. doi:10.1002/berj.3475

Hartas, D. (2015). Patterns of parental involvement in selected OECD countries: Cross-national analyses of PISA. *European Journal of Educational Research, 4*(4), 185 - 195. doi: 10.12973/eu-jer.4.4.185

Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. In A. E. Raftery (Ed.) *Sociological methodology* (pp.177–298). Cambridge, MA: Basil Blackwell.

*Hawes, C. A., & Plourde, L. A. (2005). Parental involvement and its influence on the reading achievement of 6th grade students. *Reading Improvement*, 47-57.

*Hayes, D. (2012). Parental involvement and achievement outcomes in African American adolescents. *Journal of Comparative Family Studies,* 567-582.

Hedges, L. V. (1992). Modeling publication selection effects in meta-analysis. *Statistical Science, 7*(2), 246-255.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. New York, NY: Academic Press.

Hedges, L. V., & Vevea, J. L. (1998). Fixed and random-effects models in meta-analysis. *Psychological Methods, 3*, 486–504.

Hernandez-Martinez, P., & Williams, J. (2013). Against the odds: Resilience in mathematics Students in transition. *British Educational Research Journal, 39*, 45–59.

Herrold, K., & O'Donnell, K. (2008). *Parent and family involvement in education: 2006-07 school year—National Household Educational Survey Program of 2007 (NCES 2008-050).* Washington, DC: National Center for Educational Statistics, Institute of Education Sciences, U.S. Department of Education.

*Hill, N. E. (2001). Parenting and academic socialization as they relate to school readiness: The roles of ethnicity and family income. *Journal of Educational Psychology, 93*(4), 686-697. doi:10.1037//0022-0663.93.4.686

*Hill, N. E., Castellino, D. R., Lansford, J. E., Nowlin, Dodge, K. A., Bates, J. E., & Pettit, G. S. (2004). Parent academic involvement as related to school behavior, achievement, and aspirations: Demographic variations across adolescence. *Child Development, 75*(5), 1491 – 1509.

*Hill, N. E., & Craft, S. A. (2003). Parent–school involvement and school performance: Mediated pathways among socioeconomically comparable African American and Euro-American families. *Journal of Educational Psychology, 95*(1), 74-83. doi:10.1037/0022-0663.95.1.74

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, *45*, 740–763. doi:10.1037/a0015362

Holloway, S. D., Rambaud, M. F., Fuller, B., & Eggers-Pierola, C. (1995). What is "appropriate

practice" at home and in child care?: Low-income mothers' views on preparing their children for school. *Early Childhood Research Quarterly, 10*, 451-473.

Hoover-Dempsey, K. V., Walker, J. M. T., Jones, K. P., & Reed, R. P. (2002). Teachers Involving Parents (TIP): Results of an in-service teacher education program for enhancing parental involvement. *Teaching and Teacher Education, 18*, 843–867.

Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., & Closson, K. (2005). Why do parents become involved? Research findings and implications. *The Elementary School Journal, 106*(2), 105-130.

Hornby, G., & Lafaele, R. (2011). Barriers to parental involvement in education: An explanatory model. *Educational Review, 63*(1), 37–52. doi:10.1080/00131911.2010.488049

*Hsu, H.-Y., Zhang, D., Kwok, O.-M., Li, Y., & Ju, S. (2011). Distinguishing the influences of father's and mother's involvement on adolescent academic achievement: Analyses of Taiwan Education Panel Survey Data. *Journal of Early Adolescence, 31*(5), 694–713. doi:10.1177/0272431610373101

*Iruka, I. U., Dotterer, A. M., Pungello, E. P. (2014). Ethnic variations of pathways linking socioeconomic status, parenting, and preacademic skills in a nationally representative sample. *Early Education and Development, 25*, 973–994. doi:10.1080/10409289.2014.892806

Jeynes, W. H. (2002a). *Divorce, family structure & the academic success of children.* Binghamton, NY: Haworth Press.

Jeynes, W. H. (2002b). Does parental involvement eliminate the effects of parental divorce

on the academic achievement of adolescents? *Journal of Divorce and Remarriage, 37*(1/2), 101–115.

Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education, 40*(3), 237-269. doi:10.1177/0042085905274540

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. *Urban Education, 42*(1), 82-110. doi: 10.1177/0042085906293818

Jeynes, W. H. (2010). The salience of the subtle aspects of parental involvement and encouraging that involvement: Implications for school-based programs. *Teachers College Record, 112*(3), 747-774.

Jeynes, W. H. (2011). *Parental involvement and academic success*. New York: Routledge.

*Johnson, U. Y., & Hull, D. M. (2014). Parent involvement and science achievement: A cross-classified multilevel latent growth curve analysis. *The Journal of Educational Research, 107*(5), 399-409. doi:10.1080/00220671.2013.807488

*Juang, L. P., & Silbereisen, R. K. (2002). The relationship between adolescent academic capability beliefs, parenting and school grades. *Journal of Adolescence, 25*, 3–18. doi:10.1006/jado.2001.0445

*Jung, E., & Zhang, Y. (2016). Parental involvement, children's aspirations, and achievement in new immigrant families. *The Journal of Educational Research, 109*(4), 333-350. doi:10.1080/00220671.2014.959112

*Karbach, J., Gottschling, j., Spengler, M., Hegewald, K., & Spinath, F. M. (2013). Parental

involvement and general cognitive ability as predictors of domain-specific academic achievement in early adolescence. *Learning and Instruction, 23*, 43-51. doi:10.1016/j.learninstruc.2012.09.004

*Kramer, K. Z. (2012). Parental behavioural control and academic achievement: Striking the balance between control and involvement. *Research in Education, 88*, 85-98. doi:10.7227/RIE.88.1.8

*Kugler, T. (2009). The relationship of parental involvement to student academic achievement in Latino middle school students. Unpublished doctoral dissertation, University of Southern California.

