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Olivia Murray April 12, 2015

What Matters?
A Cross-Country Analysis of Parental Involvement and Student Achievement

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An abstract of a thesis submitted to the Faculty of
Emory College of Arts and Sciences of Emory University in
partial fulfillment of the requirements of the degree of
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Abstract

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This study explores the relationship between traditional and nontraditional parental involvement (PI) actions and student achievement, holding family economic, social, and cultural status; school-level parent expectations; and student gender constant. Using a large-scale analysis of data from 15-year-olds in 14 economies, I found that, of the statistically significant PI items, nontraditional PI is typically positively associated with student scores, and traditional PI is typically negatively associated with student scores. These findings may provide support for the reactive hypothesis.

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Acknowledgements

I would like to thank my committee for your support, guidance, and never-ending supply of edits and markups. To my advisor, Dr. Cheong, thank you for your thoughtful comments, patience, and genuine interest in my potential. To Dr. Jensen, thank you for your encouragement and commitment to both me and to our wonderful department. To Dr. Banerjee, thank you for being a part of this and every other leg of my journey these past years. To Adrienne, thank you for your in-depth comments and enthusiasm for my path. And to Dr. Downey, thank you for being such an integral part of this process and for giving me hope, inspiration, and support in every step of my college career.

I also wish to thank my peers for being there for me during the honors process. My roommates, friends, and honors cohort were invaluable in keeping me sane during the rough spots and celebrating the final product with me.

Finally, I would like to thank my parents, Dr. Gregg Murray and Dr. Susan Murray. This project was inspired by their dedication and love for me and education in general. Thank you for loving me, raising me, and instilling in me a belief that I can do anything if I work hard enough. I have learned from both your words and your actions, and I strive to live my life in my own best way, just as you do. I am so lucky to have you both.

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Introduction

Honolulu, Portland, Houston, San Francisco, Houston, Amsterdam, Brownsville, Rochester, Lubbock, St. Louis, Atlanta. My parents and I moved 12 times before I left for college. For most of my life, I spent only a year or even a semester at a school before moving to the next one. Despite this constant change, some things remained constant. I remember my dad asking me about my day and all of my classes every afternoon and my mom checking my homework every night. When I attended an inner-city public school in San Francisco for six months, my parents gave me extra homework because they did not think the schoolwork was adequate. My parents prioritized helping me to learn and grow academically, both in my schools and outside them.

I know from personal experience that I would not be ready to graduate from a top university if it had not been for my parents' active academic support. This realization inspired my interest in the topic of parental involvement and is the driving force behind my study. I want to learn if the connection between parental involvement and academic achievement extends beyond my personal experience to students all over the world. I also want to explore whether this relationship exists and how it might function across different contexts.

In recent decades, researchers and policymakers have begun emphasizing the effects of parental involvement on student achievement. For example, the No Child Left Behind Act (Congress, 2002) mandated parental involvement in Title I and low-performing schools, though it did not provide recommendations about how to do this. One reason for the lack of clear guidelines on how to increase parental involvement (PI) is the wide

variation in the definitions of PI in the research. What the literature points out is that students' family background factors relate to the types of involvement their parents display. These background factors could include parents' social and economic status (Coleman et al., 1966), work status and family structure (Moro-Egido, 2012) and differences in beliefs and experiences of parents from different racial or ethnic backgrounds (Lareau & Horvat, 1999).

While these involvement differences are widely expressed within countries, they are widely expressed across countries as well, reflecting different cultures. In addition, a complex relationship between PI and student achievement exists across different countries and cultures. For instance, Coleman (1987) noted that some Asian-American immigrants would buy two of each of their children's textbooks: one for the child and one for the mother to help her child study. This form of PI is typically not practiced among non-Asian American families.

Some studies (e.g. Shen, Washington, Bierlein Palmer, & Xia, 2014) classify PI behavior into two categories: traditional PI, which is primarily in-school involvement, such as volunteering at school functions or contacting teachers; and nontraditional PI, which is primarily out-of-school involvement, such as discussing current events with their child or setting behavioral rules at home.

As mentioned, the literature on PI lacks a standard definition of either PI or student achievement. The purpose of this study is to explore the relationship between PI, as defined by the Programme for International Student Assessment (PISA), and student achievement across various countries. I will analyze data from PISA, which administers standardized tests and questionnaires to students and educational stakeholders across the globe.

