



Family Language Transmission Under Institutional Language Regimes Shapes Adolescent Mental Health Through Peers

Renyu Jiang

Teachers College, Columbia University

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Abstract

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Keywords: Intergenerational Transmission, Home Language, Adolescent Mental Health, Language of Instruction, Social Interactions.

JEL Codes: I21, I24, J24, Z13

1 Introduction

Some important social boundaries persist across generations even when formal institutions bring people into common spaces. Language illustrates this tension clearly. Schools, labor markets, and public institutions often operate through a common or official language, shaping access to education, economic exchange, and institutional participation (Angrist & Lavy, 1997; DeGraff, 2018; Laitin & Ramachandran, 2016; Lazear, 1999). Yet children first acquire language within their families, where everyday practices may differ from those used in public institutions (Casey & Dustmann, 2008; De Houwer, 2007; Hoff et al., 2012; King, Fogle, & Logan-Terry, 2008; Unsworth, 2016). Bringing children into the same classroom does not erase these inherited differences. Language is therefore not only a means of communication but also a form of family-transmitted capital tied to identity, participation, and institutional access (Casey & Dustmann, 2008; Norton, 1997; Valdés, 2005).

The consequences of these family language environments may extend beyond the children who inherit them. Joining a conversation, participating in an activity, and building a friendship require children to understand others and make themselves understood. A shared language can facilitate these interactions, while language barriers can hinder classroom social integration (Ahn & Jepsen, 2015; Bredtmann, Otten, & Vonnahme, 2021; Lazear, 1999). These interactions are especially consequential during adolescence, when social connection and peer belonging are closely linked to psychological well-being (Loades et al., 2020; Orben, Tomova, & Blakemore, 2020). This raises a broader question: when language environments are transmitted from parents to children and carried into shared institutions, do their consequences remain within the family, or spill over to other children through peers? Existing research links language proficiency, immigrant background, and classroom linguistic diversity to educational outcomes and social integration (Ahn & Jepsen, 2015; Bleakley & Chin, 2008; Bredtmann et al., 2021; Cho, 2012; Diette & Oyeler, 2017), but we know much less about whether family-transmitted language environments shape the social experiences and mental health of children from other families.

In this paper, I examine whether intergenerationally transmitted family language environments shape adolescents’ mental health and school experiences through peers, providing the first causal evidence of such spillovers. I study students’ exposure to classmates whose parents use the school’s language of instruction at home. Students assigned to classrooms with a larger share of these peers experience fewer mental-health difficulties, better peer relations, and more supportive teacher interactions. The mental-health benefits are smaller for students whose own parents speak only a local dialect at home.

My research design exploits the random assignment of students to classrooms in Chinese middle schools. I use the China Education Panel Survey, a nationally representative survey that records family language use, mental health, and school experiences. This setting combines a common language of instruction, Mandarin, with substantial variation in families’ use of Mandarin and local dialects. I restrict the sample to schools that randomly assign students to classrooms and compare students within the same school and grade. The main exposure is the leave-one-out share of classmates whose parents report using Mandarin at home, which I refer to as peer parent language-of-instruction (LOI) exposure.

This paper makes three main findings. First, exposure to peers from LOI-aligned families improves adolescent mental health. Parents’ language use strongly predicts their children’s Mandarin use, consistent with intergenerational language transmission (Bergelson et al., 2023; Casey & Dustmann, 2008; De Houwer, 2007; Hoff et al., 2012; Unsworth, 2016), whereas students’ own family language background is not significantly associated with their mental health. A one-standard-deviation increase in peer parent LOI exposure is associated with a 0.465-standard-deviation increase in classmates’ own LOI use and reduces poor mental health by approximately 0.18 standard deviations. For students whose parents speak only a local dialect at home, the estimated mental-health improvement is about 0.09 standard deviations smaller than for other students across both mental-health indices. Both differences are statistically significant.

Second, the same exposure improves students’ social experiences at school. Students

report better peer relations, a more positive classroom atmosphere, greater participation in school or class activities, and greater closeness to people at school. Estimates are positive across all five peer-environment outcomes. A one-standard-deviation increase in peer parent LOI exposure improves classroom atmosphere by approximately 0.36 standard deviations.

Third, exposure to these peers improves teacher interactions and academic engagement. Students report more teacher praise, including an increase of approximately 0.25 standard deviations in praise from the homeroom teacher. Teacher reports also indicate more time spent communicating with students after class. Students experience fewer difficulties in mathematics and Chinese, attach greater future value to these subjects, and report less class skipping and a lower desire to transfer schools.

These findings are consistent with a communication-friction interpretation. Peers from LOI-aligned families may reduce the social and cognitive costs of conversation, classroom participation, and interaction with teachers. Better peer integration and stronger school attachment provide a plausible link between these interactions and mental health (Loades et al., 2020; Orben et al., 2020). The smaller benefits among students from dialect-only homes suggest that a more LOI-aligned peer environment may not facilitate participation equally for all students. The estimates capture the overall effect of exposure to classmates from LOI-aligned families; they do not separately identify the contribution of any single mechanism.

This paper makes three contributions. First, it shows that peer effects depend not only on the characteristics students bring from home, but also on how those characteristics align with the institutional environment. Existing research studies peer effects generated by classmates' achievement, ability, family background, networks, personality, and mental health (Ammermueller & Pischke, 2009; Black, Devereux, & Salvanes, 2013; Chen, Lin, & Wang, 2026; Feng, Kim, & Yang, 2026; Giuliatti, Vlassopoulos, & Zenou, 2022; Golsteyn, Non, & Zölitz, 2021; Gong, Lu, & Song, 2021; Kiessling & Norris, 2023; Lavy & Sand, 2019), while related work examines immigrant peers, shared language, and classroom linguistic di-

versity (Ahn & Jepsen, 2015; Bredtmann et al., 2021; Cho, 2012; Diette & Oyelere, 2017). I study the alignment between peers’ family language environments and a common institutional language. Exposure to more peers from language-of-instruction-aligned families improves students’ mental health and school experiences, with smaller benefits for students from dialect-only homes. These results show that peer effects can depend on the relationship between family backgrounds and the institutional setting, rather than on peer characteristics in isolation.

Second, the paper extends research on intergenerational language transmission by showing that family language environments can generate consequences beyond the children who directly inherit them. Existing studies examine how parental language skills and family language practices shape children’s language acquisition, education, and economic outcomes (Bleakley & Chin, 2008; Casey & Dustmann, 2008; De Houwer, 2007; Hoff et al., 2012; King et al., 2008; Unsworth, 2016). I show that language provides a distinct case in which a family-transmitted characteristic becomes consequential for other students because children enter an institution organized around a common language. The findings therefore connect intergenerational transmission to cross-family externalities within shared institutional environments.

Third, the paper adds causal evidence on the social determinants of adolescent mental health. Prior work studies neighborhoods, family shocks, poverty, and school environments (Fruehwirth, Iyer, & Zhang, 2019; Kling, Liebman, & Katz, 2007; Persson & Rossin-Slater, 2018; Ridley, Rao, Schilbach, & Patel, 2020). I show that exposure to classmates from language-of-instruction-aligned families improves adolescent mental health alongside peer relations, teacher interactions, and school attachment. These findings identify peer family-language composition as a consequential dimension of the school environment. More broadly, they show that a common institutional language does not eliminate the consequences of family language differences: who students interact with, and how their own backgrounds relate to those of their peers and to the institutional language, can continue to shape social

integration and mental health.

2 Setting, Data, and Conceptual Framework

This section describes the institutional setting and data, defines the key variables, and lays out the conceptual framework guiding the empirical analysis.

2.1 Setting

My analysis takes place in Chinese middle schools. This setting has three features that facilitate causal inference and the study of classroom externalities generated by students whose home language is aligned with the language of instruction.

First, the language of instruction is institutionally clear, while students' home-language backgrounds are heterogeneous. Mandarin is the dominant language of instruction and teacher-student communication in Chinese schools. Although students come from diverse home-language environments, national language policy defines Putonghua, or standard Mandarin Chinese, as the standard spoken language and requires schools to use it as the basic language of education and teaching (Standing Committee of the National People's Congress, 2000). Teacher proficiency requirements and national Putonghua testing regulations further institutionalize Mandarin use in classrooms (Ministry of Education of the People's Republic of China, 2021; Standing Committee of the National People's Congress, 2000). In this context, students from Mandarin-speaking homes have a family language environment that is aligned with the language of instruction. Home Mandarin use is therefore a meaningful language endowment that students bring from their families into school (De Houwer, 2007; King & Fogle, 2006; King et al., 2008).

Second, middle school is a formative period for mental health, noncognitive skills, and social relationships. Many mental health problems first emerge during adolescence, and psychological distress may affect learning effort, educational accumulation, and later outcomes

(Fruehwirth et al., 2019; Kessler et al., 2007; Persson & Rossin-Slater, 2018). Noncognitive and social skills are also important inputs into educational attainment, labor-market performance, and long-run welfare (Cunha & Heckman, 2007; Deming, 2017; Heckman, Pinto, & Savelyev, 2013; Heckman & Rubinstein, 2001). Because classroom participation, peer interaction, and teacher feedback are mediated by communication, exposure to classmates whose home language is aligned with the language of instruction may shape not only academic learning but also the social and psychological environment students experience at school (Loades et al., 2020; Orben et al., 2020).

Third, the institutional organization of Chinese middle schools provides useful variation for causal inference. Students are typically assigned to middle schools by local education authorities based on residential proximity. China’s 2006 Compulsory Education Law requires schools to organize classes in ways that avoid academic tracking, and many middle schools assign incoming students to classrooms randomly. Prior studies have exploited this institutional feature to estimate classroom peer effects on academic achievement, beliefs, noncognitive skills, and mental health (Chen et al., 2026; Eble & Hu, 2022; Gong et al., 2021; Huang, Luo, Song, Wang, & Wu, 2025). Following this literature, I focus on schools with random classroom assignment and construct leave-one-out measures of classmates’ parental Mandarin use within school-by-grade cohorts. This within-school assignment limits sorting across classrooms by student ability, family background, or parental preferences, allowing differences in peer language composition to be interpreted as plausibly exogenous.

2.2 Data and Variables

This paper uses the first wave of the China Education Panel Survey (CEPS), collected during the 2013–2014 academic year. The CEPS is a nationally representative survey of Chinese middle school students. The baseline survey sampled seventh- and ninth-grade students and collected linked information from students, parents, teachers, and school principals. These data include student mental health, peer relationships, school attachment, academic

attitudes, family background, parent-reported home language use, teacher characteristics, and classroom assignment rules.

