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The prevalence of parent-teacher interaction in developing countries and its effect on student outcomes

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HIGHLIGHTS

- The prevalence of parent-teacher interaction is low in rural China, especially among disadvantaged students.
- Parent-teacher interaction has positive effects on raising academic achievement and reducing learning anxiety.
- The prevalence and effectiveness of parent-teacher interaction varies by both demand-side and supply-side factors.

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ABSTRACT

Empirical evidence from developed countries supports the idea that parent-teacher interaction is high and improves student outcomes. The evidence from developing countries is, however, decidedly mixed. Using longitudinal data from nearly 6000 students and their 600 teachers in rural China, we show the prevalence of parent-teacher interaction is generally much lower than that of developed countries. We also show parent-teacher interaction, when it exists, can have positive effects on raising academic achievement and reducing learning anxiety. We demonstrate that the prevalence and effectiveness of parent-teacher interaction in a developing country context varies considerably due to both demand-side and supply-side factors.

Parents make critical investments in the human capital of their children. They decide how much schooling their children obtain, the type of schools they attend, and the learning resources they receive at home (Becker & Tomes, 1986). Parents furthermore participate with their kids in a wide range of educational activities inside and outside of school (Cunha & Heckman, 2007). In fact, parental investments are so critical that they do more to improve children's educational outcomes than investments made by schools or even by the children themselves (Coleman et al., 1966, p. 218; De Fraja, Oliveira, & Zanchi, 2010; Dufur, Parcel, & Troutman, 2013; Heckman, 2008; Houtenville & Conway, 2008).

A major way in which parents invest in their children's educational outcomes is by interacting with teachers. Parent-teacher interaction allows parents and teachers the opportunity to exchange information, strengthen feelings of mutual obligation and trust, and coordinate efforts to help students thrive (Coleman, 1988). By helping each other better monitor what happens in school and at home, parent-teacher interaction also facilitates mutual accountability (Mbiti, 2016).

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Empirical evidence from developed countries shows that parent-teacher interaction is high and improves student outcomes. Specifically, randomized interventions designed to increase parent-teacher communication in the United States result in higher levels of attainment, attendance, and achievement (Bergman, 2015; Kraft & Dougherty, 2013; Kraft & Rogers, 2015). Randomly inviting parents to school meetings in rural and urban France leads to positive student attitudes and behaviors (Avvisati, Gurgand, Guyon, & Maurin, 2014; Goux, Gurgand, & Maurin, 2017). Meta-analyses also show positive correlations between parental involvement in school and student achievement in the developed world (Hill & Tyson, 2009).

Despite the positive findings from developed countries, it is less clear whether parent-teacher interaction improves student outcomes in developing countries. On the demand side, parents from developing countries are generally less educated and therefore may lack the knowledge and experience that is needed to work with teachers to help improve their children's performance (Banerjee & Duflo, 2006). Parents also may be less motivated to interact with teachers if they believe that their child is a low performer and has little chance of succeeding in the school system (and benefiting from the higher returns associated with attaining higher levels of schooling—Brown, 2006). In addition, parents in developing countries may have fewer or more superficial interactions with teachers because they live far from school or need to spend more time at work due to financial constraints (Gowda, Kochar, Nagabhushana, & Raghunathan, 2014; Yang et al., 2013; Zhang, Behrman, Fan, Wei, & Zhang, 2014). On the supply-side, institutional factors such as the lack of formal parent-teacher conferences or large class sizes may hinder productive parent-teacher interaction (OECD, 2006). Low levels of teacher quality may further dampen the benefits of parent-teacher interaction.

Despite potential barriers to the effectiveness of parent-teacher interaction in developing countries, policymakers have started to encourage greater parent involvement in schools. For example, South Africa implemented reforms that give parents more opportunities to participate in decision-making at the schools their children attend (Bojuwoye, 2009). Jamaica has instituted a National Parenting Program that encourages teachers and principals to bridge the home-school gap (Kinkead-Clark, 2017). A growing literature shows mixed results of such reforms, however, and argues that teachers may require further training in how to best communicate with parents (e.g. Crozier & Davies, 2007; Hoover-Dempsey, Walker, Jones, & Reed, 2002; Lemmer, 2012).

Indeed, empirical evidence about the effect of parent-teacher interaction on student outcomes in developing countries is mixed. Randomly asking teachers to provide parents with information on student learning outcomes has little impact on student achievement in India or Kenya (Banerjee, Banerji, Duflo, Glennerster, & Khemani, 2010; Lieberman, Posner, & Tsai, 2014). Arranging weekly parent-teacher meetings with a random subset of parents significantly increases student achievement in Bangladesh but not in South Africa (Bouguen, Gumede, & Gurgand, 2015; Islam, 2019). Importantly, these experimental studies have examined the impact of researcher-led interventions to increase parent-teacher interaction. However, few, if any, studies have examined the impact of parent-teacher interaction in developing countries as it exists in its current form. At a more basic level, few studies have documented the prevalence of parent-teacher interaction in developing countries. Finally, few studies have examined the prevalence and impacts of parent-teacher interaction for students from different backgrounds and for students studying under different educational conditions.

The goal of our study is to examine the role of parent-teacher interaction in improving student outcomes in developing countries. Under this goal, we have four specific objectives. First, we examine the prevalence and nature of parent-teacher interaction as it currently exists in a developing country context. Second, we examine how existing levels of parent-teacher interaction in this context influence student achievement and learning anxiety. Third, we examine how the prevalence, nature, and effects of parent-teacher interaction on achievement and learning anxiety differ between disadvantaged (low-achieving, poor, left-behind by migrant parents) students and advantaged students (higher achieving, not-poor, living with their parents). In doing so, we examine demand-side (student- and parent-level) reasons that may explain under which conditions parent-teacher interaction is effective in developing contexts. Fourth, we explore supply-side reasons—at the class- and teacher-level—that may explain under which conditions parent-teacher interaction is effective.

To fulfill these objectives, we utilize a longitudinal dataset that we collected from approximately 6000 students and their 600 teachers in rural China. We examine prevailing levels of parent-teacher interaction for the average student and for different types of disadvantaged and advantaged students. Using student fixed effects models, we further examine the impact of parent-teacher interaction on student achievement and learning anxiety and how it differs by demand-side (student- and parent-level) and supply-side (class- and teacher-level) factors.

1. Literature review

Bronfenbrenner's (1979) ecological systems model of human development posits that children's development is influenced by multiple environments such as the home, community, and school. Open communication between the home and school integrates the development process and promotes children's academic success. This is echoed by Epstein's (1987, 2011) theory of overlapping spheres, which states that parent-teacher interactions lead to more frequent parent involvement in their children's academic work and, in turn, better academic outcomes.

According to Epstein (1995), parent involvement can further be categorized into six levels of activities. The first is providing for children's basic needs and supervising them. The second is communicating with teachers to keep up-to-date about academic progress. Communication is the gateway to higher levels, such as 3) volunteering at school; 4) helping with homework and home learning; 5) participating in school decision-making through parent-teacher associations; and 6) collaborating with community organizations to strengthen school programs.