Student reading scores will be used as the measure of student achievement, and answers taken from a parent questionnaire composed of 16 items (see Table 1) from the 2009 PISA assessments will be used to measure PI. I will examine the direction and strength of the association between student achievement and these PI measures across the 14 countries available in the 2009 parent PISA data set to gain a better understanding of the effect of PI on academic performance in each of these countries and perhaps lend support to a causal model of PI and student achievement.

Research Questions

1. What is the relationship between various measures of both traditional and nontraditional parental involvement (PI) and student reading achievement in the included 14 countries?
2. Does the relationship between PI and student reading achievement vary across these 14 countries?

Educational Significance

Much of the research on PI focuses on a single country, region, or even school, but not much research has been done cross-nationally, even though the results from Hampden-Thompson, Guzman, and Lippman (2013) suggest that numerous types of PI promote positive educational outcomes across country borders. My study strives to develop this broader picture of the association between PI and academic performance by spanning 14 countries from four continents. The goal is to help researchers understand what types of parent actions are most correlated with reading performance in each country and across countries.

This study expands upon Borgonovi and Montt's (2012) working paper, which explores similar questions from the 2009 PISA results to test the associations between PI factors and cognitive and non-cognitive student outcomes while contextual variables are held constant. Their paper focuses particularly on students from lower socio-economic backgrounds, whereas I focus on all students. I will build on the model specification of their research by including different controls, such as school PI climate. Second, I will build on the measurement model from this working paper by performing a factor analysis to better understand the unobserved construct of PI, and examine whether and how it varies by country. Third, I will build upon their model by examining the effects of a specific PI action while holding other PI actions constant. A better understanding of the construct of PI in each of these countries and their relationships with student achievement *may* lead to policies, recommendations, and attitudinal changes that promote student learning.

Literature Review

Parental Involvement

Although the specifics vary widely, parental involvement (PI) can be broadly defined as a set of relationships between parents, their children, their children's teachers and administrators, other parents, and the community. Taken together, these relationships constitute an extended social network (Epstein, 1995; McNeal, 2014). Some children are more receptive to PI, such as younger kids, those at risk of having low achievement, and boys, in both positive and negative ways. This means that these children are more likely to be hurt by involvement that focuses on control and negative beliefs about the child's

abilities (Pomerantz, Moorman, & Litwack, 2007) and would likely be strongly helped by involvement that encourages autonomy and positive beliefs about the child's abilities (S. C. Ho & Willms, 1996). The debate about the effects of PI, though, is hotly contested.

Many researchers have found evidence that PI raises student achievement (Epstein, 1991; S. C. Ho & Willms, 1996; Lareau, 1989). Some (e.g. McNeal, 20140) go further to argue that individual-level PI and school-level PI raise achievement and that school-level PI magnifies individual-level PI, though the effect may be contingent on other factors. According to Stevenson and Baker (1987), involved parents are more likely to have children who do well in school, as measured by grades or standardized test scores, and the effect is basically the same for boys and girls. PI appears to positively influence the skills and behaviors that directly relate to success in school. Children whose parents are more involved tend to be more engaged with and motivated in school; have higher levels of mental health; are more outgoing and sociable; and are better at setting and accomplishing goals. These skills and attributes help students succeed in school and eventually in life (Borgonovi & Montt, 2012). The Stockhom Birth Cohort (SBC) research project, a longitudinal study started in the 1960's, tracked PI in 3343 individuals from Sweden for over 50 years and found that PI was positively associated with academic performance and attained level of education (Janson, 1995).

However, not all researchers are convinced of the power of PI. Pomerantz and Moorman (2007) assert that school-based PI, which tends to be highly structured by teachers and administrators, tends to have positive effects, whereas home-based PI, which is generally less structured, has a weaker relationship to student outcomes. Domina (2005) and Epstein (1991) found no effect or a negative effect of PI on student

achievement. Oftentimes, researchers who find no or negative effects do so after taking certain other factors into account, such as student and parent attitudes (Lam & Lau, 2014).

In addition, some researchers have pointed to the negative effects of *too much* parental involvement. Parents taking control or focusing on negative aspects of the child (Pomerantz et al., 2007), creating too much pressure for the child to succeed, or challenging the proficiency of the teachers (Lareau, 1987) can lead to a decline in academic achievement and student motivation or confidence.