The analysis focuses on schools in which students were randomly assigned to classrooms. Following prior work using CEPS to study classroom peer effects (Chen et al., 2026; Eble & Hu, 2022; Gong et al., 2021; Huang et al., 2025), the sample is restricted to school-by-grade cohorts in which principals and homeroom teachers report random classroom assignment. Ninth-grade cohorts are excluded if students were re-sorted after initial assignment. This restriction limits the possibility that classroom composition reflects prior achievement, family background, or parental preferences. The resulting estimation sample contains 9,361 students in 215 classrooms across 86 schools. Table 1 reports summary statistics for the analysis sample.

The main peer exposure captures classmates’ home-language alignment with the language of instruction. In China, Mandarin is the language of instruction. The parent questionnaire asks what language parents usually speak with the child at home. I define an indicator equal to one if the parent reports speaking Mandarin Chinese, and zero if the parent reports mixed Mandarin and dialect, dialect, or another language. The measure is restricted to biological parents and stepparents. For each student, I construct a leave-one-out classroom measure: the share of classmates whose parents report speaking Mandarin at home, excluding the student’s own parent report when available. If the student’s own parent report is missing, the exposure is defined as the classroom mean among classmates with nonmissing parent reports. This exposure is standardized over the analysis sample. I interpret it as a proxy for exposure to classmates from language environments aligned with the language of instruction, while recognizing that the survey measures parent-reported home language use rather than mother tongue directly.

The main outcome is student mental health. The CEPS asks students how often, during the past seven days, they felt blue, depressed, unhappy, unable to enjoy life, and sad. Responses are coded on a five-point scale from never to always, with higher values indicat-

Table 1: Summary statistics

	Mean	SD
<i>Panel A. Student characteristics</i>		
Age	13.927	(1.167)
Female (1=YES)	0.480	(0.500)
Ethnic minority (1=YES)	0.117	(0.322)
Only child (1=YES)	0.468	(0.499)
Agricultural hukou (1=YES)	0.481	(0.500)
Attended preschool (1=YES)	0.809	(0.393)
Ever repeated a grade (1=YES)	0.144	(0.351)
<i>Panel B. Mental health</i>		
Poor mental health, PCA index	0.000	(0.993)
Poor mental health, mean index	0.000	(0.993)
Sad	2.024	(1.024)
Not enjoying life	1.736	(1.067)
Unhappy	2.268	(1.039)
Depressed	1.956	(1.045)
Feeling blue	2.219	(0.983)
<i>Panel C. Family background and home language</i>		
Mother's years of schooling	9.875	(3.709)
Father's years of schooling	10.614	(3.278)
Household economic status	2.850	(0.586)
Parent has agricultural hukou (1=YES)	0.513	(0.500)
Parent uses LOI at home (1=YES)	0.378	(0.485)
Student uses LOI at home (1=YES)	0.439	(0.496)
Number of observations	9,361	

Notes: This table reports summary statistics for the analysis sample. Standard deviations are reported in parentheses. The number of observations varies across variables because of missing values; the full student sample contains 9,361 observations. The sample includes students in school-by-grade cohorts where classroom assignment was reported to be random. Mental-health indices are standardized within school-by-grade cells, with higher values indicating worse mental health. Household economic status ranges from 1 (very poor) to 5 (very rich). Mandarin is the language of instruction in this setting. LOI variables indicate parent- or student-reported use of the language of instruction at home.

ing worse mental health. I construct two indices: the row mean of the five items and the first principal component, oriented so that higher values indicate worse mental health. Both indices are standardized within school-by-grade cells (Chen et al., 2026; Gong et al., 2021).

Additional outcomes characterize the margins through which the peer language environment may matter. These include peer relations, classroom atmosphere, participation in school or class activities, closeness to people in school, teacher praise, homeroom teacher communication time, parent reports of whether the child likes the homeroom teacher, academic difficulty, perceived future value of subjects, skipping classes, and desire to transfer schools. These outcomes are standardized over the analysis sample.

Control variables include student age, gender, minority status, agricultural hukou status, only-child status, preschool attendance, whether the student has ever repeated a grade, household economic status, mother’s and father’s years of schooling. Hukou refers to China’s household registration system; agricultural hukou indicates that the student is registered under the agricultural (rural) category. Robustness specifications also control for leave-one-out classroom characteristics, including classmates’ parental education, parental agricultural hukou, openness, cognitive ability, and the share of female classmates.

2.3 Intergenerational Language Transmission and Classroom Communication Environments

Figure 1 presents the conceptual framework motivating the peer analysis. The natural starting point is an intergenerational transmission process: parents who use the language of instruction (LOI) at home are more likely to have children who also use the LOI. Through children’s own language use, family-originated language environments may then enter the classroom and become part of the communication environment in which peers interact, form relationships, and develop a sense of belonging. In turn, these classroom communication conditions may shape adolescent mental health.

The empirical analysis provides evidence that is consistent with different parts of this

framework, rather than identifying the entire pathway. Parental LOI is strongly associated with children’s LOI use, while peer parental LOI predicts classroom communication conditions and adolescent mental-health outcomes. These patterns are consistent with the idea that family language environments are carried into peer settings and matter for students’ classroom experiences. At the same time, children’s language use, peer interaction, classroom communication, and mental health are jointly determined within the classroom and may affect one another.

Accordingly, the framework should not be read as a fully identified mediation chain from parental LOI to mental health. The data support several links that are consistent with this interpretation, but the intermediate process remains partly unobserved and therefore retains a substantial black-box component. I therefore interpret the main estimates as reduced-form effects of exposure to peers from different family language environments, rather than as evidence that any single pathway constitutes the causal mechanism.

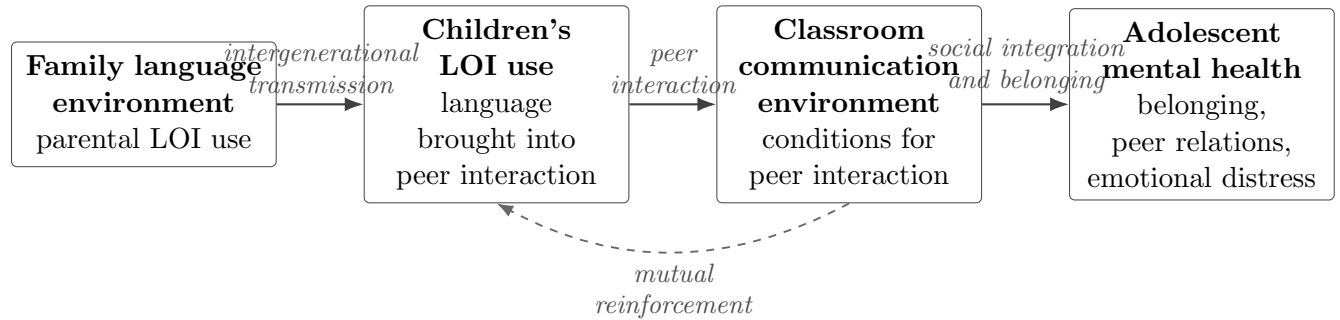


Figure 1: Conceptual framework: from family language transmission to classroom communication and mental health. Family language environments may be transmitted to children and carried into peer settings through children’s LOI use. Children’s language use and classroom communication conditions may reinforce one another through peer interaction, potentially shaping social relationships, belonging, and mental health. The figure is conceptual and does not identify a unique mediation pathway.

3 Empirical Strategy

This section describes my empirical approach, evaluates the identifying assumption that students are randomly assigned to classrooms within schools and grades, and discusses how I interpret the main coefficient estimates.

3.1 Estimation

My identification strategy exploits random variation across classrooms, within the same school and grade, in the share of classmates whose parents report using the language of instruction at home. The main estimating equation is

$$Y_{icgs} = \beta_0 + \beta_1 \text{PeerParentLOI}_{icgs} + X'_{icgs} \beta_2 + Z'_{icgs} \beta_3 + O'_{icgs} \beta_4 + \eta_{gs} + \varepsilon_{icgs}.$$

In this equation, Y_{icgs} denotes an outcome for student i in classroom c , grade g , and school s . The outcomes include mental health, peer relations, classroom climate, teacher interactions, academic difficulty, and school attachment. $\text{PeerParentLOI}_{icgs}$ is the standardized leave-one-out share of classmates whose parents report using Mandarin at home.

X_{icgs} is a vector of baseline student and family characteristics, including control variables. The term η_{gs} denotes school-by-grade fixed effects. Standard errors are clustered at the classroom level.

In robustness specifications, I additionally include Z_{icgs} , a vector of leave-one-out peer characteristics, including classmates' parental SES, parental agricultural hukou, openness, cognitive ability, and the share of female classmates. I also include O_{icgs} , which captures the student's own family language environment, including whether the student's parent reports using Mandarin at home and whether the student reports using Mandarin with parents.

The coefficient of interest is β_1 . It captures the effect of a one-standard-deviation increase in peer parent LOI exposure, comparing students assigned to different classrooms within

the same school and grade. I interpret β_1 as the reduced-form effect of being assigned to a classroom with a larger share of peers from language-of-instruction-aligned families. It captures the overall effect of this peer language environment rather than the causal effect of any single mediation channel.

3.2 Assessing Random Assignment

A key concern for identification is that students may not be randomly assigned to classrooms. If students are sorted across classes by academic ability, family background, or parental preferences, then differences in peer parent LOI may be correlated with other classroom characteristics that also affect student outcomes. In that case, estimates of β_1 would capture not only differences in peer language composition, but also the effects of this sorting.

I first address this concern by following the sample restriction used in prior CEPS studies exploiting classroom assignment. I retain only school-by-grade cohorts in which principals and homeroom teachers report that students were randomly assigned to classrooms (Chen et al., 2026; Eble & Hu, 2020, 2022; Gong et al., 2021; Huang et al., 2025). Prior studies using this restriction show that observable student characteristics are balanced across classrooms, consistent with random assignment.

I further probe the random assignment assumption by testing whether predetermined student characteristics predict peer parent LOI. Specifically, I regress the leave-one-out share of classmates whose parents report using Mandarin at home on mother’s and father’s years of schooling, age, minority status, only-child status, agricultural hukou, preschool attendance, household economic status, gender, and whether the student has repeated a grade. Column 1 of Table 2 reports estimates without fixed effects, while Column 2 adds the school-by-grade fixed effects used in the main estimating equation.