Regular and meaningful communication with teachers can enable parents to access and monitor school-based learning (in addition to home-based learning). Parents can gain influence in schools to advocate for their children, as well as regular after-school study activities, such as private tutoring (Addi-Raccah & Grinshtain, 2016; Ji & Koblinsky, 2009). Indeed, research conducted in developed countries indicates that parental school involvement is significantly associated with improving student achievement and wellbeing (e.g. Hill & Tyson, 2009; Jeynes, 2012; Thijs & Eilbracht, 2012).

The nature and impact of parent-teacher interactions in China may, however, differ from that of Western countries because of social or cultural differences in the perceived roles of parents and teachers in the educational process (Addi-Raccah & Grinshtain, 2016; Guo & Kilderry, 2018; Lasky, 2000). Traditionally, parents and teachers in China play roles that are clearly defined and distinct (e.g. Chen & Agbenyega, 2012; Gu & Yawkey, 2010; Lau, Li, & Rao, 2012; Ng, 1999). Chinese parents consider teachers as experts who best know the child's educational needs (Guo & Kilderry, 2018). Chinese parents, for their part, are often willing to provide

supplemental educational support to teachers as needed.

The concept of, and approaches to, learning may further vary across cultures. In particular, the nature and impact of parent-teacher interactions in China might be distinct from those described in studies conducted in Europe or North America because of differences in cultural beliefs about learning. While Western youth perceive learning as driven by passion and curiosity and defined by moments of inspiration, Chinese youth view learning as a means for moral development and a goal achieved through diligence and practice (Li, 2005). As a result of these different beliefs, Chinese children may be socialized to approach learning and schooling differently than Western children.

Beliefs about learning consist of varying understandings of the purposes, processes, personal importance, affects, and social perceptions of learning, of successful learners, and of teachers (Li, 2005; Li & Harris, 2003). The beliefs held by students themselves, parents, and teachers play an important role in shaping students' academic attitudes (including learning anxiety) and achievement. In the Chinese cultural model of learning, successful learning brings calmness to the learner and happiness to her family; in contrast, failures to learn lead to depression and guilt as the learner is perceived to have brought shame upon her family (Li, 2002). This framework captures the relations among learning outcomes, student affect, and the role of family as both a stakeholder and an accountability mechanism.

Even starker differences in the nature and effect of parent-teacher interactions may exist across urban and rural China. Evidence suggests that parents in urban China are increasingly keen to learn Western-inspired educational practices from teachers (Guo & Kilderry, 2018). For example, they increasingly initiate in-person meetings with teachers with the hopes of building a relationship and ensuring that children receive more attention and favorable treatment (Guo & Kilderry, 2018). Such in-person meetings are probably more uncommon in rural China however, because a large percentage of rural students' parents work outside of their home county (Author, 2015b). Since parent-initiated interactions are less frequent in rural areas, teachers in rural areas may also tend to communicate with parents only if students have academic or behavioral problems.

2. Research design

2.1. Background on students in rural China

Despite comprising roughly three-fourths of China's school-age population, students in rural China have low levels of education (Author, 2017a). While almost all students from urban areas finish high school, only about 37% of rural students do (Author, 2015c). The achievement levels of rural students are also much lower than those of their urban peers (Author, 2016).

Students in rural junior high schools in China face particular challenges. There is intense competition among students to pass the high school entrance exam that determines entry into a limited number of slots in academic high school. In the midst of such competition, learning anxiety among junior high school students is high and negatively associated with achievement (Wang et al., 2015). Because of intense pressures and low levels of learning in the first year of junior high school, the educational aspirations of poor, rural students to attend academic high school and college also decrease markedly over time (Author, 2013; 2015a).

The challenges facing junior high school students in rural China may be exacerbated by a lack of effective parent-teacher interaction. Like in other developing contexts, there are several demand-side (student- and parent-level) reasons why parent-teacher interaction might be infrequent or ineffective in rural junior high schools in China. First, because entry into China's academic high schools is extremely competitive (Author, 2017b), parents of low-achieving students may feel that the returns to investing in their children (through investments in parent-teacher interaction) are too low. Second, because parents have low levels of education (with roughly one-half of parents, according to our data, not having graduated from junior high school themselves—Appendix Table 1), they may be unfamiliar with how to effectively interact with teachers at the junior high school level. Third, parents may live far away from school and have little chance to interact with teachers in person. This may be a particularly big problem in rural China where more than 60 million “left-behind” children have parents who have migrated in search of gainful employment in urban areas (Author, 2015b). In our data, 62% of the students have at least one parent who is living and working away from home in the first semester (Appendix Table 1). Similarly, many parents from rural areas are financially constrained and may have to work long hours; this may make it difficult for them to find time to interact with teachers.

There are also a number of supply-side (teacher- and class-level) reasons why parent-teacher interaction may be infrequent or ineffective in rural China. Class sizes tend to be large (55 students per class on average, according to our data—Appendix Table 1). Large class sizes may make it difficult for teachers to find time to interact with the parents of individual students. Teachers in China also have low levels of education (according to our data, only 33% of teachers have a four-year college degree—Appendix Table 1). Teachers with low levels of education or training may not know how to interact effectively with parents. Teachers may further have too few or too many years of experience teaching (years of teaching experience varies substantially in our sample with a mean of 14.9 years and a standard deviation of 9.1 years—Appendix Table 1). On the one hand, teachers that are new to teaching may not have yet developed the ability to effectively interact with parents; on the other hand, teachers that have been in the teaching profession for a long time may use traditional teaching methods that do not leverage parent involvement. Finally, schools in rural China may lack the institutional norms that have been established in schools in urban areas or developed countries such as regular parent-teacher conferences or parent-teacher associations that can foster and leverage parent-teacher interaction to help students to learn.

Given this background context, we will test four specific hypotheses in this study:

Hypothesis 1. Parent-teacher interactions will be less frequent in rural junior high schools in China than in developed countries.

Hypothesis 2. The frequency of parent-teacher interaction will have a positive effect on student achievement and a negative (reducing) effect on learning anxiety.

Hypothesis 3. Parent-teacher interactions will be less frequent for the following groups of students: 1) students from economically disadvantaged families; 2) students in larger classes; and 3) students with less experienced teachers.

Hypothesis 4. The effect of parent-teacher interactions will be larger on the above three groups of students (than students from wealthier families, in smaller classes, and with more experienced teachers respectively).

2.2. Data collection

Our study sample was originally comprised of 600 teachers that were randomly chosen from a representative list of 300 rural junior high schools in one inland province of China. Approximately 96% (578 out of the 600) of the teachers filled out a detailed survey form

on their own perceptions of their interactions with the parents of a random subset of students (see *Teacher Surveys* below). In particular, for each teacher, we randomly chose 12 students that were present at the beginning of the school year (6936 students in total). However, by the end of the school year (May 2016) when teachers filled out the survey form about parent-teacher interactions, a small proportion of the students were absent (1.7%), had transferred to other classes or schools (3.1%), or had dropped out (6%). Because we were unable to obtain survey information about parent-teacher interactions for these students, our analytical sample was reduced to 6143 students. To examine if the attrition of these students biased our sample, we checked the characteristics of students at the beginning of the school year by their attrition status. Results from our data show that attrition did not bias our sample. In other words, there was no systematic difference in terms of characteristics at the beginning of the school year between those students who attrited and those who did not.

Besides the end-of-the-year survey form about parent-teacher interactions, additional student and teacher data were collected in three stages: (a) a baseline survey at the start of the first semester of the school year (October 2015); (b) a midline survey at the end of the first semester (January 2016); and (c) a supplemental endline survey at the end of the second semester (May 2016).