*Lam, B. T., & Ducreux, E. (2013). Parental influence and academic achievement among middle school students: Parent perspective. *Journal of Human Behavior in the Social Environment, 23*(5), 579-590. doi:10.1080/10911359.2013.765823

Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. London: University of California Press.

Lareau, A. (2011). *Unequal childhoods: Class, race, and family life* (2nd ed.). Berkeley, CA: University of California Press.

*Lau, W.-F. K. (2013). Examining a brief measure of parent involvement in children's education. *Contemporary School Psychology, 17*(1), 11-21.

*Lee, J.-S., & Bowen, N. K. (2006). Parent involvement, cultural capital, and the achievement gap among elementary school children. *American Educational Research Journal, 43*(2), 193-218.

* LeFevre, J. A., Polyzoi, E., Skwarchuk, S.-L., Fast, L., & Sowinski, C. (2010). Do home

numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children? *International Journal of Early Years Education, 18*(1), 55-70. doi:10.1080/09669761003693926

Leenders, H., de Jong, J., Monfrance, M., & Haelermans, C. (2019). Building strong parent–teacher relationships in primary education: The challenge of two-way communication. *Cambridge Journal of Education, 49*(4), 519-533. doi: 10.1080/0305764X.2019.1566442

*Levpuscek, M. P., & Zupancic, M. (2009). The role of parental involvement, teachers' behaviour, and students' motivational beliefs about math. *Journal of Early Adolescence, 29*(4), 541-570. doi:10.1177/0272431608324189

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.

*Long, H., & Pang, W. (2016). Family socioeconomic status, parental expectations, and adolescents' academic achievements: A case of China. *Educational Research and Evaluation, 22*(5/6), 283-304. doi:10.1080/13803611.2016.1237369

Malone, D. (2017). Socioeconomic status: A potential challenge for parental involvement in schools. *The Delta Kappa Gamma Bulletin: International Journal for Professional Educators*, 58-62.

*Marchant, G. J., Paulson, S. E., Rothlisberg, B. A. (2001). Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools, 38*(6), 505-519.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*(9), 954–969. doi:org/10.1037/0003-066x.41.9.954

*Matsuoka, R. (2014). An empirical investigation of relationships between junior high school

students' family socioeconomic status, parental involvement, and academic performance in Japan. *Sociological Theory and Methods, 29*(1), 147-165.

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica, 22*(3), 276-282.

*Mji, A., & Mbinda, Z. (2005). Exploring high school science students' perceptions of parental involvement in their education. *Psychological Reports, 97*, 325-336.

*Mo, Y., & Singh, K. (2008). Parents' relationships and involvement: Effects on students' school engagement and performance. *Research in Middle Level Education Online, 31*(10), 1-11.

*Moon, S. S., Kang, S.-Y., & An, S. (2009). Predictors of immigrant children's school achievement: A comparative study. *Journal of Research in Childhood Education, 23*(3), 278-289. doi:10.1080/02568540909594661

*Moon, S. S., & Lee, J. (2009). Multiple predictors of Asian American children's school achievement. *Early Education and Development, 20*(1), 129-147. doi:10.1080/10409280802206635

*Motti-Stefanidi, F., Asendorpf, J. B., & Masten, A. S. (2012). The adaptation and well-being of adolescent immigrants in Greek schools: A multilevel, longitudinal study of risks and resources. *Development and Psychopathology, 24*, 451-473. doi:10.1017/S0954579412000090

Mueller, C. W., & Parcel, T. L. (1981). Measures of socioeconomic status: Alternatives and recommendations. *Child Development, 52,* 13–30.

*Myrberg, E., & Rosen, M. (2009). Direct and indirect effects of parents' education on

reading achievement among third graders in Sweden. *British Journal of Educational Psychology, 79*, 695–711. doi:10.1348/000709909X453031

*Neuenschwander, M. P., Vida, M., Garrett, J. L., & Eccles, J. S. (2007). Parents' expectations and students' achievement in two western nations. *International Journal of Behavioral Development, 31*(6), 594–602. doi:10.1177/0165025407080589

*Niia, A., Almqvist, L., Brunnberg, E., & Granlund, M. (2015). Student participation and parental involvement in relation to academic achievement. *Scandinavian Journal of Educational Research, 59*(3), 297-315. doi:10.1080/00313831.2014.904421

Park, S., & Holloway, S. D. (2013). No parent left behind: Predicting parental involvement in adolescents' education within a sociodemographically diverse population. *The Journal of Educational Research*, 106, 105–119 . doi:10.1080/00220671.2012.667012

Park, S., & Holloway, S. (2018). Parental involvement in adolescents' education: An examination of the interplay among school factors, parental role construction, and family income. *School Community Journal, 28*(1), 9-36.

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research, 78*(4), 1039-1101. doi:10.3102/0034654308325185

*Pelegrina, S., Garc!ıa-Linares, M. C., & Casanova, P. F. (2003). Adolescents and their parents' perceptions about parenting characteristics. Who can better predict the adolescent's academic competence? *Journal of Adolescence, 26*, 651–665. doi:10.1016/S0140-1971(03)00062-9

*Phillipson, S. (2009). Context of academic achievement: Lessons from Hong Kong. *Educational Psychology, 29*(4), 447-468. doi:10.1080/01443410903059024

*Phillipson, S., & Phillipson, S. N. (2007). Academic expectations, belief of ability, and involvement by parents as predictors of child achievement: A cross-cultural comparison. *Educational Psychology, 27*(3), 329-348. doi:10.1080/01443410601104130

*Phillipson, S., & Phillipson, S. N. (2012). Children's cognitive ability and their academic achievement: The mediation effects of parental expectations. *Asia Pacific Education Review, 13*, 495–508. doi:10.1007/s12564-011-9198-1

Polanin, J. R., Tanner-Smith, E. E., & Hennessy, E. A. (2016). Estimating the difference between published and unpublished effect sizes: A meta-review. *Review of Educational Research, 86*, 207-236.