The results support the random assignment assumption. Without school-by-grade fixed effects, the predetermined characteristics strongly predict peer parent LOI, reflecting differences across schools and grades. Once school-by-grade fixed effects are included, these

Table 2: Test for randomization

	(1)	(2)
Mother's years of schooling	0.044*** (0.006)	0.000 (0.001)
Father's years of schooling	-0.002 (0.008)	0.001 (0.001)
Age	-0.007 (0.048)	0.001 (0.002)
Ethnic minority	-0.176 (0.111)	0.004 (0.004)
Only child	0.394*** (0.056)	-0.001 (0.003)
Holds agricultural hukou	-0.183*** (0.060)	-0.010** (0.004)
Attended preschool	0.110*** (0.035)	-0.001 (0.004)
Household economic status	0.095*** (0.030)	0.001 (0.002)
Female	0.053** (0.023)	-0.002 (0.002)
Ever repeated a grade	-0.291*** (0.059)	-0.002 (0.005)
Number of observations	8,508	8,508
School-by-grade fixed effects		X
Joint test p -value	< 0.001	0.144

Notes: This table presents a balance test of whether predetermined student and family characteristics jointly predict peer parent LOI. The dependent variable is the standardized leave-one-out share of classmates whose parents use the language of instruction at home. Column 2 includes school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses. The joint p -value tests whether the listed characteristics jointly predict peer parent LOI. Throughout all tables, *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

characteristics fail to jointly predict variation in peer parent LOI across classrooms within the same school and grade. Although agricultural hukou remains individually significant, the joint test fails to reject the null that the predetermined characteristics do not predict the variation used for identification.

Random assignment limits several potential sources of confounding. It reduces the possibility that students are sorted into classrooms according to ability or family background, that parents select their children into classrooms with similar families, or that schools systematically allocate teachers or classroom resources according to classroom composition. Without random assignment, each of these factors could generate a correlation between peer parent LOI and student outcomes independent of any peer language effect.

I provide two additional checks in the Appendix. First, I repeat the balance test using peer parental dialect-only exposure as the dependent variable. The predetermined characteristics again fail to jointly predict within-school-grade variation in this measure (joint $p = 0.437$; Table A2). Second, Figure A6 reports a randomization-inference exercise based on 1,000 simulated classroom assignments within school-grade groups, preserving the observed classroom size distribution. The observed joint balance statistic lies well within the permutation distribution, with a permutation p-value of 0.82. This provides a complementary check that the observed classroom assignment is consistent with random assignment.

A separate issue is that parent-reported home language is measured after classroom assignment. I discuss this timing issue and related robustness checks in the robustness section.

4 Main Results

This section presents the main effects of peer parent LOI on adolescent mental health. I first document the relationship between family language background and children’s outcomes, then estimate the effects of peer exposure generated by random classroom assignment and

examine heterogeneity by students’ own family language background.

4.1 Family Language Alignment and Mental Health

Parents’ and children’s language use are strongly related. Table 3 shows that students whose parents report using the language of instruction at home are 64.9 percentage points more likely to report using it themselves, conditional on baseline controls. Adding school-by-grade fixed effects reduces this difference to 48.7 percentage points. These descriptive estimates are consistent with intergenerational language transmission and show that parent-reported LOI captures substantial differences in the language backgrounds children bring to school.

Table 3: Intergenerational Alignment in Language Use

	Student LOI	
	(1)	(2)
Parent LOI	0.649*** (0.016)	0.487*** (0.016)
Observations	7,233	7,233
R-squared	0.489	0.553
Baseline controls	X	X
School-by-grade fixed effects		X

Notes: Student LOI equals one if the student reports using the language of instruction at home; Parent LOI equals one if the parent reports doing so. Column 2 adds school-by-grade fixed effects. The estimates are descriptive and show a strong alignment between parent- and student-reported language use, consistent with intergenerational transmission of family language environments. Standard errors, clustered by classroom, are reported in parentheses.

I find no statistically detectable association between students’ own family language background and their mental health. Table 4 reports coefficients of -0.022 standard deviations for parent LOI and 0.013 standard deviations for parent dialect-only use; neither is statistically distinguishable from zero. This null relationship provides a useful contrast with the peer-exposure results below. While family language background strongly predicts children’s own language use, it does not itself predict mental health. This pattern is consistent with the mental-health effects operating through the peer social environment rather than simply

reflecting an individual-level relationship between family language background and mental health. These estimates are descriptive, however, and do not identify the causal effect of students’ own family language background.

Table 4: Own Family Language Background and Adolescent Mental Health

	Poor mental health, PCA index	
	(1)	(2)
Parent LOI	−0.022 (0.029)	
Parent dialect-only		0.013 (0.031)
Observations	7,402	7,402
R-squared	0.013	0.013

Notes: This table reports the association between students’ own family language background and adolescent mental health. The outcome is the standardized PCA index of poor mental health; higher values indicate worse mental health. Parent LOI equals one if the parent reports using the language of instruction at home. Parent dialect-only equals one if the parent reports speaking only a local dialect at home. The estimates are descriptive. Standard errors, clustered by classroom, are reported in parentheses. All specifications include baseline controls and school-by-grade fixed effects.

4.2 Mental Health

I next estimate the effects of peer exposure on mental health. Peer parent LOI is the standardized leave-one-out share of classmates whose parents report using the language of instruction at home. Random classroom assignment within school-grade cells provides the identifying variation.

Columns 2 and 4 of Table 5 present the main results. A one-standard-deviation increase in peer parent LOI reduces the PCA index of poor mental health by 0.181 standard deviations and the mean index by 0.169 standard deviations. Students assigned to classrooms with more peers whose parents use the language of instruction therefore report fewer mental-health difficulties. The similarity of the estimates indicates that the finding is not sensitive to these two ways of constructing the mental-health index.

Peer parent LOI also strongly predicts classmates' own reported language use. Column 1 shows that a one-standard-deviation increase in peer parent LOI is associated with a 0.465-standard-deviation increase in peer student LOI. Together with the parent-child relationship in Table 3, this estimate shows that the parent-based exposure measure captures differences in classmates' language backgrounds. It does not directly measure the language classmates use when interacting at school.

Exploiting random classroom assignment within school-grade cells, I interpret the mental-health estimates as reduced-form effects of exposure to classmates whose parents use the language of instruction at home. They do not separately identify the role of classmates' own language use or particular forms of classroom interaction.

Table 5: Effects of Peer Parent LOI on Peer Language Use and Mental Health

	(1) Peer student LOI	(2) Poor mental health, PCA index	(3) Poor mental health, PCA index	(4) Poor mental health, mean index	(5) Poor mental health, mean index
Peer parent LOI	0.465*** (0.088)	-0.181*** (0.069)	-0.188*** (0.072)	-0.169** (0.068)	-0.175** (0.070)
Peer parent LOI $\times$ Parent dialect-only			0.086** (0.041)		0.088** (0.041)
Observations	8,508	8,236	7,402	8,357	7,511
R-squared	0.981	0.012	0.014	0.012	0.015

Notes: This table reports estimates from the main specification, with dependent variables indicated in the column headings. Peer parent LOI is the standardized leave-one-out share of classmates whose parents report using the language of instruction at home. Peer student LOI is the standardized leave-one-out share of classmates who report using the language of instruction at home. Higher values of the mental-health indices indicate worse mental health. Columns 3 and 5 include an interaction between peer parent LOI and an indicator for whether the student's parent reports speaking only a local dialect at home; the main effect of this indicator is included but not reported. All specifications include baseline controls and school-by-grade fixed effects. Standard errors clustered by classroom are reported in parentheses.

Figure 2 plots the residualized relationships for the two mental-health indices. Both panels show a negative fitted relationship between peer parent LOI and poor mental health, consistent with Table 5.

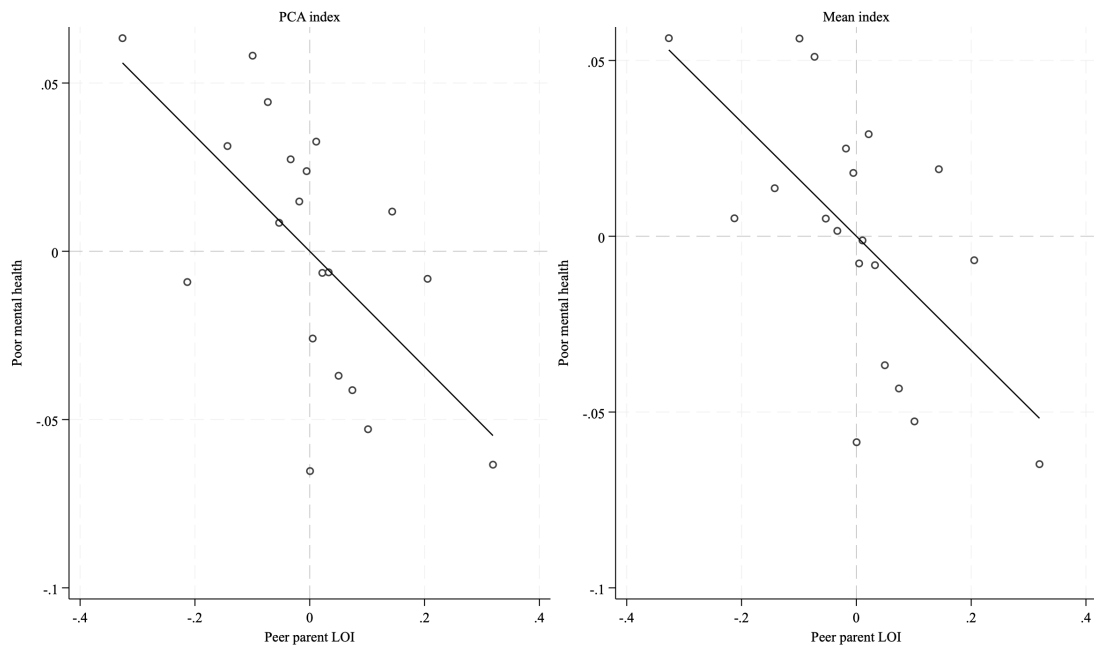


Figure 2: Peer Parent LOI and Adolescent Mental Health

Notes: This figure plots binned residualized mental-health outcomes against residualized peer parent LOI. The left panel uses the PCA index; the right panel uses the mean index. Both variables are residualized with respect to baseline controls and school-by-grade fixed effects. Higher outcome values indicate worse mental health.

4.3 Heterogeneity by Own Family Language Background

The estimated mental-health effects are smaller for students from dialect-only homes. In Columns 3 and 5 of Table 5, I interact peer parent LOI with an indicator for whether the student’s own parent reports speaking only a local dialect at home. The interaction is positive and statistically significant for both outcomes: 0.086 standard deviations for the PCA index and 0.088 standard deviations for the mean index.