Student Achievement and Learning Anxiety. Our primary outcomes are student math achievement and learning anxiety. Math achievement was measured at baseline, midline, and endline using 35-min mathematics tests. The tests were grade-appropriate and tailored to the national and provincial-level mathematics curricula. The tests were also constructed by trained psychometricians using a multi-stage process. Mathematics test items were first selected from standardized mathematics curricula for each grade (7, 8, and 9). The content validity of these test items was checked by multiple experts. The psychometric properties of the test were then validated through extensive pilot testing and data analysis. The math achievement tests exhibited good psychometric properties including reliability (Cronbach alphas of approximately 0.8), unidimensionality, and a lack of differential item functioning by student background characteristics such as gender.

Students took the same test in the baseline and midline waves and a different test at endline. In the analyses, we standardized each wave of mathematics achievement scores separately. The achievement measures are thus in standard deviation (SD) units.

During the baseline, midline, and endline surveys, we also measured the learning anxiety of students. Learning anxiety (in math) was measured using specially designed and validated items from the 2012 Programme for International Student Assessment (OECD, 2013). We summarized student responses to the items into a single measure of math anxiety using the GLS weighting procedure described in Anderson (2008). We normalized the measure by first subtracting the mean and then dividing by the standard deviation. The learning anxiety measures are thus also expressed in SD units. The math anxiety variables also exhibited good reliability (Cronbach alphas between 0.79 and 0.81).

Student Surveys. We collected detailed survey data on students. In the baseline survey, we asked students about their parent's education levels and their possession of durable household assets. We used the information on durable household assets to create a measure of parent wealth for each student (using the method of polychoric principal components analysis described by Kolenikov & Angeles, 2009).[1] We also constructed dichotomous measures about whether students' mothers and fathers were migrating (working outside of their hometown) in either the first or second semester. We present descriptive statistics of these baseline student characteristics in Appendix Table 1, Panel A.

Teacher Surveys. We also collected detailed data from teachers. In the baseline, we asked teachers to report their years of teaching experience (the total number of years for which they have been a teacher) and educational levels (whether they graduated from a four-year college—see Appendix Table 1, Panel B). In the endline, we asked teachers to fill out a detailed questionnaire about the extent and nature of their interactions with parents in the first and second semesters of the school year. Specifically, for each student and for each semester, we asked teachers whether they had interacted with the student's parents (in any format and regardless of which party initiated the interaction), the nature of the parent-teacher interaction (whether the focal issue of the interaction was academic, disciplinary, social, physical, or emotional), and whether the parent acted upon any decisions reached through the interaction. We also asked a more general (not student- or semester-specific) question about how often the teachers organized parent-teacher conferences.

2.3. Statistical approach

To estimate the impacts of parent-teacher interaction on student outcomes, we use a student fixed effects (or within-student) analysis. Econometricians use individual or student fixed effects in multivariate regression analyses to help identify causal effects (Angrist & Pischke, 2008, pp. 165–169). Student fixed effects analyses are widely used in the economics of education literature to help determine the impact of teacher characteristics and behaviors on student outcomes (see, for example, Clotfelter, Ladd, & Vigdor, 2007).

The student fixed effects analysis employed in our study uses the variation within students across semesters (the first and second semesters of the school year) to identify causal effects. More specifically, because the analysis utilizes only the variation within students across semesters, it by design controls for all observable and unobservable student, classroom, teacher, and school covariates that do not vary across semesters. To capture any remaining variation that may still be correlated with both parent-teacher interaction and student outcomes, we further control for key covariates that vary across semesters.

We chose to use a student fixed effects analysis because it improves upon the ordinary least squares regression used in past studies (see Hill & Tyson, 2009). Equation (1) below illustrates how the standard use of ordinary least squares regressions (without student fixed effects) can result in biased estimates:

$$Y_{ics} = \beta_0 + \beta_1 T_{ics} + X'_{ics}\alpha + Z_{ic}\psi + \rho_{ic} + \varepsilon_{ics}, i, \ldots N, \bullet c = 1, \ldots N, \bullet s \bullet = \bullet 1, \ldots S \quad (1)$$

Where Y_{ics} represents the outcome (achievement or learning anxiety) of student i in class (or with teacher) c in semester s. T_{ics} is a dummy variable for whether parent-teacher interaction occurred. X'_{ics} represents a vector of observable student (i), class/teacher, and school (c) covariates that vary across semesters (s). Z_{ic} represents a vector of observable student, class/teacher, and school characteristics that do not vary across semesters. Similarly, ε_{ics} represents a vector of unobservable student, class/teacher, and school covariates that vary across semesters. And ρ_{ic} represents a vector of unobservable student, class/teacher, and school characteristics that do not vary across semesters.

Running an analysis based on Equation (1) would result in

[1] Durable household assets simply refer to "items in the child's home" that can be used to create a family wealth index for each child (for an extensive discussion on this method, see Kolenikov & Angeles, 2009).

biased estimates if the unobserved variables (ε_{ics} and ρ_{ic}) were correlated with both the outcome (Y_{ics}) and parent-teacher interaction (T_{ics}). Importantly, if parents were highly motivated to help their children, or if they were particularly excellent at parenting (variables that are represented by ρ_{ic}), they would simultaneously be more likely to interact with teachers and more likely to have high-achieving children. Omitting measures of parent motivation and the quality of parenting from the ordinary least squares regression analysis would therefore result in upwardly biased impact estimates.

The student fixed effects analysis addresses the omitted variables bias problem by subtracting each variable in equation (1) by the within-student cross-semester average of that variable. As reflected in Equation (2) below, subtracting the cross-semester average of each variable results in the elimination of observable and unobservable factors ($Z_{ic}\psi$ and ρ_{ic}) that are semester-invariant but which vary across students (such as parent motivation and the quality of parenting):

$$Y_{ics} - \overline{Y}_{ic} = \beta_1 (T_{ics} - \overline{T}_{ic}) + (X_{ics} - \overline{X}_{ic})\alpha + (\varepsilon_{ics} - \overline{\varepsilon}_{ic}), \quad (2)$$

where $\overline{Y}_{ic} = \frac{1}{S}\sum_{S=1}^{S} Y_{ics}, \overline{X}_{ic} = \frac{1}{S}\sum_{S=1}^{S} X_{ics}, \overline{T}_{ic} = \frac{1}{S}\sum_{S=1}^{S} T_{ics}, \overline{\varepsilon}_{ic} = \frac{1}{S}\sum_{S=1}^{S} \varepsilon_{ics}$.

Compared to the OLS regression approach (Equation (1)), the student fixed-effects approach (Equation (2)) produces unbiased estimates of β_1 under less restrictive assumptions (Angrist & Pischke, 2008, pp. 165–169).[2] The first assumption is that the error term $\varepsilon_{ics} - \overline{\varepsilon}_{ic}$ in Equation (2) must be uncorrelated with the treatment $T_{ics} - \overline{T}_{ic}$ and outcome $Y_{ics} - \overline{Y}_{ic}$ terms. To account for the possibility that the error term is correlated with the treatment and outcome terms, we control for the achievement and learning anxiety levels of students at the start of each semester. The second assumption is that the way in which the parent-teacher interaction affects student outcomes is the same across the two semesters. To account for the possibility that it varies across semesters, we further control for semester order using a dummy variable.