Portes, A., & MacLeod, D. (1996). Educational progress of children and immigrants: The roles of class, ethnicity, and school context. *Sociology of Education, 69*(4), 255–275.

*Puccioni, J. (2015). Parents' conceptions of school readiness, transition practices, and children's academic achievement trajectories. *The Journal of Educational Research, 108*(2), 130-147. doi:10.1080/00220671.2013.850399

Reay, D. (1998). Cultural reproduction: Mothers' involvement in their children's primary schooling. In M. Grenfell & D. James (Eds.), *Bourdieu and education: Acts of practical theory* (pp. 55–71). Bristol, PA: Falmer.

*Rodríguez, S., Piñeiro, I., Gómez-Taibo, M. L., Regueiro, B., Estévez, I., & Valle, A. (2017). An explanatory model of maths achievement: Perceived parental involvement and academic motivation. *Psicothema, 29*(2), 184-190.DOI: 10.7334/psicothema2017.32

*Rogers, M. A., Theule, J., Ryan, B. A., Adams, G. R., & Keating, L. (2009). Parental involvement and children's school achievement. *Canadian Journal of School Psychology, 24*(1), 34-57. doi:10.1177/0829573508328445

Rosenthal, J. A. (1996). Qualitative descriptors of strength of association and effect size. *Journal of Social Service Research, 21*(4), 37-59.

Ryan, C., Casas, J., Kelly-Vance, L., Ryallas, B., & Nero, C. (2010). Parent involvement and views of schools' success: The role of parents' Latino and White American cultural orientations. *Psychology in the Schools, 47*(4), 391-405. doi:10.1002/pits.20477

*Seginer, R., & Vermulst, A. (2002). Family environment, educational aspirations, and academic achievement in two cultural settings. *Journal of Cross-Cultural Psychology, 33*(6), 540-558. doi:10.1177/00220022102238268

*Sénéchal, M., & LeFevre, J.-A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development, 73*(2), 445–460.

Sénéchal, M., & Young, L. (2008). The effect of family literacy interventions on children's acquisition of reading from kindergarten to grade 3: A meta-analytic review. *Review of Educational Research, 78*(4), 880-907.

*Seyfried, S. F., & Chung, I.-J. (2002). Parent involvement as parental monitoring of student motivation and parent expectations predicting later achievement among African American and European American middle school age students. *Journal of Ethnic and Cultural Diversity in Social Work, 11*(1/2), 109-131. doi:10.1300/J051v11n01_05

*Shen, Y.-L. (2011). Effects of Chinese parental practices on adolescent school outcomes mediated by conformity to parents, self-esteem, and self-efficacy. *International Journal of Educational Research, 50*, 282-290. doi:10.1016/j.ijer.2011.09.001

*Shin, H. J. (2004). Parental involvement and its influence on children's school performance:

A comparative study between Asian (Chinese and Koreans) Americans and Mexican Americans. Unpublished doctoral dissertation, Columbia University.

*Shumow, L., & Lomax, R. (2002). Parental efficacy: Predictor of parenting behavior and adolescent outcomes. *Parenting, Science and Practice, 2*(2), 127-150.

*Silinskas, G., Lerkkanen, M.-K., Tolvanen, A., Niemi, P., Poikkeus,A.-M., & Nurmi, J.-E. (2012). The frequency of parents' reading-related activities at home and children's reading skills during kindergarten and Grade 1. *Journal of Applied Developmental Psychology, 33*, 302–310. doi:10.1016/j.appdev.2012.07.004

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*(3), pp. 417–453.

*Sirin, S. R., & Rogers-Sirin, L. (2004). Exploring school engagement of middle-class African American adolescents. *Youth & Society, 35*(3), 323-340. doi:10.1177/0044118X03255006

*Stephenson, K. A., Parrila, R. K., Georgiou, G. K., & Kirby, J. R. (2008). Effects of home literacy, parents' beliefs, and children's task-focused behavior on emergent literacy and word reading skills. *Scientific Studies of Reading, 12*(1), 24-50. doi:10.1080/10888430701746864

Stevenson, H. W., & Stigler, J. W. (1992). *The learning gap*. New York, NY: Summit Books.

*Stright, A. D., & Yeo, K. L. (2014). Maternal parenting styles, school involvement, and children's school achievement and conduct in Singapore. *Journal of Educational Psychology, 106*(1), 301–314. doi:10.1037/a0033821

Sy, S. R., Rowley, S. J., & Schulenberg, J. E. (2007). Predictors of parent involvement across

contexts in Asian American and European American families. *Journal of Comparative Family Studies, 38*(1), 1-29.

*Tan, C. Y. (2015). The contribution of cultural capital to students' mathematics achievement in medium and high socioeconomic gradient economies. *British Educational Research Journal, 41*(6), 1050–1067. doi: 10.1002/berj.3187

Tan, C. Y. (2017a). Examining cultural capital and student achievement: Results of a meta-analytic review. *Alberta Journal of Educational Research,* 63(2), 139-159.

Tan, C. Y. (2017b). Conceptual diversity, moderators, and theoretical issues in quantitative studies of cultural capital theory. *Educational Review, 69*(5), 600-619. doi: 10.1080/00131911.2017.1288085

Tan, C. Y. (2018). Socioeconomic status, involvement practices, and student science achievement: Insights from a typology of home and school involvement patterns. *American Educational Research Journal, 56*(3), 899-924. doi: 10.3102/0002831218807146

*Topor, D. R., Keane, S. P., Shelton, T. L., & Calkins, S. D. (2010). Parent involvement and student academic performance: A multiple mediational analysis. *Journal of Prevention & Intervention in the Community, 38*(3), 183-197. doi:10.1080/10852352.2010.486297

*Toren, N. K. (2013). Multiple dimensions of parental involvement and its links to young adolescent self-evaluation and academic achievement. *Psychology in the Schools, 50*(6), 634-649. doi:10.1002/pits

*Unger, D. G., McLeod, L. E., Brown, M. B., Tressell, P. A. (2000). The role of family support in interparental conflict and adolescent academic achievement. *Journal of Child and Family Studies, 9*(2), 191-202.