For the PCA index, the implied point estimate for students from dialect-only homes is -0.102 standard deviations, roughly half the -0.188 estimate for other students, but it is not statistically distinguishable from zero. The mean index yields a similar pattern in magnitudes, with implied point estimates of -0.087 and -0.175 standard deviations, respectively. These comparisons use the interaction specifications, whose samples are smaller because they require nonmissing own-parent language reports.

Taken together, the results show that parent-reported language use captures meaningful differences in children’s language backgrounds, and that exposure to classmates whose parents use the language of instruction reduces mental-health difficulties on average. The effects are smaller for students from dialect-only homes. This pattern is consistent with students who are less linguistically aligned with the school environment facing greater barriers to communication and social integration, and therefore benefiting less from a more LOI-aligned peer environment. More broadly, the results suggest that family language environments can matter beyond the household through peer composition, although they do not identify the specific mechanisms linking peer exposure to mental health. I next examine peer relations, classroom climate, teacher interactions, academic engagement, and school attachment to assess which dimensions of students’ school experience change with this exposure.

5 Evidence on Mechanisms: Communication and Social Integration

The main results point to communication and social integration as a potential mechanism linking peer family language environments to adolescent mental health. The heterogeneity by students' own family language background provides a first piece of evidence consistent with this interpretation. The mental-health effects are substantially smaller for students from dialect-only homes, who are less linguistically aligned with the school's language environment. If greater linguistic distance makes communication and social integration more difficult, these students may be less able to benefit from a more LOI-aligned peer environment.

This interpretation yields three additional empirical predictions. First, greater peer parent LOI should improve students' interactions with classmates and the broader classroom social environment. Second, if improved communication facilitates classroom integration, students should also experience more positive interactions with teachers. Third, these changes should be reflected further downstream in lower academic strain and stronger attachment to school. These outcomes do not constitute a formal mediation test. Rather, they show whether the same peer exposure that improves mental health also shifts students' school experiences in the directions implied by the communication-and-integration interpretation.

Figure 3 presents evidence on these predictions. Panel A examines students' peer environment. A one-standard-deviation increase in peer parent LOI improves reported classroom atmosphere by 0.360 standard deviations. Students also report that classmates are nicer, that it is easier to get along with them, that they participate more in school activities, and that they feel closer to people at school. The estimates are positive across all of the peer-environment outcomes. Peer parent LOI also maps strongly onto classmates' own reported language use, reinforcing the interpretation that the exposure captures meaningful differences in the language backgrounds students encounter among their peers. Taken together, these

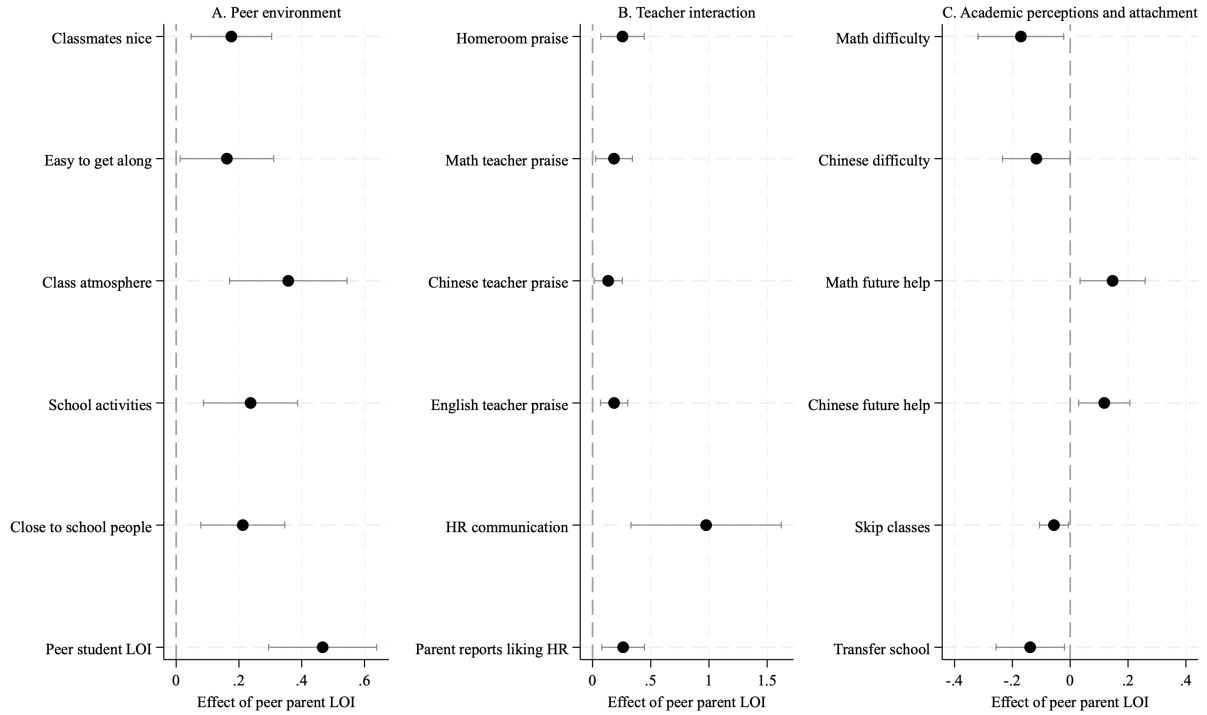


Figure 3: Effects of Peer Parent LOI on Classroom Experience

Note: This figure reports coefficients from separate regressions of the outcome listed on the vertical axis on peer parent LOI. Outcomes are grouped into peer environment, teacher interaction, and academic perceptions and school attachment. The math- and Chinese-difficulty specifications additionally control for the corresponding Grade 6 difficulty measure. Horizontal bars report 95% confidence intervals based on standard errors clustered by classroom. The peer student LOI estimate is also reported in Table 5; full regression results for the remaining outcomes are reported in Appendix Table A3.

results are consistent with greater language alignment reducing barriers to peer interaction and classroom integration.

Panel B examines interactions with teachers. Higher peer parent LOI increases praise from the homeroom, math, Chinese, and English teachers, with estimates ranging from 0.128 to 0.254 standard deviations. It also substantially increases communication with the homeroom teacher and the likelihood that parents report that their child likes the homeroom teacher. Because these outcomes draw on student, teacher, and parent reports, the pattern is not confined to a single reporter. The results are consistent with improved communication and social integration extending beyond peer relationships to students' interactions with teachers.

Panel C examines academic perceptions and school attachment, which are more downstream implications of the same mechanism. Students assigned to classrooms with higher peer parent LOI report lower difficulty in both mathematics and Chinese, greater perceived future usefulness of both subjects, less skipping of classes, and a lower desire to transfer schools. A one-standard-deviation increase in peer parent LOI reduces reported math difficulty by 0.176 standard deviations and Chinese difficulty by 0.119 standard deviations. These patterns are consistent with lower communication and integration frictions reducing academic strain and strengthening students' engagement with school.

Taken together, the heterogeneity and classroom-experience results provide a coherent set of evidence consistent with communication and social integration as mechanisms linking peer family language environments to adolescent mental health. Students from dialect-only homes, who are less linguistically aligned with the school environment, experience smaller mental-health effects, while greater peer parent LOI improves peer relationships, teacher interactions, academic perceptions, and school attachment. These patterns are difficult to reconcile with an interpretation in which peer parent LOI affects mental health without changing students' social experience at school. They do not, however, identify any of these outcomes as causal mediators of the mental-health effect. I therefore interpret them as mechanism-consistent evidence rather than a decomposition of the reduced-form effect.

6 Robustness and Interpretation of Results

This section addresses two concerns about the interpretation of peer parent LOI. First, because the parent survey was administered after students were assigned to classrooms, peer parent LOI could partly reflect post-assignment responses rather than pre-existing family-language environments, raising a potential reverse-causality concern. Students may bring classroom language practices back into the home, parents may respond to other parents in the classroom network, or classroom and teacher characteristics may affect parental language

practices or reporting.

Second, peer parent LOI may proxy for other sources of peer effects. Families that differ in home language use may also differ in socioeconomic background and other characteristics that shape student outcomes. I therefore examine both whether peer parent LOI is systematically generated by the assigned classroom and whether its association with student outcomes is accounted for by other observed dimensions of peer composition.

6.1 Post-Assignment Responses

I first exploit differences in the duration of classroom exposure across grades. Seventh-grade students have only recently entered their assigned classrooms, whereas ninth-grade students have been exposed to their classmates for substantially longer. If peer parent LOI were primarily generated by students bringing newly acquired classroom language practices back into the home, this process should have had less time to operate among seventh graders.

Appendix Table A4 reports estimates separately by grade. The full-sample estimate is -0.181 standard deviations. Among seventh graders, the estimate is already negative and similar in magnitude, at -0.164 standard deviations; the corresponding estimate for ninth graders is -0.244 standard deviations. The Grade 7 estimate is less precisely estimated, but its magnitude provides little support for an explanation in which the main relationship emerges only after prolonged exposure to the assigned classroom. These results do not rule out rapid post-assignment responses, but they make an explanation based primarily on accumulated child-to-parent language transmission less plausible.

I next test whether interactions among parents could generate the observed relationship. Parents may change their language practices or reports after becoming connected to the parents of their child's classmates. If this channel were important, the effect of peer parent LOI should vary with parents' knowledge of their child's peer network. Appendix Table A5 tests this possibility. Column 1 interacts peer parent LOI with an indicator for whether the parent knows the child's friends; Column 2 instead uses an indicator for whether the

parent knows those friends' parents. The interaction estimates are -0.049 and -0.025 , respectively, and both are small and statistically indistinguishable from zero. I therefore find little evidence that parent-to-parent social connections account for the estimated effect of peer parent LOI.

Finally, I test whether characteristics of the randomly assigned classroom predict peer parent LOI. If parental language reports respond systematically to the post-assignment classroom environment, peer composition or teacher characteristics should predict parents' reported language use. Appendix Table A6 reports this test. The listed classroom and teacher characteristics are not jointly significant predictors of parent LOI. Conditional on school-by-grade fixed effects, these characteristics explain very little of the remaining within-cell variation in parent LOI (within $R^2 = 0.0009$).

Overall, these three exercises provide little evidence that parent LOI is systematically generated by the classroom to which students are randomly assigned. The timing test shows that the mental-health relationship is already present among recently assigned seventh graders; the parental-network tests provide little evidence of transmission through parents' connections to the child's peer network; and observed classroom and teacher characteristics have little joint predictive power for peer parent LOI. These tests do not establish that parent-reported home language is predetermined, but they provide evidence against several concrete forms of post-assignment reverse causality.