One general limitation to using the student fixed effects approach is that the estimated effects may be overly conservative (i.e. biased towards zero—Angrist & Pischke, 2008). This is because the student fixed effects typically control for too much variation in the outcome variable. Student fixed effects estimates are also more sensitive to attenuation bias arising from measurement error in the treatment variable. As such, the results of our study may underestimate the impact of parent-teacher interaction on student outcomes and should be considered lower-bound estimates.

3. Results

3.1. The prevalence of parent-teacher interaction

According to our descriptive analyses, the prevalence of parent-teacher interaction in junior high schools in rural China is low. In our sample, as reported by teachers, only 47.8% of students had parents that interacted with teachers, in any shape or form, in the first semester; only 45.9% of students had parents that interacted with teachers in the second semester (Table 1, Columns 1 and 2). Our data also show that 43.1% of students had parents who did not interact with teachers at all at any point in the school year under discussion (Table 1, Column 3). Finally, by the time of our endline survey, teachers stated that they (as teachers) did not extend a request to 43.9% of the parents to attend a meeting at any time during the academic year.[3]

The prevalence of parent-teacher interaction in developing country contexts such as rural China appears to be much lower than that of developed countries such as the United States. According to Noel, Stark, and Redford (2013), over the course of a school year, approximately 87% of parents of grade 6–8 students in the United States reported attending a school-initiated meeting, 85% reported receiving general communications from the school, 71% reported attending a parent-teacher conference, 70% reported attending a school or class-event, 55% reported receiving specific notes or emails about their child, and 44% reported receiving a telephone call about their child.

While the prevalence of parent-teacher interaction in rural China is low overall, it also varies significantly by student and parent characteristics (Table 1). According to teacher survey responses, the percentage of parents who had any interactions with teachers during the school year was 62.3%, 56.2%, and 52.4% for high, mid, and low-achieving students, respectively (Table 1, Column 3). The differences between high- and low-achieving students, as well as between mid- and low-achieving students, are statistically significant at the 5% level. The percentage of parents who interacted with teachers during the school year was 59.8% for students with parents who finished junior high school and only 51.0% for students with parents who did not finish junior high school (difference statistically significant at the 1% level—Table 1, Column 3). Parent-teacher interaction was also significantly less common among students that had at least one parent migrate during the first semester (53.1%). Family wealth, as measured by possession of durable household assets, also played a role. Parents from the wealthiest tercile were 11.8 percentage points more likely to interact with teachers during the school year than parents from the least wealthy tercile (63.8% versus 52.0%, statistically significant at the 1% level).[4]

Even when parents and teachers in rural China do interact, they appear, by and large, to discuss academic and disciplinary issues (Table 2). Conditional on interacting with parents, teachers reported interacting about academic issues in 70.8% of the cases and disciplinary issues in 30.5% of the cases (Columns 1 and 2). Students' emotional health, physical health, and social well-being were each brought up in less than 8% of the cases (Columns 3–5).

The content of parent-teacher interaction also differs substantially across different types of students (Table 2). As reported by teachers, parent-teacher interaction about academic issues was more prevalent among high-achieving students (15.7 percentage points more) and mid-achieving students (10.4 percentage points more) than low-achieving students (Column 1). By contrast, parent-teacher interaction about disciplinary, emotional, or physical issues was more prevalent among low-achieving students compared to high- and mid-achieving students (Columns 2–4). Similarly, parents who did not finish junior high school were 55.5% more likely to discuss their child's physical health with teachers

[2] We also adjust the standard error estimates from the student fixed effects analyses to account for the nesting of students within classes.

[3] The last result is omitted from Table 1 for the sake of brevity.

[4] The prevalence of parent-teacher interaction also significantly differs by teacher characteristics (results are not included in tables for the sake of brevity). When we use the teacher experience variable to create roughly equal size teacher experience tercile groups, teachers in the top and middle terciles of teaching experience were approximately 15.6 and 13.2 percentage points more likely to interact with parents than teachers in the lowest tercile. The differences are statistically significant at the 1% level. Perhaps somewhat counterintuitively, teachers with a college degree were 8.9 percentage points less likely to interact with teachers (50.9% versus 59.7%, statistically significant at the 5% level). By contrast, class size (measured in terciles) was not significantly related to the prevalence of parent-teacher interaction.

Table 1
Teacher reported percentage of parents who interacted with teacher at least once over the given period *(total and by different student characteristics).*

	(1)	(2)	(3)
	First Semester	Second Semester	Full School Year
All students	0.478	0.459	0.569
By Baseline Achievement Level			
Top Achievement Tercile	0.543	0.513	0.623
Middle Achievement Tercile	0.468	0.451	0.562
Bottom Achievement Tercile	0.425	0.419	0.524
Top-Bottom Difference	0.118*** (0.023)	0.094*** (0.025)	0.099*** (0.024)
Middle-Bottom Difference	0.043** (0.018)	0.032* (0.019)	0.038** (0.019)
By Parent Education Level			
Parent Finished Junior High (JH)	0.508	0.487	0.598
Parent Did Not Finish JH	0.416	0.404	0.51
Finished JH-Did Not Finish JH Difference	0.092*** (0.017)	0.083*** (0.018)	0.088*** (0.018)
By Parent Migration Status			
Either Parent Left	0.442	0.418	0.531
Both Parents Stayed	0.537	0.525	0.63
Left-Stayed Difference	−0.095*** (0.018)	−0.107*** (0.018)	−0.099*** (0.018)
By Parent Wealth			
Top Wealth Tercile	0.563	0.533	0.638
Middle Wealth Tercile	0.469	0.444	0.558
Bottom Wealth Tercile	0.412	0.413	0.520
Top-Bottom Difference	0.151*** (0.021)	0.120*** (0.024)	0.118*** (0.022)
Middle-Bottom Difference	0.057*** (0.017)	0.031* (0.018)	0.038** (0.018)

Notes.
1) Cluster (school)-robust standard errors in parentheses.
2) ***p < 0.01, **p < 0.05, *p < 0.1.
3)1st semester N = 5,985, 2nd Semester N = 5,764, Full Year N = 5787.