*Vukovic, R. K., Roberts, S. O., & Wright, L. G. (2013). From parental involvement to children's mathematical performance: The role of mathematics anxiety. *Early Education & Development, 24*(4), 446-467. doi:10.1080/10409289.2012.693430

Walker, J. M. T., Ice, C. L., Hoover-Dempsey, K. V., & Sandler, H. M. (2011). Latino parents' motivations for involvement in their children's schooling: An exploratory study. *The Elementary School Journal, 111*(3), 409-429.

Wang, Y., Deng, C., & Yang, X. (2016). Family economic status and parental involvement: Influences of parental expectation and perceived barriers. *School Psychology International, 37*(5), 536–553. doi:10.1177/0143034316667646

*Wei, W., Wu, Y., Lv, B., Zhou, H., Han, X., Liu, Z., & Luo, L. (2016). The relationship between parental involvement and elementary students' academic achievement in China: One-only children vs. children with siblings. *Journal of Comparative Family Studies, XLVII* (4), 483-411.

Whitaker, M., & Hoover-Dempsey, K. (2013). School influences on parents' role beliefs. *The Elementary School Journal, 114*(1), 73-99.

Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-synthesis. *Educational Review, 66*(3), 377–397. doi:10.1080/00131911.2013.780009

Yamamoto, Y., & Holloway, S. D. (2010). Parental expectations and children's academic performance in sociocultural context. *Educational Psychology Review, 22*, 189–214. doi: 10.1007/s10648-010-9121-z

Yamamoto, Y., Holloway, S. D., & Suzuki, S. (2006). Maternal involvement in preschool children's education in Japan: Relation to parenting beliefs and socioeconomic status. *Early Childhood Research Quarterly, 21*, 332–346. doi:10.1016/j.ecresq.2006.07.008

Yamamoto, Y., Holloway, S. D., & Suzuki, S. (2016). Parental engagement in children's education: Motivating factors in Japan and the U.S. *School Community Journal, 26*(1), 45-66.

*Yang, B. & Wan, M. (2015). How father's education and economic capital impact academic performance — An analysis based on the mediating effect and moderating effect. *Chinese Education & Society, 48*(6), 412-432. doi:10.1080/10611932.2015.1119508

*Yeo, L. S., Ong, W. W., & Ng, C. M. (2014). The home literacy environment and preschool children's reading skills and interest. *Early Education and Development, 25*, 791–814. doi:10.1080/10409289.2014.862147

*Zadeh, Z. Y., Farnia, F., & Ungerleider, C. (2010). How home enrichment mediates the relationship between maternal education and children's achievement in reading and math. *Early Education and Development, 21*(4), 568-594. doi:10.1080/10409280903118424

*Zedan, R. F. (2012). Parents' involvement among the Arab ethnic minority in the State of Israel. *School Community Journal, 22*(2), 161-182.

TABLE 1

Studies Analyzed

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Abd-El-Fattah (2006)	CS			275, mixed, high school	At least high sch	Home inv Sch inv				.36 .38
Adamski, Fraser, & Peiro (2013)	CS			223, mixed, Grade 4-6		Home/Sch inv	.16			
Alomar (2006)	CS			566, mixed, Grade 8		Home/Sch inv				-.04
Altschul (2012)	L	Grade 8	Grade 10	1609, mixed, Grade 8-10	Mothers (graduate equivalency degree); fathers (Grade 8, not high sch graduation)	Discussion Participation Supervision				.17 .09 -.01
Aram, Korat, & Hassunah-Arafat (2013)	L	Kindergarten	Grade 1	88, mixed, K-1	Vocational high sch diploma to academic high sch diploma	Reading Support	.23 .28			
Bacete & Remirez (2001)	CS			150, mixed, Grade 7	Elementary to high sch	Communication Participation				.39 .43
Baker, Vernon-Feagans, & The Family Life Project Investigators (2015)	L	Before kindergarten entry	After kindergarten entry	551, mixed, kindergarten	Mothers (15.92 yrs); fathers (15.23 yrs)	Reading	.09	.06		
Banerjee, Harrell, & Johnson (2011)	CS			92, mixed, Grade 4-5		Sch inv	.09			
Barnes (2016)	CS			141, mixed, 48-60 mths	High sch/General equivalency degree	Sch inv				No involvement: M(SD) = 0.71(0.14), n

[1] Effect sizes presented are Pearson's correlations unless otherwise stated

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
										= 110; With involvement: M(SD) = 0.77(0.15), n = 31
Barnes & Puccioni (2017)	CS			700, mixed, kindergarten		Reading	.09	.07		
Bodovski & Farkas (2008)	L	Kindergarten	Grade 1	8035, mixed, K-1		Expectations	.20			
Brown, Mahatmya, & Vesely (2016)	CS			156, mixed, Grade 4-6	High sch	Sch inv	-.02	.01		
				388, mixed, K-Grade 3	High sch	Sch inv	.11	.09		
Butler (2014)	CS			198, mixed, Grade 4		Home/Sch inv Emphasis Expectations	-.19 .06 .18			
				191, mixed, Grade 6		Home/Sch inv Emphasis Expectations	.01 -.02 .23			
				183, mixed, Grade 8		Home/Sch inv Emphasis Expectations	.18 .10 .57			
Campbell (2006)i	CS			14952, mixed, kindergarten	High sch diploma	Sch inv	.23	.25		
Carolan (2016)	L	Grade 9	Grade 11	10350, mixed, Grade 9-11		Expectations		.38		
Casanova et al. (2005)	CS			105, mixed, 144-180 mths		Sch inv Discussion Expectations				.15 .16 .29
				205, mixed, 144-180 mths		Sch inv Discussion Expectations				-.05 .21 .09