This pattern is also consistent with the relative persistence of home language use. Adult language habits and family language practices are typically rooted in longer-run linguistic routines and identity-related practices (De Houwer, 2007; King & Fogle, 2006; King et al., 2008; Norton, 1997). Together with the robustness evidence above, this persistence supports treating parent LOI as a relatively stable characteristic of the family language environment rather than one that is likely to adjust quickly in response to classroom assignment. The post-assignment timing of the parent survey nevertheless remains a limitation of the design.

6.2 Alternative Sources of Peer Effects

I next ask whether peer parent LOI captures a dimension of peer exposure that is distinct from other standard sources of peer effects. Families that differ in home language use may also differ in parental education, residency status, personality, gender composition, or cognitive ability. Peer parent LOI could therefore proxy for these characteristics rather than capture an independently relevant dimension of the classroom environment.

I examine this possibility using a series of horse-race regressions. Starting from the baseline specification, I sequentially add controls for peer parental SES, peer hukou composition, peer openness, the female share of classmates, and peer cognitive ability. The final specification additionally controls for the student’s own language background and cognitive ability. If peer parent LOI primarily proxies for these other sources of peer effects, its coefficient should attenuate substantially as these controls are introduced.

Table 6 reports the results. Panel A shows that the mental-health estimate is remarkably stable across specifications. The baseline coefficient is -0.181 standard deviations and remains between -0.176 and -0.213 as the peer controls are added sequentially. In the most saturated specification, the estimate returns to -0.181 standard deviations.

Panel B shows a similar, though somewhat less stable, pattern for classroom atmosphere. The baseline estimate is 0.360 standard deviations and remains positive throughout the sequence of specifications. In the most saturated specification, the estimate is 0.281 standard deviations. Thus, although conditioning on other peer characteristics reduces the classroom-atmosphere estimate somewhat, a substantial relationship remains.

The stability of these estimates provides little evidence that peer parent LOI is simply a proxy for the observed peer characteristics considered here. Variation in classmates’ family-language environments remains strongly related to both mental health and classroom atmosphere after accounting for several standard sources of peer effects.

A separate possibility is that peer parent LOI captures classmates’ contemporaneous mental health. Peer mental health is not an ideal control for distinguishing this channel,

Table 6: Peer Parent LOI and Other Sources of Peer Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Base	+ Peer SES	+ Peer hukou	+ Peer openness	+ Peer female	+ Peer ability	+ Language and ability
<i>Panel A. Mental health, PCA index</i>							
Peer parent LOI	-0.181*** (0.069)	-0.176** (0.068)	-0.196*** (0.070)	-0.206*** (0.071)	-0.206*** (0.071)	-0.213*** (0.071)	-0.181** (0.071)
Number of observations	8,236	8,236	8,236	8,236	8,236	8,236	7,032
R-squared	0.012	0.013	0.013	0.013	0.013	0.013	0.019
<i>Panel B. Classroom atmosphere</i>							
Peer parent LOI	0.360*** (0.096)	0.295*** (0.099)	0.289*** (0.103)	0.256** (0.099)	0.281*** (0.103)	0.303*** (0.103)	0.281*** (0.102)
Number of observations	8,421	8,421	8,421	8,421	8,421	8,421	7,169
R-squared	0.142	0.143	0.143	0.144	0.145	0.145	0.147

Notes: This table examines whether the estimated effects of peer parent LOI are accounted for by other common sources of peer effects. Panel A reports results for the mental-health PCA index, and Panel B reports results for classroom atmosphere. Column 1 reports the baseline specification. Columns 2–6 sequentially add peer parental SES, peer hukou composition, peer openness, the female share of classmates, and peer cognitive ability. Column 7 additionally controls for own and parental language use and own cognitive ability. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

because it may itself respond to family-language environments and thus form part of the peer process generated by classroom assignment. The usual reflection problem further limits the causal interpretation of a peer mental-health coefficient. I therefore treat this exercise as a robustness check rather than as a mediation test.

Appendix Table A9 shows that controlling for leave-one-out peer mental health does not attenuate the peer parent LOI coefficient. The estimate remains negative for both mental-health measures and, if anything, increases in magnitude. Contemporaneous peer mental health therefore does not appear to account for the reduced-form relationship between peer parent LOI and students' mental health.

Overall, the robustness exercises narrow the set of plausible explanations for the main estimates. I find little evidence that peer parent LOI is systematically generated by post-assignment changes in parental language use or reporting, while the horse-race regressions show that the estimated effects are not readily explained by other observed sources of peer effects.

I therefore interpret peer parent LOI as a relatively stable dimension of classmates' family-language environments. The estimates capture the reduced-form effect of being assigned

to a classroom with a larger share of peers from language-of-instruction-aligned families, rather than the effect of any single underlying characteristic. The estimated effects remain substantial after accounting for the observed dimensions of peer composition considered above.

7 Conclusion

This paper asks whether characteristics transmitted within families remain confined to those families once children enter shared institutions. I study this question through family language environments. Exploiting random classroom assignment in Chinese middle schools, I find that exposure to classmates whose parents use the language of instruction at home improves adolescent mental health. A one-standard-deviation increase in peer parent LOI reduces poor mental health by about 0.18 standard deviations and improves peer relationships, classroom atmosphere, teacher interactions, academic perceptions, and school attachment. The mental-health benefits are smaller for students from dialect-only homes.

These results show how intergenerational transmission can generate effects beyond the parent-child relationship. Parents' language use strongly predicts their children's own language use, consistent with family language environments being carried into school through children. Yet there was no statistically detectable association between students' own family language background and their mental health. Instead, mental-health outcomes vary with the family-language backgrounds of the peers to whom students are randomly assigned. The estimates are also robust to controlling for other sources of peer effects, including peers' parental SES, hukou, gender composition, openness, and cognitive ability. Taken together, the results suggest that characteristics transmitted vertically within families can generate horizontal externalities once children enter shared peer environments.

The pattern of effects is consistent with communication and social integration as mechanisms underlying these spillovers. Students exposed to more LOI-aligned peers report more

favorable relationships with classmates, more positive interactions with teachers, lower academic difficulty, and stronger attachment to school. The heterogeneity by students' own family language background points in the same direction: students from dialect-only homes, who are less linguistically aligned with the school environment, experience smaller mental-health effects. These findings are consistent with greater language alignment reducing communication and integration frictions in the classroom.

This paper has two limitations. First, the process linking peer parental language use to adolescent mental health remains partly a “black box.” Parental language use may reflect both the language children acquire and broader parenting practices that may shape their peer interactions. Although the findings are consistent with communication and social integration, the research design does not disentangle these components or identify the full pathway to mental health. Second, parent-reported home language necessarily simplifies the more complex language practices of multilingual households.

The broader contribution is to extend the study of intergenerational transmission beyond what parents pass to their own children. Children carry family environments with them into classrooms, where these environments can become part of the social conditions experienced by others. In this sense, social transmission can operate both vertically across generations and horizontally across peers. Institutions organized around a common language may therefore shape whether differences inherited from families remain private or become consequential for communication, participation, and belonging.

These findings have implications for schools serving students from different linguistic backgrounds. The policy problem is not simply whether students learn the language of instruction, nor do the results imply that dialect or minority languages should be displaced. Rather, schools face the problem of ensuring that linguistic distance does not become a barrier to peer interaction, teacher engagement, or social inclusion. We know much less about which policies can reduce these frictions without reducing linguistic diversity itself. Understanding whether language support, classroom practices, or other forms of institutional

support can do so—and whether these changes produce lasting improvements in mental health and educational outcomes—is an important question for future research.

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A Appendix

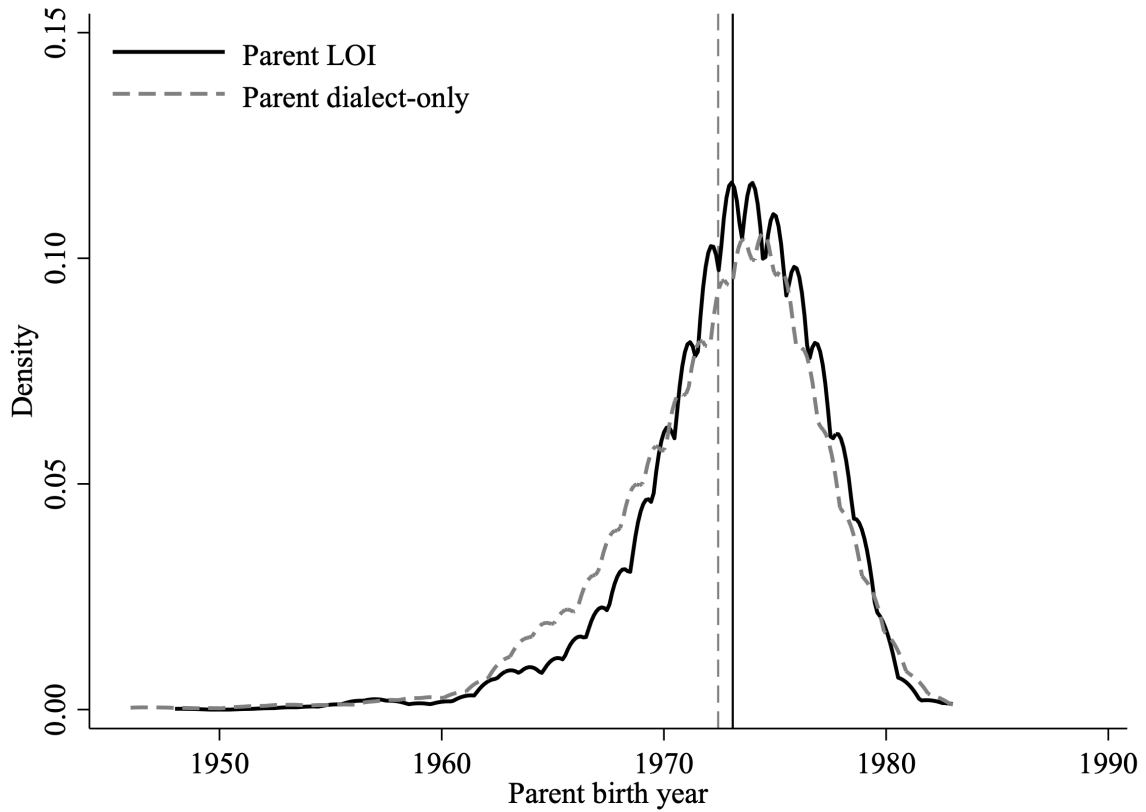


Figure A1: Parent birth-year distributions by home-language group. The figure plots kernel density estimates of parent birth year separately for parents who report using the language of instruction (LOI) at home and parents who use dialect-only at home. Vertical lines indicate group means.