Table 2
Content of parent-teacher interaction (reported by teachers), conditional on their being parent-teacher interaction *(total and by student and parent characteristics).*

Subgroup	(1)	(2)	(3)	(4)	(5)
	Academic	Disciplinary	Emotional	Physical	Social
All students	0.708	0.305	0.075	0.073	0.050
By Baseline Achievement Level					
Top Achievement Tercile	0.777	0.247	0.062	0.061	0.048
Middle Achievement Tercile	0.724	0.272	0.068	0.069	0.047
Bottom Achievement Tercile	0.620	0.401	0.094	0.090	0.055
Top-Bottom Difference	0.157*** (0.024)	−0.154*** (0.022)	−0.032** (0.012)	−0.029** (0.013)	−0.007 (0.010)
Middle-Bottom Difference	0.104*** (0.021)	−0.129*** (0.020)	−0.026** (0.012)	−0.021* (0.011)	−0.008 (0.009)
By Parent Education Level					
Parent Finished Junior High (JH)	0.718	0.310	0.075	0.063	0.053
Parent Did Not Finish JH	0.688	0.294	0.072	0.098	0.045
Finished JH-Did Not Finish JH Difference	0.030 (0.019)	0.016 (0.017)	0.003 (0.010)	−0.035*** (0.012)	0.008 (0.008)
By Parent Migration Status					
Either Parent Left	0.702	0.297	0.080	0.080	0.051
Both Parents Stayed	0.718	0.317	0.069	0.063	0.049
Left-Stayed Difference	−0.016 (0.017)	−0.020 (0.016)	0.011 (0.009)	0.017 (0.011)	0.002 (0.008)
By Parent Wealth					
Top Wealth Tercile	0.709	0.340	0.066	0.056	0.049
Middle Wealth Tercile	0.708	0.305	0.078	0.073	0.056
Bottom Wealth Tercile	0.709	0.269	0.079	0.091	0.044
Top-Bottom Difference	0.000 (0.022)	0.071*** (0.021)	−0.013 (0.011)	−0.035*** (0.013)	0.005 (0.009)
Middle-Bottom Difference	−0.001 (0.019)	0.036* (0.019)	−0.001 (0.010)	−0.018 (0.013)	0.012 (0.008)

Notes.
1) Cluster (school)-robust standard errors in parentheses.
2) ***p < 0.01, **p < 0.05, *p < 0.1.
3) N = 3854 students.

(9.8% vs. 6.3%, statistically significant at the 1% level). Compared to the least wealthy parents, the wealthiest parents were 62.5% less likely to discuss physical issues with teachers (9.1% vs. 5.6%, significant at the 1% level). Taken together, the results indicate a greater focus on academic topics among the parents and teachers of advantaged students and a greater focus on disciplinary and physical issues among the parents and teachers of disadvantaged students. The only exception to this general trend is that the parents and teachers of wealthier students discuss disciplinary issues more than the parents and teachers of less wealthy students.

3.2. The effects of parent-teacher interaction on achievement and learning anxiety

What are the effects of parent-teacher interaction on student achievement? According to results from the student-fixed effects analysis, there were no discernible impacts of parent-teacher interaction on the achievement levels of the average student

Table 3
Impact of parent-teacher interaction (as reported by teachers) on achievement and learning anxiety (average and by student characteristics).

Subgroup	(1) Endline Achievement (SDs)	(2) Endline Anxiety (SDs)
Panel A: Average Impact		
Parent-Teacher Interaction	0.000 (0.022)	−0.068** (0.029)
N	11,566	11,540
Panel B: Impacts by Baseline Achievement Levels		
Parent-Teacher Interaction	−0.022 (0.037)	−0.083* (0.049)
Parent-Teacher Interaction X Middle Achievement Tercile	−0.035 (0.052)	0.056 (0.069)
Parent-Teacher Interaction X Top Achievement Tercile	0.112** (0.054)	−0.015 (0.071)
Impact on Mid-Achieving Students	−0.057 (0.037)	−0.026 (0.048)
Impact on High-Achieving Students	0.090** (0.039)	−0.098* (0.051)
N	11,565	11,539

Notes.
1) Cluster (school)-robust standard errors in parentheses.
2) ***p < 0.01, **p < 0.05, *p < 0.1.
3) Model includes student fixed effects and controls for pre-test baseline outcomes and a semester dummy.
4) Parent-teacher interaction is a binary variable that takes on value 1 if there was any parent-teacher interaction during the academic year and 0 otherwise. In the second set of regression results, low-achieving students (the bottom achievement tercile) is the omitted category.

(effect size = 0.00, statistically insignificant at even the 10% level—Table 3, Panel A). However, parent-teacher interaction did have a substantial, positive impact on the achievement levels of high-achieving students even within a single semester: 0.09 standard deviations (SDs), statistically significant at the 5% level (Table 3, Panel B). In contrast, there were no impacts of parent-teacher interaction on the achievement levels of mid- or low-achieving students. There were also no effects on achievement for students whose parents have different levels of education, migration status, or wealth (Table 4, Column 1).

The effects of parent-teacher interaction on student achievement do not appear to vary by supply-side factors, either. The effects of interaction on achievement were not statistically different from zero whether a student was in a small, medium, or large class (Table 5, Panel A). They were also not statistically different from zero, regardless of a teacher's education level or experience (Table 5, Panels B and C).

Although parent-teacher interaction had little impact on the achievement levels of most types of students (with the exception of high-achieving students), it did significantly reduce learning anxiety in math for a wide range of students (Table 3, Column 2). Within one semester, parent-teacher interaction significantly decreased the learning anxiety of the average student by approximately 0.07 SDs (statistically significant at the 5% level)—Panel A). In addition, parent-teacher interaction significantly reduced the learning anxiety of low-achieving students (−0.08 SDs, significant at the 10% level) as well as high-achieving students (−0.10 SDs, significant at the 10% level—Table 3, Panel B). Furthermore, it reduced the learning anxiety of students whose parents finished junior high school by 0.08 SDs (significant at the 5% level—Table 4, Panel A). Students from the wealthiest families saw an even larger reduction in learning anxiety (0.16 SDs, significant at the 1% level—Table 4, Panel C).

A number of supply-side factors (i.e. class and teacher characteristics) appear to contribute to the impact of parent-teacher interaction on the learning anxiety in math of students (Table 5).

Table 4
Impact of parent-teacher interaction (as reported by teachers) on achievement and learning anxiety, by parent characteristics *(education level, migration status, wealth).*

	(1) Endline Achievement (SDs)	(2) Endline Anxiety (SDs)
Panel A: Parent Education Level		
Parent-Teacher Interaction	0.033 (0.038)	−0.054 (0.050)
Parent-Teacher Interaction X Parent Finished Junior High	−0.049 (0.046)	−0.021 (0.061)
Impact on Students with Parent who Finished Junior High	−0.016 (0.027)	−0.076** (0.035)
N	11,562	11,536
Panel B: Parent Migration Status		
Parent-Teacher Interaction	0.021 (0.035)	−0.076 (0.046)
Parent-Teacher Interaction X Either Parent Migrated	−0.035 (0.045)	0.012 (0.059)
Impact on Students whose Parent Migrated	−0.015 (0.028)	−0.064 (0.036)
N	11,512	11,487
Panel C: Parent Wealth		
Parent-Teacher Interaction	−0.011 (0.037)	0.004 (0.049)
Parent-Teacher Interaction X Middle Wealth Tercile	0.038 (0.050)	−0.073 (0.066)
Parent-Teacher Interaction X Top Wealth Tercile	−0.016 (0.057)	−0.166** (0.074)
Impact on Mid-Wealth Students	0.027 (0.034)	−0.069 (0.045)
Impact on Top-Wealth Students	−0.026 (0.043)	−0.163*** (0.056)
N	11,566	11,540

Notes.
1) Cluster (school)-robust standard errors in parentheses.
2) ***p < 0.01, **p < 0.05, *p < 0.1.
3) Model includes student fixed effects and controls for pre-test baseline outcomes and a semester dummy.
4) Parent-teacher interaction is a binary variable that takes on value 1 if there was any parent-teacher interaction during the academic year and 0 otherwise. Students whose parents did not finish junior high, students whose parents did not migrate during first semester, and students in the bottom family wealth tercile are the omitted categories.