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Chen & Gregory (2010)	CS			59, mixed, Grade 9		Supervision Support Expectations				-.08 .14 .31
Chen, Newland, Liang, & Giger (2016)	CS			100, mixed, 109 mths	College/four-yr degree	Home inv Sch inv				.22 .12
Cheung & Pomerantz (2012)	L	Grade 7	Grade 8	374, mixed, Grade 7-8		Home/Sch inv				.12
				451, mixed, Grade 7-8		Home/Sch inv				.10
Clinton & Hattie (2013)	CS			1554, mixed, Grade 8-11		Expectations Discussion Communication	.17 -.05 -.27	.07 .09 .04		
Daniel, Wang, & Berthelsen (2016)	L	Grade 1	Grade 3	2877, mixed, Grade 1-3		Sch inv	.13	.10		
Deng et al. (2015)	L	Grade 1	Grade 2	177, mixed, Grade 1-2		Support Reading	0 -.12	.04 -.02		
Doctoroff & Arnold (2017)	CS			61, mixed, Grade 1-4	College/professional sch	Support	.25			
Dotterer & Wehrspann (2016)	CS			108, mixed, Grade 6-8	College degree or more	Home/Sch inv				.26
Driessen (2001)	CS			7531 Dutch, mixed, Grade 2	Senior secondary vocational or higher	Supervision Communication Discussion Emphasis	-.08 .02 .10 -.06	-.10 -.02 .06 -.06		
				282 Surinamese & Antillean, mixed, Grade 2	Lower than senior secondary vocational	Supervision Communication Discussion Emphasis	.03 .02 .07 -.10	-.12 .06 0 -.03		
				515 Turkish,	Lower than senior secondary vocational	Supervision Communication Discussion	-.06 .02 .03	-.08 -.04 0		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				mixed, Grade 2		Emphasis	.03	.01		
				415 Moroccan, mixed, Grade 2	Lower than senior secondary vocational	Supervision Communication Discussion Emphasis	.06 .03 .06 -.07	-.03 -.07 .07 -.03		
Driessen (2003)	CS			10774, mixed, K-6		Support	-.10	-.10		
Driessen, Smit, & Sleegers (2005)	CS			12000, mixed, Grade 8		Home inv	0	-.01		
Dumont et al. (2012)	CS			1270, mixed, Grade 8, Germany		Supervision	.08	.05		
	L	Start of Grade 8	End of Grade 8	1911, mixed, Grade 8, Switzerland		Supervision Support	-.16 .22			
Durand (2010)	CS			56, mixed, kindergarten	Below high sch diploma	Home inv	-.14			
Englund et al. (2004)	L	42 mths-Grade 1	Grade 3	187, mixed, K-3	11.83 yrs of schooling	Support Sch inv Expectations				.31 .10 .29
Espinosa et al. (2006)	L	Kindergarten	Grade 3	22782, mixed, K-3		Reading	.14	.09		
Fernandez-Alonso et al. (2017)	CS			26543, mixed, 172.80 mths		Supervision Discussion	-.06 .09	-.06 .06	-.06 .08	
Fite et al. (2014)	CS			704, mixed, K-5		Sch inv				.23
Gauvain, Savage, & McCollum (2000)	CS			75 Euro American, mixed, Grade 2	13.79 yrs of schooling	Reading	-.11			