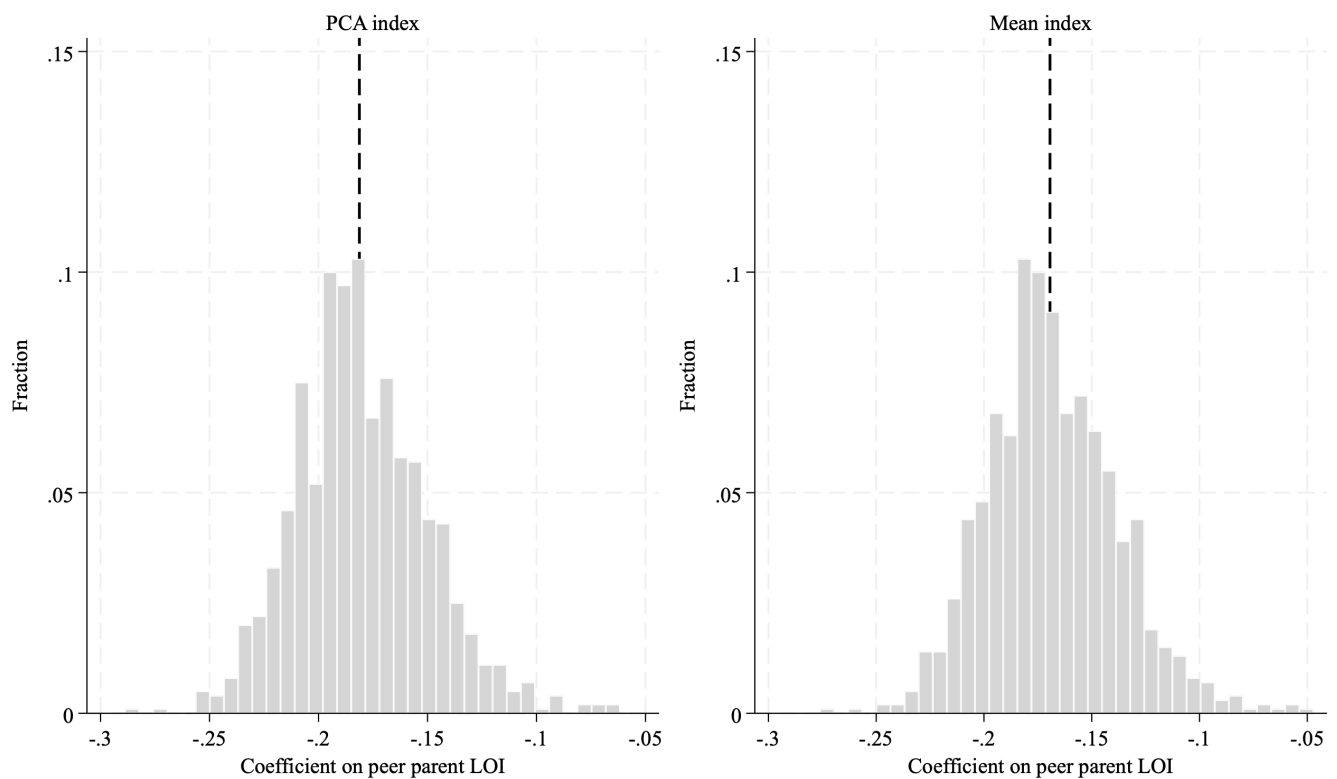


Figure A2: Stability of mental-health estimates when randomly dropping schools. Each distribution is based on 1,000 re-estimations of the main mental-health specification after randomly dropping nine schools, approximately 10 percent of the estimation sample. Dashed vertical lines mark the full-sample estimates.

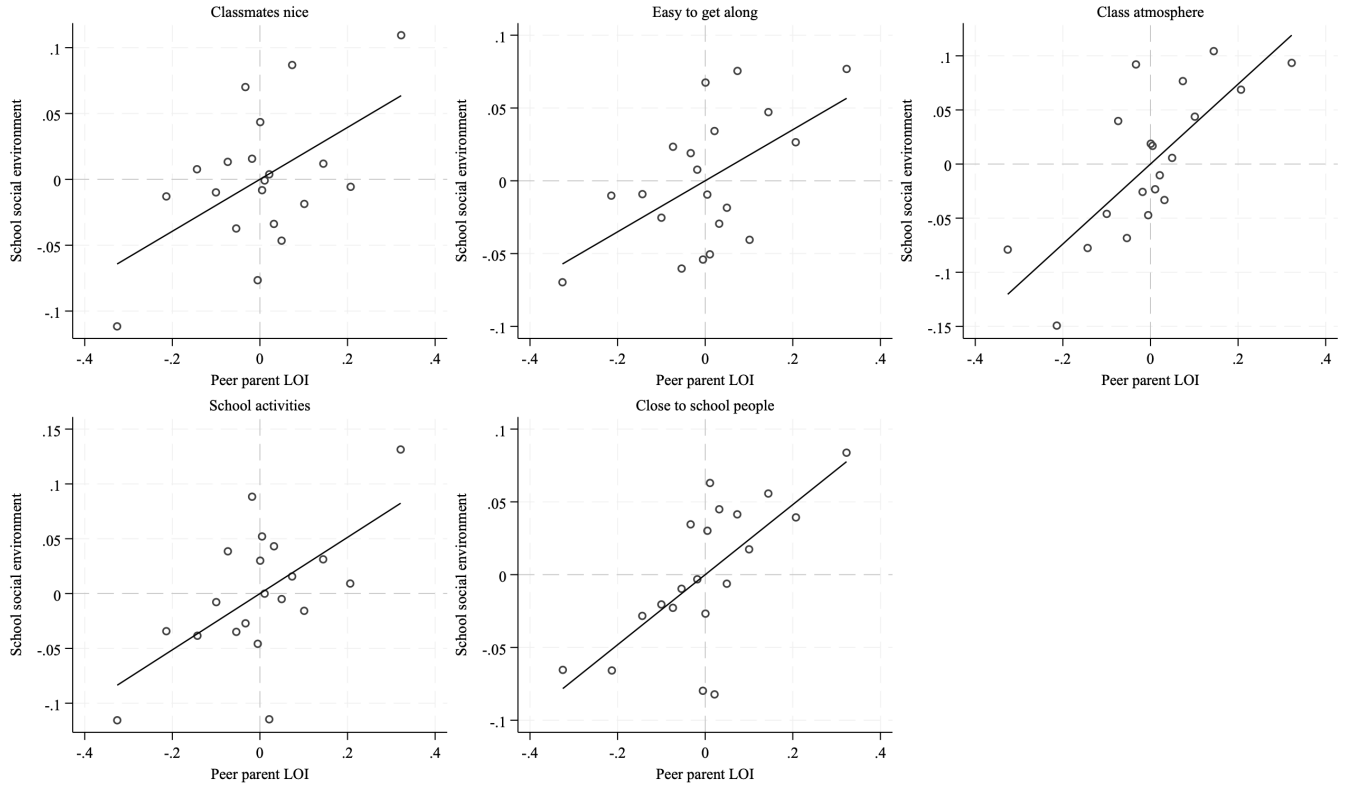


Figure A3: Peer parental language alignment predicts stronger peer relations. Each panel plots residualized school social-environment outcomes against residualized peer parent LOI, after removing school-by-grade fixed effects and baseline controls. The fitted lines summarize the associations between peer parent LOI exposure and students' peer relations, classroom atmosphere, participation in school activities, and closeness to people at school.

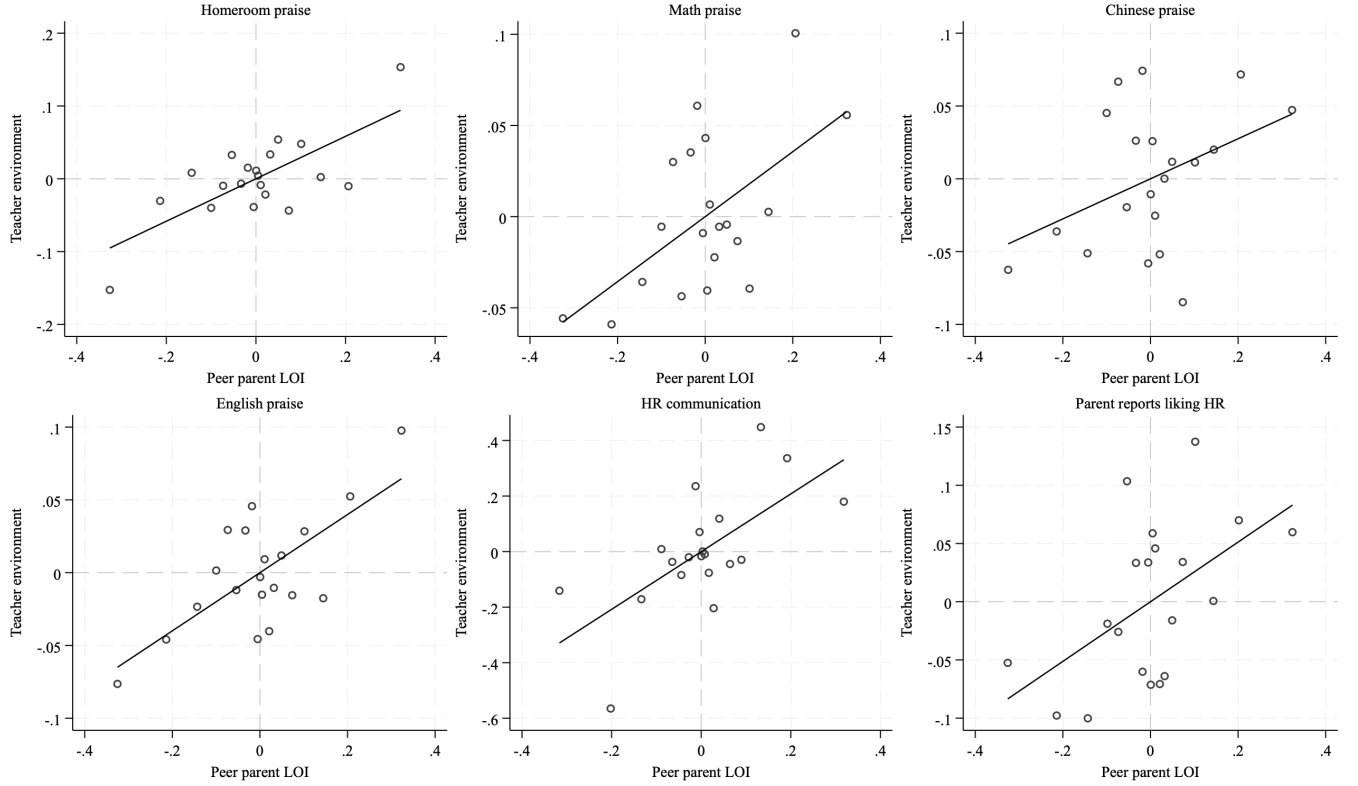


Figure A4: Peer parental language alignment predicts more positive teacher interaction. Each panel plots residualized teacher-interaction outcomes against residualized peer parent LOI, after removing school-by-grade fixed effects and baseline controls. Outcomes include praise from the homeroom, math, Chinese, and English teachers, homeroom-teacher communication time, and parent-reported liking of the homeroom teacher.