Table 5
Impact of parent-teacher interaction (as reported by teachers) on achievement and learning anxiety by supply-side factors *(class size, teacher education level, teacher experience).*

Subgroup	(1)	(2)
	Endline Achievement (SDs)	Endline Anxiety (SDs)
Panel A: Class Size		
Parent-Teacher Interaction	−0.020 (0.039)	−0.073 (0.051)
Parent-Teacher Interaction X Medium Class	0.030 (0.053)	0.079 (0.070)
Parent-Teacher Interaction X Large Class	0.029 (0.054)	−0.070 (0.071)
Impact on Students in Medium-sized Classes	0.010 (0.036)	0.001 (0.048)
Impact on Students in Large Classes	0.009 (0.038)	−0.143*** (0.049)
N	11,566	11,540
Panel B: Teacher Education Level		
Parent-Teacher Interaction	−0.021 (0.026)	−0.033 (0.034)
Parent-Teacher Interaction X Teacher Graduated 4-Year College	0.072 (0.047)	−0.118* (0.062)
Impact on Students whose Teacher Graduated 4-Year College	0.051 (0.040)	−0.151*** (0.052)
N	11,566	11,540
Panel C: Teacher Experience		
Parent-Teacher Interaction	0.000 (0.039)	−0.092* (0.052)
Parent-Teacher Interaction X Middle Teacher Experience Tercile	0.011 (0.053)	−0.013 (0.070)
Parent-Teacher Interaction X Top Teacher Experience Tercile	−0.013 (0.055)	0.091 (0.072)
Impact on Students with Teacher in Middle Experience Tercile	0.011 (0.036)	−0.106** (0.047)
Impact on Students with Teacher in Top Experience Tercile	−0.012 (0.038)	−0.002 (0.050)
N	11,566	11,540

Notes.
1) Cluster (school)-robust standard errors in parentheses.
2) ***p < 0.01, **p < 0.05, *p < 0.1.
3) Model includes student fixed effects and controls for pre-test baseline outcomes and a semester dummy.
4) Parent-teacher interaction is a binary variable that takes on value 1 if there was any parent-teacher interaction during the academic year and 0 otherwise. Medium Classes are classes in the middle class size tercile. Large classes are classes in the top class size tercile. Students in small classes, students whose teachers did not graduate from a 4-year college, and students with teachers in the bottom experience tercile are the omitted categories.

Though the impact on students in small- and medium-sized classes was small, students in large classes benefitted from a 0.14 SD reduction in learning anxiety (statistically significant at the 1% level—Table 5, Panel A). Parent-teacher interaction lowered the learning anxiety of students whose teachers had graduated from four-year colleges by 0.15 SDs but not the learning anxiety of students whose teachers had not graduated from four-year colleges (Table 5, Panel B). Parent-teacher interaction also reduced the learning anxiety of students with the least experienced teachers by 0.09 SDs (significant at the 10% level) and students with mid-experience teachers by 0.11 SDs (significant at the 5% level—Table 5, Panel C). However, there was no impact of parent-teacher interaction on the learning anxiety of students who had the most experienced teachers.

Due to the longitudinal nature of our data and the use of student fixed effects, a very high proportion of the variance in the dependent variables is explained by our analytical model. For example, in Table 3, Panel A, the proportion of explained variance for student achievement is 0.894, while the proportion of explained variance for learning anxiety is 0.824.

4. Discussion and conclusion

Using a unique matched student-teacher data set that we collected at the start, middle, and end of the academic school year from approximately 6000 junior high school students and 600 teachers in rural China, we estimated the prevalence of parent-teacher interaction and its influence on academic achievement and learning anxiety. Our key descriptive results show that the prevalence of parent-teacher interaction is low in rural China, especially among disadvantaged students. Only about half of the parents and teachers of disadvantaged students interact, in any form, during the course of an entire school year. Moreover, teachers set up parent-teacher meetings for only a little more than half the students. Taken together, the results suggest that parent-teacher interaction—a key feature of school culture in developed countries—is conspicuously absent in developing contexts, especially among disadvantaged students.

This is problematic in several ways. First, such weak connections between the home and school spheres can negatively affect student developmental and academic outcomes (Bronfenbrenner, 1979; Epstein, 1987). Teachers and parents each hold pieces of knowledge and information that are critical to maximizing the student's academic potential. Minimal exchange of this information limits the adults' abilities to support the student at school and at home. Second, infrequent parent-teacher interactions may reinforce existing social inequalities. Teachers possess cultural capital that can help students succeed academically and in turn, economically (Becker & Strauss, 1956; Bourdieu & Passeron, 1990, p. 47). Parents can access this cultural capital on the student's behalf by interacting and building relationships with teachers (Addi-Raccah & Grinshtain, 2016). However, disadvantaged parents are less likely to do so. Thus, the gap between advantaged and disadvantaged parents' interactions with teachers may attribute to maintaining or exacerbating academic and, ultimately, socioeconomic gaps.

Our findings, in fact, show the promise and threat of parent-teacher interaction in developing contexts such as that of rural China. Parent-teacher interaction has a substantial and positive effect on student achievement (0.09 SDs in one semester) but has little impact on the achievement of mid- and low-achieving students. As such, whereas increasing parent-teacher interaction clearly has the potential to improve student outcomes, at its current (unequal) levels it is contributing to gaps in achievement. Somewhat more reassuringly, parent-teacher interaction reduces learning anxiety among both advantaged students and (albeit to a lesser degree) disadvantaged students. This is not surprising. Junior high school students in China face the tremendous pressure of high school entrance exams (Author, 2016). Interactions between parents and teachers tend to lead to more parent-child interaction at home (Epstein, 1987). As such, open communications among the

three parties may provide students with social support, thus reducing anxiety.

Our findings also suggest that both parents and teachers might be encouraged to play a greater role in working together to build the human capital of students. Demand-side and supply-side factors both play a role in determining whether parent-teacher interaction is effective. High-achieving students appear to benefit more from parent-teacher interaction, which suggests that parents (and probably teachers) may be more willing to invest in students if they can partake of the rewards associated with succeeding in a competitive education system. Students of parents with more education and wealth are also able to benefit, which implies that financial and human capital play an important role in making parent-teacher interaction effective. That the students of more educated and younger teachers are able to benefit more from parent-teacher interaction suggests that teaching skills, attitudes, and style, all of which are potentially malleable, can play a role in facilitating effective interaction.

Research conducted in developed and developing countries alike suggest that parents and teachers need to and should be trained to communicate more effectively with each other (e.g. Addi-Raccah & Grinshtain, 2016; Bojuwoye, 2009; Lasky, 2000; Lemmer, 2012). Few teacher training programs place emphasis on parent interaction and parent education. As a result, many teachers have not internalized parent-teacher partnerships as part of their professional responsibilities (Hornby & Lafaele, 2011). Similarly, parents, especially less wealthy parents, might believe that they should entrust all of their children's learning to the professional authority of teachers and thus refrain from intervening (Hill & Torres, 2010). Such beliefs must be challenged through intentional outreach and education. In addition, even when parent-teacher conferences do take place, dialogue without appropriate communication techniques may not achieve its intended effects (Lemmer, 2012; McEwan, 2005, pp. 98–109). For these reasons, prior studies recommend explicit training for both teachers and parents in effective communication skills.