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				53 Hispanic, mixed, Grade 2	13.79 yrs of schooling	Reading	.04			
Gilbert, Brown, & Mistry (2017)	CS			68, mixed, Grade 3-4		Emphasis Supervision	.26 .23	.18 .21		
Goforth et al. (2014)	CS			747, mixed, K-8		Communication Supervision		.03 .06		
Gonida & Cortina (2014)	CS			282, mixed, Grade 5 & 8	Fathers (senior high sch); mothers (university degree)	Support Supervision				.06 -.23
Graves Jr & Wright (2011)	CS			14951, mixed, kindergarten		Support Participation Supervision	.27 -.38 .06			
Gregory & Rimm-Kaufman (2008)	L	Kindergarten	Grade 9	142, mixed, K-9	High sch diploma/some college	Support	.41	.43		
Gutman, Sameroff, & Eccles (2002)	CS			837, mixed, Grade 7	Post-high sch	Participation				.10
Hammouri (2004)	CS			3736, mixed, Grade 8		Emphasis		.21		
Haney (2000)	CS			210, mixed, kindergarten		Communication	.02			
Hawes & Plourde (2005)	CS			48, mixed, Grade 6		Sch inv	.13			
Hayes (2012)	CS			145, mixed, high sch		Discussion Participation				.22 .20
Hill (2001)	CS			103, mixed, kindergarten	College to associate degree	Support Participation Emphasis Communication Expectations	.06 .29 .44 -.01 .36	.06 .25 .32 -.11 .37		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Hill et al. (2004)	L	Grade 7	Grade 9	463, mixed, Grade 7-9	≥ 13 yrs	Communication Participation Home inv	.08 .13 .06	.06 .09 .11		
Hill & Craft (2003)	CS			54 African American, mixed, kindergarten	College/associate degree	Support Sch inv Emphasis	-.10 .36 .39	-.05 .25 .14		
				49 Euro American, mixed, kindergarten	College/associate degree	Support Sch inv Emphasis	.14 .17 .48	.24 .14 .40		
Hsu et al. (2011)	CS			8180, mixed, Grade 7	Less than high sch	Discussion Support Supervision Participation Expectations				.12 .10 .17 .09 .27
Iruka, Dotterer, & Pungello (2014)	L	24-mth	Pre-sch	4450 US European American, mixed, kindergarten	Vocational program/some college to bachelor's degree	Support	.14	.15		
				1750 US African American, mixed, kindergarten	High sch diploma to vocational program/some college	Support	.11	.12		
				2200 US Hispanic, mixed, kindergarten	High sch diploma to vocational program/some college	Support	.16	.14		
				1250 US Asian, mixed, kindergarten	Vocational program/some college to bachelor's degree	Support	.14	.11		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Johnson & Hull (2014)	L	Grade 3	Grade 8	8070, mixed, Grade 3-8		Participation			.14	
Juang & Silbereisen (2002)	L	Grade 6	Grade 9	641, mixed, Grade 6-9		Expectations Home/Sch inv				-.55 -.52
Jung & Zhang (2016)	CS			1255, mixed, 120 mths	Certificate/degree/diploma from educational institutions (not including vocational/trade schs)	Supervision				.13
Karbach et al. (2013)	CS			334, mixed, 148.80 mths	General qualification for university entrance to university degree	Support Expectations Supervision	.11 -.10 -.25	.05 0 -.20		
Kramer (2012)	L	Year 1994/1995	Year 1996	6134, mixed, Grade 7-12	High sch/general equivalency degree to college/post-secondary	Home inv				.13
Kugler (2009)	CS			184, mixed, Grade 6-8		Sch inv Expectations	-.04 .11	.03 .12		
Lam & Ducreux (2013)	CS			32, mixed, Grade 6-8	Grade 8 or less	Home inv				.15
Lau (2013)	CS			182, mixed, kindergarten	High sch diploma or less	Home/Sch inv	.30			
Lee & Bowen (2006)	CS			415, mixed, Grade 3-5	College/vocational training to 2-yr degree	Participation Discussion Supervision Expectations				.45 .21 .08 .39
LeFevre et al. (2010)	CS			104, mixed, in Canada, kindergarten	Undergraduate degree	Expectations Reading Support		.31 .09 .37		
				100, mixed, in Greece, kindergarten	Undergraduate degree	Expectations Reading Support		.26 .51 .38		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Levpuscek & Zupancic (2009)	CS			365, mixed, in Slovenia, Grade 8	Elementary/vocational sch to high sch	Emphasis Supervision		-.20 -.11		
Long & Pang (2016)	CS			5066, mixed, Grade 9	High/vocational sch	Expectations		.15		
Marchant, Paulson, & Rothlisberg (2001)	CS			230, mixed, Grade 5-6		Emphasis Participation				.25 .26
Matsuoka (2014)	CS			4414, mixed, Grade 8		Discussion		.14		
Mji & Mbinda (2005)	CS			201, mixed, Grade 12		Home inv Participation				-.15 .10
Mo & Singh (2008)	CS			1235, mixed, Grade 7-8		Expectations				.16
Moon, Kang, & An (2009)	CS			103, mixed, Grade 1-3	Bachelor's degree	Participation				.17
				100, mixed, Grade 1-3	Grade 1-8	Participation				.26
Moon & Lee (2009)	CS			1100, mixed, kindergarten		Participation	.02	.01		
Motti-Stefanidi, Aasendorpf, & Masten (2012)	L	Sec Year 1	Sec Year 3	620, mixed, Sec Year 1-3		Home/Sch inv				.47
Myrberg & Rosen (2009)	CS			10632, mixed, Grade 3		Reading	.14			
Neuenschwander et al. (2007)	CS			2535, mixed, Grade 7		Expectations	.34	.35		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				361, mixed, Grade 6		Expectations	33	.28		
				406, mixed, Grade 6		Expectations	.41	.39		
Niia et al. (2015)	CS			786, mixed, 156-180 mths		Communication	-.11	-.09		
Pelegrina, Garcia-Linares, & Casanova (2003)	CS			323, mixed, 132-180 mths		Home/Sch inv				.28
Phillipson (2009)	CS			45, mixed, Grade 5-6	Secondary	Expectations Home inv Sch inv	.59 .30 -.20	.50 .41 .03		
				59, mixed, Grade 5-6	Secondary	Expectations Home inv Sch inv	.46 .18 .03	.38 .05 .13		
				58, mixed, Grade 5-6	University	Expectations Home inv Sch inv	.51 -.29 -.24	.38 -.25 -.34		
				53, mixed, Grade 5-6	University	Expectations Home inv Sch inv	.45 -.12 -.14	.49 -.21 -.21		
Phillipson & Phillipson (2007)	CS			43, boys, Grade 5-6	Secondary	Expectations Home inv Sch inv	.62 .36 -.13	.51 .46 .13		
				58, mixed, Grade 5-6	Secondary	Expectations Home inv Sch inv	.45 .20 -.05	.40 .03 .12		

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				57, mixed, Grade 5-6	University	Expectations Home inv Sch inv	.57 -.21 -.29	.50 -.16 -.37		
Phillipson & Phillipson (2012)	CS			780, mixed, Grade 1-6	Tertiary education	Sch inv Home inv Expectations	.05 .13 .51	.04 .08 .49		
Puccioni (2015)	L	Fall of Kindergarten	Spring of Grade 1	12622, mixed, K-1		Emphasis Support	.05 .06	.03 .06		
Rodríguez et al. (2017)	CS			897, mixed, Grade 5-6		Homework Expectations		-.08 .29		
Rogers et al. (2009)	CS			231, mixed, Grade 5-6		Supervision Emphasis Support	.13 .12 .13	.04 .07 .11	.01 .14 .12	
Seginer & Vermulst (2002)	CS			161, girls, Grade 8	High sch	Support	.25	.26		
				168, boys, Grade 8	High sch	Support	.33	.31		
				192, girls, Grade 8	More than high sch	Support	.16	.10		
				165, boys, Grade 8	More than high sch	Support	.07	.13		
Senechal & LeFevre (2002)	L	Kindergarten	Grade 3	66, mixed, K-3		Reading	.27			
Seyfried & Chung (2002)	L	Grade 7	Grade 8	195 African American, mixed, Grade 5, 7, 8		Expectations				.29
				372 European American, mixed, Grade 5, 7, 8		Expectations				.53