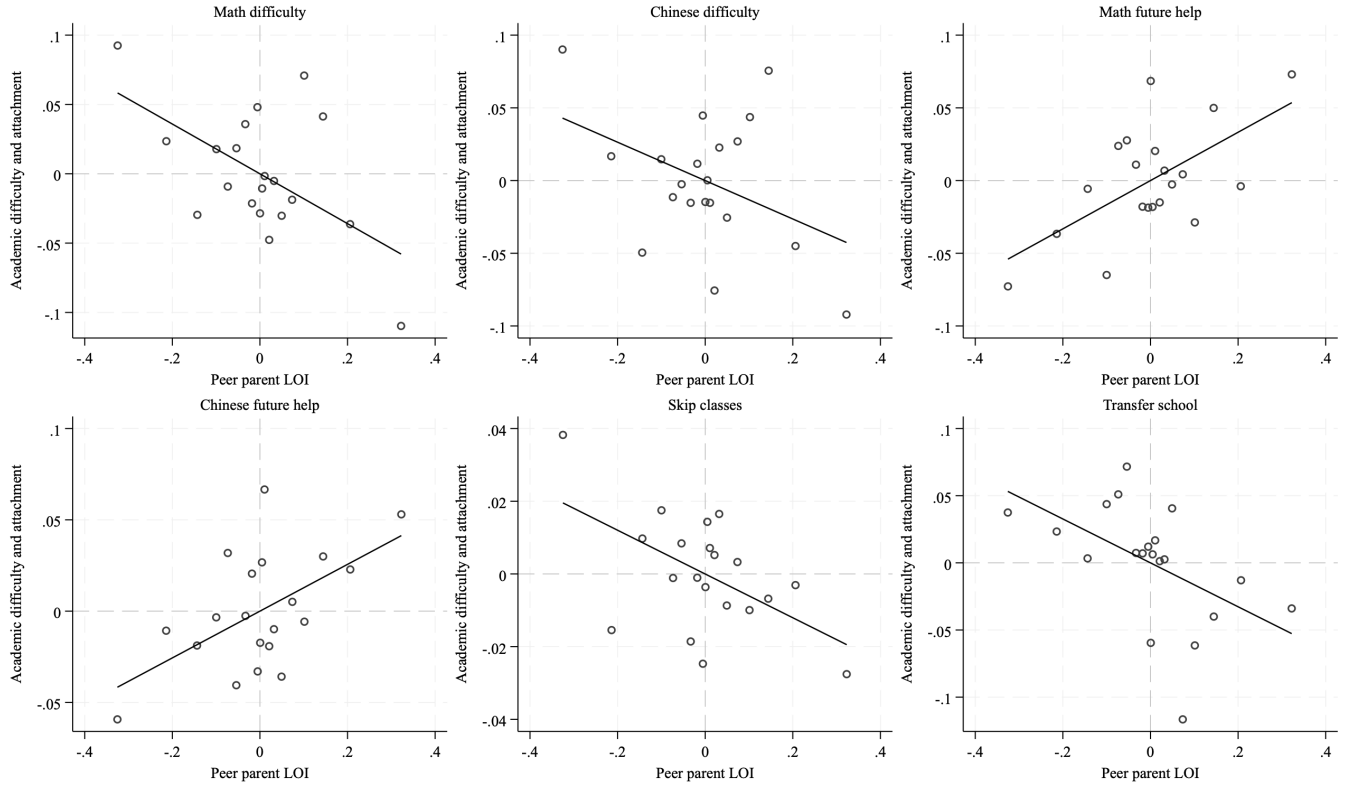


Figure A5: Peer parental language alignment predicts lower academic difficulty and stronger school attachment. Each panel plots residualized academic-difficulty and school-attachment outcomes against residualized peer parent LOI, after removing school-by-grade fixed effects and baseline controls. Outcomes include perceived difficulty in math and Chinese, expected future help from math and Chinese teachers, skipping classes, and intentions to transfer schools.

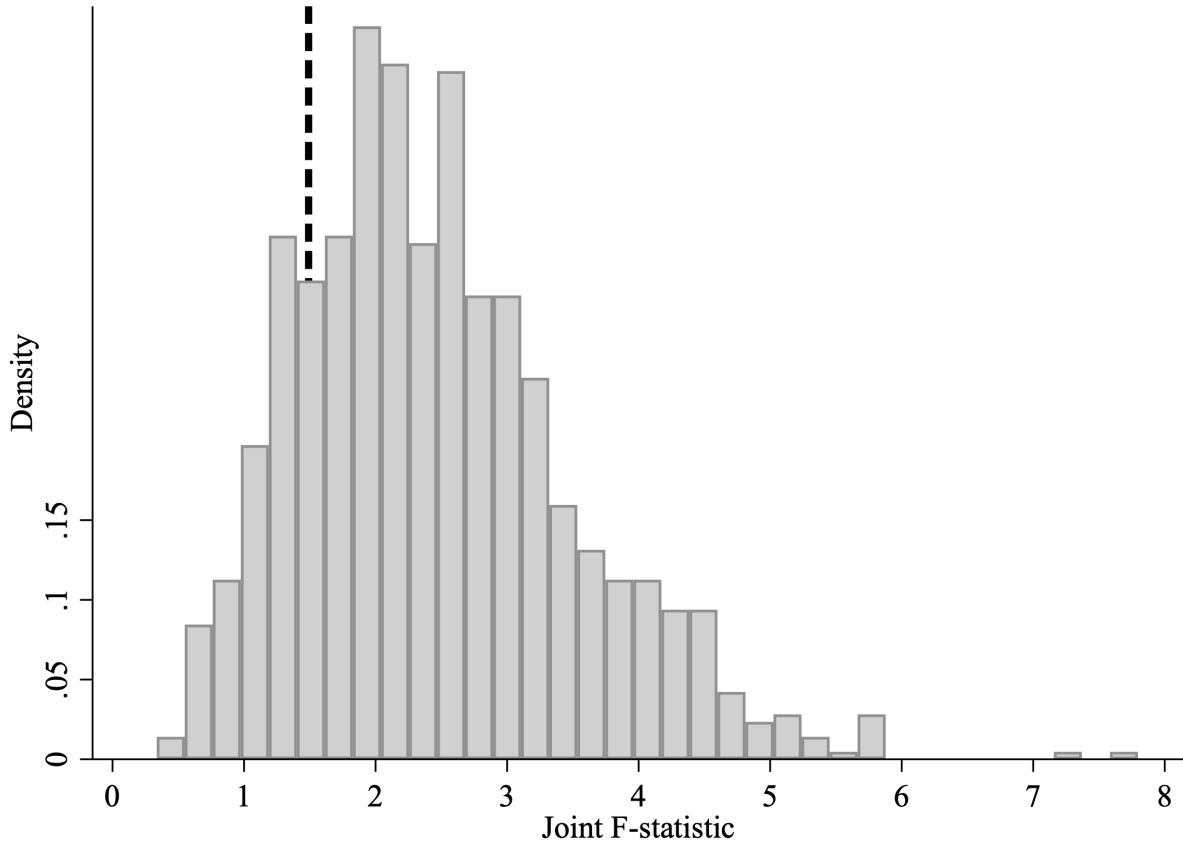


Figure A6: Permutation distribution of the joint balance F-statistic. The histogram presents the distribution of joint F-statistics obtained from 1,000 random classroom assignments within school-grade groups while preserving the original classroom size distribution. The dashed vertical line indicates the joint F-statistic from the actual classroom assignment. The permutation p-value is calculated as the fraction of simulated F-statistics that exceed the observed statistic.

Table A1: Descriptive statistics by parent home-language group

	Full sample	Parent LOI	Parent dialect-only	Difference	<i>p</i> -value
<i>Panel A. Home-language group</i>					
Parent LOI (1=YES)	0.378	1.000	0.000	1.000	< 0.001
Parent dialect-only (1=YES)	0.335	0.000	1.000	-1.000	< 0.001
Observations	8,371	3,165	2,802		
<i>Panel B. Family background and student characteristics</i>					
Mother's years of schooling	9.984	11.300	8.516	2.783	< 0.001
Father's years of schooling	10.702	11.686	9.613	2.073	< 0.001
Age	13.909	13.768	14.164	-0.397	0.005
Ethnic minority (1=YES)	0.112	0.075	0.203	-0.128	0.007
Only child (1=YES)	0.484	0.656	0.302	0.354	< 0.001
Agricultural hukou (1=YES)	0.470	0.334	0.620	-0.286	< 0.001
Attended preschool (1=YES)	0.815	0.870	0.747	0.123	< 0.001
Household economic status	2.861	2.955	2.714	0.242	< 0.001
Female (1=YES)	0.487	0.502	0.458	0.043	0.005
Ever repeated a grade (1=YES)	0.130	0.058	0.228	-0.170	< 0.001
<i>Panel C. Mental health</i>					
Feeling blue	2.204	2.111	2.306	-0.195	< 0.001
Depressed	1.936	1.824	2.066	-0.241	< 0.001
Unhappy	2.250	2.132	2.377	-0.245	< 0.001
Not enjoying life	1.724	1.690	1.772	-0.082	0.019
Sad	2.006	1.892	2.127	-0.235	< 0.001
Poor mental health, mean index	2.027	1.933	2.132	-0.200	< 0.001
Poor mental health, PCA index	-0.036	-0.241	0.197	-0.438	< 0.001

This table reports descriptive statistics by parent-reported home-language group. Parent dialect-only refers to students whose parents report speaking only a local dialect at home. The difference column reports the parent LOI mean minus the parent dialect-only mean. P-values are from regressions of each variable on the parent LOI indicator among students in the two groups, with standard errors clustered at the classroom level. Observations vary slightly across variables because of missing responses. The large differences across groups illustrate why comparisons based on students' own home-language background are likely to be confounded. The main analysis instead exploits within-school-grade variation in classmates' home-language background generated by classroom assignment.