Finally, the combination of findings that prevailing levels of parent-teacher interaction are (a) low; (b) vary significantly by student and teacher characteristics; and (c) are currently more effective for certain types of teachers and students, suggests the need for policy and program interventions that will promote effective parent-teacher interaction on a wider basis. Indeed, improving parent-teacher interaction for a wide range of students may be critical for building human capital in developing countries such as China. Researchers in developed countries have long argued that the bonds established between parents and teachers constitute an important form of social capital that contributes directly to human capital development (Coleman, 1988). Because these bonds appear to be weak, and at times, nonexistent in developing country contexts, policymakers and school administrators may especially wish to introduce more formal means of social organization such as a system of regular communications or regular parent-teacher conferences. With the widespread use of the Internet and mobile phones in rural China, as well as the ready availability of social media tools, more creative and cost-effective ways of establishing parent-teacher interaction could also be considered.

Our study has some limitations. We recognize that our findings rely heavily on teacher survey data and as a result, face a couple of limitations. First, the quantity and quality of parent-teacher interaction is only reported by the teacher. Since 62% of the students in our sample had at least one parent who lived away from the student, collecting survey data from parents was unfeasible. Second, although survey data illustrate the breadth of parent-teacher communication, the responses do not effectively explore the interactions in depth. Qualitative data would provide valuable insight on the mechanisms that are driving our results. We hope to conduct follow-up interviews and focus groups in the future.

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Appendix

Table 1
Basic descriptive characteristics of students and teachers.

	Mean	SD
Panel A: Student Characteristics		
Age (years)	13.52	1.09
Father finished junior high (1 = yes, 0 = no)	0.56	0.50
Mother finished junior high (1 = yes, 0 = no)	0.47	0.50
Either parent migrating in the first semester (1 = yes, 0 = no)	0.62	0.49
Panel B: Teacher Characteristics		
Class size (number of students)	55.36	15.41
Teaching experience (years)	14.92	9.07
Graduate 4-year college (1 = yes, 0 = no)	0.33	0.47

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tate.2019.102878.

References

Addi-Raccah, A., & Grinshtain, Y. (2016). Teachers' capital and relations with parents: A comparison between Israeli Jewish and Arab teachers. *Teaching and Teacher Education, 60*, 44–53.

Anderson, M. L. (2008). Multiple inference and gender differences in the effects of early intervention: A reevaluation of the Abecedarian, Perry preschool, and early training projects. *Journal of the American Statistical Association, 103*(484), 1481–1495.

Angrist, J. D., & Pischke, J. S. (2008). *Mostly harmless econometrics: An empiricist's companion*. Princeton, NJ: Princeton University Press.

Author, 2013 (details removed for peer review).

Author, 2015a (details removed for peer review).

Author, 2015b (details removed for peer review).

Author, 2015c (details removed for peer review).

Author, 2016 (details removed for peer review).

Author, 2017a (details removed for peer review).

Author, 2017b (details removed for peer review).

Avvisati, F., Gurgand, M., Guyon, N., & Maurin, E. (2014). Getting parents involved: A field experiment in deprived schools. *The Review of Economic Studies, 81*(1), 57–83. https://doi.org/10.1093/restud/rdt027.

Banerjee, A. V., Banerji, R., Duflo, E., Glennerster, R., & Khemani, S. (2010). Pitfalls of participatory programs: Evidence from a randomized evaluation in education in India. *American Economic Journal: Economic Policy, 2*(1), 1–30.

Banerjee, A., & Duflo, E. (2006). Addressing absence. *The Journal of Economic Perspectives, 20*(1), 117–132. https://doi.org/10.1257/089533006776526139.

Becker, H., & Strauss, A. (1956). Careers, personality, and adult socialization. *American Journal of Sociology, 62*(3), 253–263. https://doi.org/10.1086/222002.

Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics, 4*(3), 1–39. https://doi.org/10.1086/298118.

Bergman, P. (2015). Parent-child information frictions and human capital investment: Evidence from a field experiment. *CESifo Working Paper Series No. 5391*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2622034.

Bojuwoye, O. (2009). Home-school partnership – a study of opinions of selected parents and teachers in Kwazulu natal province, South Africa. *Research Papers in Education, 24*(4), 461–475. https://doi.org/10.1080/02671520802150004.

Bouguen, A., Gumede, K., & Gurgand, M. (2015). Parent's participation, involvement and impact on student achievement: Evidence from a randomized evaluation in South Africa. HAL: ffhalshs01241957f. Retrieved from https://halshs.archives-ouvertes.fr/halshs-01241957.

Bourdieu, P., & Passeron, J. C. (1990). *Reproduction in education, society and culture*. London: Sage.

Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press (pp. 215-218, 230-231).