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
Shen (2011)	CS			350, mixed, junior-senior high school		Supervision				.05
Shin (2004)	CS			14311 US White American, mixed, Grade 8		Communication Participation Discussion Supervision Expectations				-.05 .23 .30 .08 .33
				207 Chinese American, mixed, Grade 8		Communication Participation Discussion Supervision Expectations				.06 .23 .35 .09 .30
				110 Korean American, mixed, Grade 8		Communication Participation Discussion Supervision Expectations				.03 .07 .35 -.08 .10
Shumow & Lomax (2002)	CS			387 European American, mixed, 120-204 mths	College	Sch inv Supervision				.13 .10
				259 African American, mixed, 120-204 mths	Trade/business sch	Sch inv Supervision				.08 .15
				283 Latin American, mixed, 120-204 mths	High sch	Sch inv Supervision				.05 .22
Silinskas et al. (2012)	L	Kindergarten	Spring Grade 1	684, girls, K-1	Vocational sch	Reading	.02			

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				752, boys, K-1		Reading	.02			
Sirin & Rogers-Sirin (2004)	CS			328, mixed, 184.32 mths	At least 1 parent completed college	Emphasis				.15
Stephenson et al. (2008)	L	Kindergarten	Grade 1	61, mixed, 66.84 mths, K-1	Community college	Support Reading Expectations	.30 .05 .04			
Stright & Yeo (2014)	CS			712, mixed, Grade 3-6	High sch	Communication Participation				.27 .08
Tan (2015)	CS			55327, mixed, medium SES gradient economies, Grade 8		Expectations		.19		
				17851, mixed, high SES gradient economies, Grade 8		Expectations		.41		
Topor et al. (2010)	CS			158, mixed, 84 mths		Emphasis				.39
Toren (2013)	CS			397, mixed, Grade 7	More than high sch	Home inv Communication Participation				.11 -.11 .01
Unger et al. (2000)	CS			115, mixed, 186 mths		Home/Sch inv				.33
Vukovic, Roberts, & Wright (2013)	CS			78, mixed, Grade 2	High sch	Home/Sch inv		-.06		
Wei et al. (2016)	CS			228, mixed, from families	Middle to high sch	Sch inv Discussion Supervision				-.18 .03 -.14

Authors (yr)	Research design	Data-collection time frame		Samples (No., gender, grade/age)	Edu attainment/yrs of edu of highest % of parents or mean/modal parental edu	Inv variables	Effect sizes[1]			
		Involvement	Outcomes				Lang	Math	Sci	Comb
				with more than one child, Grade 4-6						
				397, mixed, from only-child families, Grade 4-6	High sch to associate degree	Sch inv Discussion Supervision				.05 .15 -.01
Yang & Wan (2015)	CS			1142, mixed, middle sch		Expectations Support Emphasis				.12 .07 .11
Yeo, Ong, & Ng (2014)	CS			193, mixed, kindergarten	Postgraduate degree	Reading	.34			
Zadeh, Farnia, & Ungerleider (2010)	CS			1093, mixed, Grade 1		Support	.25	.27		
Zedan (2012)	CS			408, mixed, Grade 3-11		Supervision Emphasis Communication Participation				.22 .24 .22 .05

Note. CS = Cross-sectional; L = Longitudinal; Discussion = Parent-child academic discussions; Supervision = Parental supervision of children; Support = Parental support of children's home learning; Reading = Parent-child reading; Home inv = Home involvement; Communication = Parent-teacher communication; Participation = Parental school participation; Sch inv = School involvement; Home/Sch inv = Home and school involvement; Emphasis = Parental educational emphasis; Expectations = Parental academic expectations of children

TABLE 2

Coding of Key Variables

Variables	Categories	Examples
Home-based parental involvement	Parent-child academic discussions on learning and school	Topics discussed • What children are interested in learning • Children's thinking and study habits • Things children learnt in school • Children's school activities and experiences • Encouragement and rewards for children to learn well in school • Children's school behaviour and relationships with classmates • Children's learning progress/performance • Children's plans for further education and career
	Parental supervision of children	• Knowing children's homework assigned • Helping with and checking children's homework completion • Preparing children for tests • Monitoring children's time use • Knowing children's company and activities outside home
	Parental support of their children's learning at home	• Numeracy and problem-solving learning activities • Developing children's autonomy and competence • Pproviding emotional support • Actively managing home learning environment
	Parent-child reading together	
School-based parental involvement	Parental communication with teachers regarding their children's learning	• Knowing, contacting, and meeting teachers • Collaborating with teachers • Parents encouraged by teachers to express opinions and ideas • Visiting children in school following teachers' encouragement
	Parental participation in school activities	• Visiting schools • Attending school talks and workshops • Participating in school events, fundraising, parent-teacher associations, school councils • Volunteering to support school events
Subtle forms of parental involvement	Parental emphasis on the importance of education to their children	• Enhancing children's school readiness • Transmitting intrinsic and extrinsic academic values • Understanding and valuing school educational activities

Variables	Categories	Examples
		• Emphasizing academic achievement and attainment
	Parents' academic expectations of their children	
Composite parental involvement	≥ 2 home involvement variables ≥ 2 school involvement variables ≥ 2 home/school involvement variables	
Student achievement	Languages Mathematics Science Combination of subjects	• Reading • Literacy • Numeracy • GPA
Student gender	Boys Girls Mixed	
Students' grade levels	Kindergarten Grade 1-6 Grade 7-12 K-6 K-12 Grade 1-12	
Parental educational attainment	Low (< Grade 9) Middle (Grade 9–12) High (≥ Bachelor's degree) Middle-High (≥ Grade 9) Low-Middle (≤ Grade 12) Mixed grade levels	• Elementary school • Middle school • High school • Community college • Bachelor's degree • Master's degree • Doctorate degree
Study type	Academic journals Dissertations	
Research design	Cross-sectional Longitudinal (≥ 1 year)	