Table A2: Balance Test for Peer Parental Dialect-Only Exposure

	(1)	(2)
Mother's years of schooling	-0.042*** (0.006)	-0.000 (0.000)
Father's years of schooling	0.004 (0.006)	-0.000 (0.001)
Age	0.039 (0.045)	-0.003* (0.002)
Ethnic minority	0.571*** (0.145)	-0.004 (0.007)
Only child	-0.382*** (0.053)	0.000 (0.003)
Holds agricultural hukou	0.213*** (0.058)	-0.006 (0.005)
Attended preschool	-0.119*** (0.039)	0.003 (0.004)
Household economic status	-0.203*** (0.032)	-0.001 (0.003)
Female	-0.059*** (0.021)	0.001 (0.002)
Ever repeated a grade	0.328*** (0.075)	0.005 (0.008)
Number of observations	8,508	8,508
School-by-grade fixed effects		X
Joint test p -value	< 0.001	0.437

Notes: This table presents a balance test of whether predetermined student and family characteristics jointly predict peer parental dialect-only exposure. The dependent variable is the standardized leave-one-out share of classmates whose parents report speaking only a local dialect at home. Column 2 includes school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses. The joint p -value tests whether the listed characteristics jointly predict peer parental dialect-only exposure.

Table A3: Effect of Peer Parent LOI on Classroom Experience

<i>Panel A. Peer environment</i>						
	(1) Classmates nice	(2) Easy to get along	(3) Class atmosphere	(4) School activities	(5) Close to people	
Peer parent LOI	0.181*** (0.066)	0.160** (0.077)	0.360*** (0.096)	0.232*** (0.078)	0.221*** (0.068)	
Number of observations	8,430	8,435	8,421	8,426	8,372	
R-squared	0.076	0.061	0.142	0.153	0.112	
<i>Panel B. Teacher interaction</i>						
	(1) Homeroom praise	(2) Math praise	(3) Chinese praise	(4) English praise	(5) HR teachers communication	(6) Parent report children likes HR teachers
Peer parent LOI	0.254*** (0.096)	0.176** (0.080)	0.128** (0.061)	0.182*** (0.060)	0.976*** (0.330)	0.260*** (0.093)
Number of observations	8,417	8,448	8,433	8,451	8,154	8,156
R-squared	0.118	0.156	0.139	0.147	0.679	0.113
<i>Panel C. Academic perceptions and school attachment</i>						
	(1) Math difficulty	(2) Chinese difficulty	(3) Math future help	(4) Chinese future help	(5) Skip classes	(6) Transfer school
Peer parent LOI	-0.176** (0.075)	-0.119** (0.060)	0.148** (0.058)	0.119*** (0.045)	-0.058** (0.026)	-0.141** (0.061)
Number of observations	8,447	8,412	8,460	8,457	8,466	8,444
R-squared	0.344	0.303	0.090	0.077	0.080	0.115

Notes: Each column reports a separate regression of the outcome listed below the column number on peer parent LOI. Peer parent LOI is the standardized leave-one-out share of classmates whose parents report using the language of instruction at home. All specifications include baseline controls and school-by-grade fixed effects. Columns 1 and 2 of Panel C additionally control for the corresponding Grade 6 subject-difficulty measure. Standard errors, clustered by classroom, are reported in parentheses.

Table A4: Effects on Student Mental Health, by Grade

	(1) Full sample	(2) Grade 7	(3) Grade 9
Peer parent LOI	-0.181*** (0.069)	-0.164* (0.085)	-0.244** (0.110)
Number of observations	8,236	5,452	2,784
R-squared	0.012	0.013	0.014

Notes: This table reports estimates of the effect of peer parent LOI on mental-health difficulties for the full sample and separately by grade. Peer parent LOI is the standardized leave-one-out share of classmates whose parents report using the language of instruction at home. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

Table A5: Channels of peer parental language transmission through parental peer networks

	(1) Know child's friends	(2) Know friends' parents
Peer parent LOI	-0.099 (0.086)	-0.142* (0.083)
Peer parent LOI $\times$ Know child's friends	-0.049 (0.046)	
Know child's friends	-0.122*** (0.041)	
Peer parent LOI $\times$ Know friends' parents		-0.025 (0.030)
Know friends' parents		-0.108*** (0.030)
Number of observations	7,180	6,382
R-squared	0.015	0.019

Notes: This table examines whether the effect of peer parent LOI varies with parental knowledge of the child's peer network. Column 1 interacts peer parent LOI with an indicator for whether parents know the child's friends. Column 2 interacts peer parent LOI with an indicator for whether parents know the friends' parents. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

Table A6: Predictors of Peer Parent LOI

	(1) Peer parent LOI
Peer cognitive ability	0.005 (0.010)
Peer female share	-0.132 (0.090)
Female homeroom teacher	0.034*** (0.012)
Homeroom teacher age	0.003 (0.003)
Homeroom teacher experience	-0.002 (0.002)
Number of observations	8,135
School-by-grade fixed effects	X
Within R-squared	0.0009
Joint test p -value	0.104

Notes: This table examines whether peer composition and homeroom-teacher characteristics predict peer parent LOI. Peer parent LOI is the standardized leave-one-out share of classmates whose parents report using the language of instruction at home. The specification includes school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses. The joint p -value tests whether the listed characteristics jointly predict peer parent LOI.

Table A7: Robustness to Full-Sample Standardization of Mental-Health Indices

	(1) Base	(2) + Peer SES	(3) + Peer hukou	(4) + Peer openness	(5) + Peer female	(6) + Peer ability	(7) + Language and ability
<i>Panel A. Mental health, PCA index</i>							
Peer parent LOI	-0.170** (0.069)	-0.161** (0.067)	-0.184*** (0.070)	-0.191*** (0.070)	-0.194*** (0.071)	-0.201*** (0.070)	-0.169** (0.072)
Number of observations	8,236	8,236	8,236	8,236	8,236	8,236	7,032
R-squared	0.076	0.076	0.077	0.077	0.077	0.077	0.083
<i>Panel B. Mental health, mean index</i>							
Peer parent LOI	-0.160** (0.069)	-0.149** (0.068)	-0.169** (0.071)	-0.176** (0.072)	-0.181** (0.071)	-0.189*** (0.070)	-0.152** (0.072)
Number of observations	8,357	8,357	8,357	8,357	8,357	8,357	7,129
R-squared	0.076	0.076	0.077	0.077	0.077	0.077	0.082

Notes: This table reports estimates using mental-health indices standardized over the full sample. Panel A uses the PCA index and Panel B the mean index. Column 1 reports the baseline specification. Columns 2–6 sequentially add peer parental education, peer hukou composition, peer openness, the female share of classmates, and peer cognitive ability. Column 7 additionally controls for own and parental language use and own cognitive ability. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

Table A8: Robustness of Homeroom-Teacher After-Class Communication Measure

	(1) Original standardized	(2) Log standardized	(3) 99% winsorized standardized	(4) 95% winsorized standardized
Peer parent LOI	0.976*** (0.330)	0.762** (0.346)	0.968*** (0.329)	0.945*** (0.324)
Number of observations	8,154	8,154	8,154	8,154
R-squared	0.679	0.707	0.685	0.726

Notes: This table reports robustness checks for homeroom-teacher reports of after-class communication time. Column 1 uses the original standardized measure. Column 2 uses the standardized log transformation, $\log(x + 1)$. Columns 3 and 4 use standardized measures winsorized at the 99th and 95th percentiles, respectively. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

Table A9: Controlling for Peer Mental Health

	(1) MH PCA Baseline	(2) MH PCA + Peer MH	(3) MH Mean Baseline	(4) MH Mean + Peer MH
Peer parent LOI	-0.181*** (0.069)	-0.283*** (0.097)	-0.169** (0.068)	-0.260*** (0.093)
Peer mental health		-0.055** (0.022)		-0.050** (0.021)
Number of observations	8,236	8,236	8,357	8,357
R-squared	0.012	0.015	0.012	0.014

Notes: This table examines the robustness of the estimated effect of peer parent LOI to controlling for peer mental health. Columns 1 and 3 report the baseline specifications, while Columns 2 and 4 additionally control for the leave-one-out mean mental health of classmates. Higher values of the mental-health indices indicate worse mental health. All specifications include baseline controls and school-by-grade fixed effects. Standard errors, clustered by classroom, are reported in parentheses.

Table A10: Comparison of Random-Assignment and Non-Random-Assignment Schools

	Non-random assignment	Random assignment	Difference	SE	<i>P</i> -value
Private school	0.000	0.093	-0.093	0.057	0.108
Total number of students	872.654	955.558	-82.904	155.107	0.594
Teachers with BA degree	75.522	68.272	7.250	9.477	0.446
School ranking	3.640	3.953	-0.313	0.187	0.096
Number of schools	26	86	–	–	–

Notes: This table summarizes school characteristics by reported classroom assignment practices. The two groups are similar on most observed characteristics, although non-random-assignment schools are marginally higher ranked ($p = 0.096$). This pattern is consistent with some schools using ability-based re-sorting to improve the placement of stronger students into higher-ranked high schools, while school rankings partly capture these placement outcomes.

Table A11: Definitions and Original Scales of Additional Outcomes

Outcome category	Original scale
Peer environment	Classmates nice; easy to get along with classmates; class atmosphere; participation in school; closeness to people in school. All outcomes use a 1–4 agreement scale (1 = strongly disagree, 4 = strongly agree).
Teacher interaction	Teacher praise (homeroom, math, Chinese, and English teachers) uses a 1–4 agreement scale (1 = strongly disagree, 4 = strongly agree). Homeroom-teacher communication is measured as teacher-reported minutes of communication after class. Parent-reported liking of the homeroom teacher uses a 1–4 scale (1 = strongly dislike, 4 = like very much).
Academic perceptions and school attachment	Subject difficulty (math and Chinese) uses a 1–4 scale, with higher values indicating greater difficulty. Future value of subjects (math, Chinese, and English), skipping classes, and desire to transfer schools use a 1–4 agreement scale (1 = strongly disagree, 4 = strongly agree).

Notes: All outcomes are standardized over the analysis sample before estimation.