Brown, P. H. (2006). Parental education and investment in children's human capital in rural China. *Economic Development and Cultural Change, 54*(4), 759–789.
Chen, F., & Agbenyega, J. (2012). Chinese parents' perspectives on home-kindergarten partnership: A narrative research. *Australasian Journal of Early Childhood, 37*(2), 95–105.
Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. *Economics of Education Review, 26*(6), 673–682.
Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95–S120.
Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., et al. (1966). *Equality of educational opportunity*. Washington, DC: Office of Education, U.S. Department of Health, Education, and Welfare.
Crozier, G., & Davies, J. (2007). Hard to reach parents or hard to reach schools? A discussion of home–school relations, with particular reference to Bangladeshi and Pakistani parents. *British Educational Research Journal, 33*(3), 295–313. https://doi.org/10.1080/01411920701243578.
Cunha, F., & Heckman, J. (2007). The technology of skill formation. *The American Economic Review, 97*(2), 31–47. https://doi.org/10.1257/aer.97.2.31.
De Fraja, G., Oliveira, T., & Zanchi, L. (2010). Must try harder: Evaluating the role of effort in educational attainment. *The Review of Economics and Statistics, 92*(3), 577–597. https://doi.org/10.1162/REST_a_00013.
Dufur, M. J., Parcel, T. L., & Troutman, K. P. (2013). Does capital at home matter more than capital at school? Social capital effects on academic achievement. *Research in Social Stratification and Mobility, 31*, 1–21. https://doi.org/10.1016/j.rssm.2012.08.002.
Epstein, J. L. (1987). Toward a theory of family-school connections: Teacher practices and parent involvement. In K. Hurrelmann, F.-X. Kaufmann, & F. Lösel (Eds.), *Prevention and intervention in childhood and adolescence, 1. Social intervention: Potential and constraints* (pp. 121–136). Oxford, England: Walter De Gruyter.
Epstein, J. L. (1995). School/family/community partnerships: Caring for the children we share. *Phi Delta Kappan*, 701–712. https://doi.org/10.1177/003172171009200326.
Epstein, J. L. (2011). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Philadelphia, PA: Westview Press. https://doi.org/10.1177/019263650108562710.
Goux, D., Gurgand, M., & Maurin, E. (2017). Adjusting your dreams? High school plans and dropout behaviour. *The Economic Journal, 127*(602), 1025–1046. https://doi.org/10.1111/ecoj.12317.
Gowda, K., Kochar, A., Nagabhushana, C. S., & Raghunathan, N. (2014). Evaluating institutional change through randomized controlled trials: Evidence from school decentralization in India. Retrieved from https://www.educationinnovations.org/sites/default/files/Evaluating%20Institutional%20Change%20through%20Randomized%20Controlled%20Trials_Evidence%20from%20School%20Decentralization%20in%20India.pdf.
Guo, K., & Kilderry, A. (2018). Teacher accounts of parent involvement in children's education in China. *Teaching and Teacher Education, 69*, 95–103.
Gu, W., & Yawkey, T. D. (2010). Working with parents and family: Factors that influence Chinese teachers' attitudes toward parent involvement. *Journal of Instructional Psychology, 37*(2), 146–152.
Heckman, J. J. (2008). Schools, skills, and synapses. *Economic Inquiry, 46*(3), 289–324.
Hill, N., & Torres, K. (2010). Negotiating the American dream: The paradox of aspirations and achievement among latino students and engagement between their families and schools. *Journal of Social Issues, 66*(1), 95–112. https://doi.org/10.1111/j.1540-4560.2009.01635.x.
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*(3), 740.
Hoover-Dempsey, K. V., Walker, J. M., 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*(7), 843–867. https://doi.org/10.1016/S0742-051X(02)00047-1.
Hornby, G., & Lafaele, R. (2011). Barriers to parental involvement in education: An explanatory model. *Educational Review, 63*(1), 37–52. https://doi.org/10.1080/00131911.2010.488049.
Houtenville, A. J., & Conway, K. S. (2008). Parental effort, school resources, and student achievement. *Journal of Human Resources, 3*(2), 437–453. https://doi.org/10.3368/jhr.43.2.437.
Islam, A. (2019). Parent-teacher meetings and student outcomes: Evidence from a developing country. *European Economic Review, 111*(2019), 273–304. https://doi.org/10.1016/j.euroecorev.2018.09.008.
Jeynes, W. (2012). A meta-analysis of the efficacy of different types of parental involvement programs for urban students. *Urban Education, 47*(4), 706–742. https://doi.org/10.1177/0042085912445643.
Ji, C., & Koblinsky, S. (2009). Parent involvement in children's education: An exploratory study of urban, Chinese immigrant families. *Urban Education, 44*(6), 687–709. https://doi.org/10.1177/0042085908322706.
Kinkead-Clark, Z. (2017). Bridging the gap between home and school—perceptions of classroom teachers and principals: Case studies of two Jamaican inner-city schools. *Education and Urban Society, 49*(8), 762–777. https://doi.org/10.1177/0013124516658951.
Kolenikov, S., & Angeles, G. (2009). Socioeconomic status measurement with discrete proxy variables: Is principal component analysis a reliable answer? *Review of Income and Wealth, 55*(1), 128–165. https://doi.org/10.1111/j.1475-4991.2008.00309.x.
Kraft, M. A., & Dougherty, S. M. (2013). The effect of teacher-family communication on student engagement: Evidence from a randomized field experiment. *Journal of Research on Educational Effectiveness, 6*(3), 199–222. https://doi.org/10.1080/19345747.2012.743636.
Kraft, M. A., & Rogers, T. (2015). The underutilized potential of teacher-to-parent communication: Evidence from a field experiment. *Economics of Education Review, 47*, 49–63. https://doi.org/10.1016/j.econedurev.2015.04.001 [Internet].
Lasky, S. (2000). The cultural and emotional politics of teacher-parent interactions. *Teaching and Teacher Education, 16*(8), 843–860. https://doi.org/10.1016/S0742-051X(00)00030-5.
Lau, E., Li, H., & Rao, N. (2012). Exploring parental involvement in early years education in China: Development and validation of the Chinese early parental involvement scale (CEPIS). *International Journal of Early Years Education, 20*(4), 405–421. https://doi.org/10.1080/09669760.2012.743099.
Lemmer, E. (2012). Who's doing the talking? Teacher and parent experiences of parent-teacher conferences. *South African Journal of Education, 32*(1), 83–96. https://doi.org/10.15700/saje.v32n1a460.
Li, J. (2002). A cultural model of learning: Chinese "heart and mind for wanting to learn". *Journal of Cross-Cultural Psychology, 33*(3), 248–269. https://doi.org/10.1177/0022022102033003003.
Li, J. (2005). Mind or virtue: Western and Chinese beliefs about learning. *Current Directions in Psychological Science, 14*(4), 190–194. https://doi.org/10.1111/j.0963-7214.2005.00362.x.
Lieberman, E., Posner, D., & Tsai, L. (2014). Does information lead to more active citizenship? Evidence from an education intervention in rural Kenya. *World Development, 60*, 69–83. https://doi.org/10.1016/j.worlddev.2014.03.014.
Li, J., & Harris, K. (2003). U.S. and Chinese cultural beliefs about learning. *Journal of Educational Psychology, 95*(2), 258–267. https://doi.org/10.1037/0022-0663.95.2.258.
Mbiti, I. (2016). The need for accountability in education in developing countries. *The Journal of Economic Perspectives, 30*(3), 109–132. https://doi.org/10.1257/jep.30.3.109.
McEwan, E. K. (2005). *How to deal with parents who are angry, troubled, afraid or just plain crazy*. Thousand Oaks: Corwin Press.
Ng, S. (1999). Home-school relations in Hong Kong: Separation or partnership. *School Effectiveness and School Improvement, 10*(4), 551–560. https://doi.org/10.1076/sesi.10.4.551.3488.
Noel, A., Stark, P., & Redford, J. (2013). *Parent and family involvement in education, from the national household education surveys program of 2012 (first look)*. Washington, DC: U.S. Department of Education. Retrieved from https://files.eric.ed.gov/fulltext/ED544174.pdf.
Organisation for Economic Co-operation and Development. (2006). Parent and community voice in schools. Chapter 4 of OECD. In *Demand-sensitive schooling? Evidence and issues* (pp. 83–102). Paris: OECD. Retrieved from https://www.oecd.org/site/schoolingfortomorrowknowledgebase/themes/demand/41173457.pdf.
Organisation for Economic Co-operation and Development. (2013). *PISA 2012 assessment and analytical framework: Mathematics, reading, science, problem solving and financial literacy* (pp. 42–43). Paris: OECD publishing. https://doi.org/10.1787/9789264190511-en.
Thijs, J., & Eilbracht, L. (2012). Teachers' perceptions of parent-teacher alliance and student-teacher relational conflict: Examining the role of ethnic differences and "disruptive" behavior. *Psychology in the Schools, 49*(8), 794–808. https://doi.org/10.1002/pits.21635.
Wang, H., Yang, C., He, F., Shi, Y., Qu, Q., Rozelle, S., et al. (2015). Mental health and dropout behavior: A cross-sectional study of junior high students in northwest rural China. *International Journal of Educational Development, 41*, 1–12. https://doi.org/10.1016/j.ijedudev.2014.12.005.
Yang, Y., Hu, X., Qu, Q., Lai, F., Shi, Y., Boswell, M., et al. (2013). Roots of tomorrow's digital divide: Documenting computer use and internet access in China's elementary schools today. *China and World Economy, 21*(3), 61–79. https://doi.org/10.1111/j.1749-124X.2013.12022.x.
Zhang, H., Behrman, J. R., Fan, C. S., Wei, X., & Zhang, J. (2014). Does parental absence reduce cognitive achievements? Evidence from rural China. *Journal of Development Economics, 111*, 181–195. https://doi.org/10.1016/j.jdeveco.2014.09.004.