TABLE 3

Effect Sizes for Parental Involvement Variables

	No of independent samples	Effect sizes				Homogeneity test	
		Mean	-95% CI	+95% CI	Z	Q(df)	I^2
Home-based involvement							
Parent-child academic discussions	18	.15	.09	.20	5.23**	605.64**(17)	97.19
Parental supervision of children	30	.01	-.03	.05	0.62	697.78**(29)	95.84
Parental support of children's home learning	30	.17	.11	.22	5.91**	1038.26**(29)	97.21
Parent-child reading	15	.11	.07	.14	5.32**	62.40**(14)	77.56
≥ 2 home involvement variables combined	17	.08	.01	.14	2.39*	139.76**(16)	88.55
All home-based involvement variables	85	.10	.08	.12	8.64**	1373.39**(84)	93.88
School-based involvement							
Parental communication with teachers	17	.03	-.02	.08	1.35	164.06**(16)	90.25
Parental participation in school activities	21	.14	.02	.27	2.19*	3641.96**(20)	99.45
≥ 2 school involvement variables combined	29	.07	.02	.13	2.75**	205.09**(28)	86.35
All school-based involvement variables	58	.08	.01	.14	2.40*	3985.81**(57)	98.57
Home and school involvement							
Home and school involvement variables combined	14	.10	-.08	.28	1.08	450.97**(13)	97.12
Subtle involvement							
Parental emphasis on education	20	.11	.05	.17	3.69**	297.96*(19)	93.62
Parental academic expectations	41	.28	.23	.32	11.56**	2002.69**(40)	98.00
All subtle involvement variables	56	.23	.18	.27	9.88**	3388.74**(55)	98.38
All parental involvement variables	132	.14	.11	.16	10.47**	5894.84**(131)	97.78

* $p < .05$ ** $p < .01$

TABLE 4

Meta-regression of Parental Involvement Effect Sizes on Parental Education and Covariates

	Home-based involvement				School-based involvement		Subtle involvement	
	Discussion	Supervision	Support	Reading	Communication	Participation	Emphasis	Expectations
Intercept	0.04(0.04)	0.02(0.07)	0.08(0.22)	0.08(0.15)	0.00(0.06)	0.17(0.15)	-0.02(0.03)	0.47(0.32)
Parental education								
Reference category = 'Low' for all involvement variables except Reading (reference category = 'Low-Middle')								
Middle	0.11(0.09)	0.08(0.11)	0.05(0.10)	0.01(0.14)	0.16(0.10)	-0.00(0.22)	0.41**(0.08)	-0.11(0.18)
High			0.39**(0.14)	0.19(0.14)	-0.11(0.12)	-0.09(0.22)	0.17**(0.06)	0.12(0.18)
Middle-High	0.09(0.06)	-0.08(0.10)	0.03(0.10)		-0.00(0.11)	0.12(0.21)	-0.04(0.03)	-0.15(0.21)
Low-Middle	-0.01(0.10)	-0.05(0.11)			0.41**(0.13)	0.29(0.27)	-0.18**(0.06)	0.17(0.21)
Mixed grade levels	0.05(0.08)	-0.03(0.15)				0.10(0.36)		
Research design								
Reference category = Cross-sectional								
Longitudinal			0.09(0.08)	-0.06(0.12)	0.07(0.13)	-0.18(0.26)		-0.10(0.19)
Student gender								
Reference category = Male								
Girls			-0.02(0.08)					
Mixed			-0.07(0.12)					-0.14(0.28)
Students' grade levels								
Reference category = 'Kindergarten' for all involvement variables except Discussion (reference category = 'Grade 1-6')								
Grade 1-6			0.21(0.15)					
Grade 7-12	0.09(0.07)		0.09(0.12)					
K-6			0.23**(0.06)					
K-12								
Grade 1-12			0.02(0.10)					
Q(df)	5.45(5)	2.68(4)	42.78**(10)	5.31(3)	14.78*(5)	2.81(6)	59.56**(4)	7.83(6)
R^2	0	0.07	0.88	0.17	0.48	0	1.00	0

Note. Discussion = Parent-child academic discussions; Supervision = Parental supervision of children; Support = Parental support of children's home learning; Reading = Parent-child reading; Communication = Parent-teacher communication; Participation = Parental school participation; Emphasis = Parental educational emphasis; Expectations = Parental academic expectations of children

* $p < .05$ ** $p < .01$

TABLE 5

Meta-regression of Parental Involvement Effect Sizes for Different Subjects

	Achievement domains		
	Languages	Mathematics	Combination of subjects
Intercept	-0.68**(0.20)	0.07(0.13)	0.20(0.11)
Parental education			
Reference category = 'Low' for all involvement variables except mathematics (reference category = 'Low-Middle')			
Middle	0.10(0.16)	-0.01(0.19)	0.05(0.06)
High	0.50**(0.16)	0.11(0.17)	0.01(0.07)
Middle-High	0.39*(0.19)		0.03(0.06)
Low-Middle	0.45**(0.16)		0.09(0.08)
Mixed grade levels			-0.02(0.12)
Research design			
Reference category = Cross-sectional			
Longitudinal	0.25*(0.12)		-0.04(0.05)
Student gender			
Reference category = Male			
Girls	-0.00(0.05)		-0.05(0.11)
Mixed	0.54**(0.15)		-0.06(0.09)
Students' grade levels			
Reference category = 'Kindergarten' for all involvement variables except Discussion (reference category = 'Grade 1-6')			
Grade 1-6			-0.08(0.06)
Grade 7-12			0.00(0.06)
K-6			0.09(0.08)
K-12			
Grade 1-12			-0.09(0.10)
Q(df)	37.46**(7)	0.64(2)	11.21(12)
R^2	1.00	0.00	0.08

* $p < .05$ ** $p < .01$

Figure 1

Funnel plot