There are many definitions of parental involvement. Eccles and Harold (1996) make a distinction between parent *practices*, such as helping their child with homework, and parent *beliefs and attitudes*, such as parent expectations for their child's success. My study will focus on parent practices because I believe that parent beliefs and attitudes, while very important, are more difficult to change than are parent practices. A limitation to my research is that it produces a correlational model, not a causal one. However, if it were to eventually lend support to a causal model, I would prefer the included involvement variables be easily changed (like how often a parent might attend student government meetings).

Parent Practices

In the literature, parent practices are regularly broken into two categories: traditional and nontraditional. Traditional PI often involves the parent physically coming to the school to help with activities or volunteer time by chaperoning or providing services. Traditional involvement also includes a limited number of activities in the home, such as helping with homework. These kinds of activities are usually expected by the school and are the focus of much of the research on PI (Shen, Washington, Bierlein Palmer, & Xia,

2014). Nontraditional involvement generally encompasses activities done in the home, including discussions between parents and children about topics relating or not relating directly to school, parental support in learning school materials, or even simply eating dinner around a table with the child.

Another way to label these two categories is school-based PI and home-based PI. Broadly speaking, school-based PI is traditional involvement, and home-based PI is nontraditional involvement. There is some crossover, though, such as with helping with homework, which is usually categorized as traditional involvement, but it is done in the home, so it would also be home-based PI.

It is important to understand the distinction between these two ways of categorizing PI practices for this study. PISA uses the terms home-based and school-based involvement to classify the variables, which are presented in Table 1, PISA PI Questionnaire Items. In the PISA data that is used, variables 0801-0808 are considered home-based involvement, and variables 1501-1508 are considered school-based involvement. However, variables 0801-0807 are considered nontraditional involvement, and variables 0808 and 1501-1508 are considered traditional involvement. Keeping consistent with much of the literature, I will be using the traditional/nontraditional distinction in the analysis.

Table 1: PISA PI Questionnaire Items

Home-Based Involvement Questions	**How often do you or someone in your home do the following things with your child?**
	(1 = Never or hardly ever, 2 = Once or twice a month, 3 = Once or twice a week, 4 = Every day or almost every day)
Discuss Political/Social (0801: Dis Pol/Soc)	Discuss political or social issues?
Discuss Books/Films/TV (0802: Dis Pop Cul)	Discuss books, films or television programmes?
Discuss Progress with Child (0803: Dis School Prog)	Discuss how well your child is doing at school?
Eat Main Meal (0804: Eat)	Eat the main meal with your child around a table?
Talking with Child (0805: Talk)	Spend time just talking to your child?
Bookstore/Library (0806: Books/Lib)	Go to a bookstore or library with your child?
Talk About Reading (0807: Talk Read)	Talk with your child about what he/she is reading on his/her own?
Help with Homework (0808: Help Homewk)	Help your child with his/her homework?
School-Based Involvement Questions	**The last academic year, have you participated in any of the following school-related activities?**
	(1 = Yes, 2 = No)
Discuss on Parent Initiative (1501: Dis Par Init)	Discuss your child's behavior or progress with a teacher on your own initiative
Discuss on Teacher Initiative (1502: Dis Teach Init)	Discuss your child's behavior or progress on the initiative of one of your child's teachers
Volunteer Physical (1503: Vol Phys)	Volunteer in physical activities, e.g. building maintenance, carpentry, gardening or yard work
Volunteer Extra-Curricular (1504: Vol Ex Cur)	Volunteer in extra-curricular activities, e.g. book club, school play, sports, field trip
Volunteer Library/Media (1505: Vol Lib)	Volunteer in the school library or media center
Assist Teacher (1506: Assist Teach)	Assist a teacher in the school
Guest Speaker (1507: Speaker)	Appear as a guest speaker
School Government (1508: Sch Govt)	Participate in local school government, e.g. parent counsel or school management committee

Another nuance that is common in the research is that levels of PI fluctuate with the child's abilities, needs, and behavior. Known as the "reactive hypothesis" (Hampden-Thompson et al., 2013), its proponents argue that PI increases when the child struggles in school (Domina, 2005; Patall, Cooper, & Robinson, 2008), when the parents do not agree with decisions made by the school (Useem, 1992), or when their children are performing

well in school, although this last point is not as common (Desforges & Abouchaar, 2003). In other words, parents increase their involvement in response to the child's needs and performance (von Otter, 2014). The implication of the reactive hypothesis is that it complicates the relationship between PI and student achievement. As such, the data may show that parents are more involved when their children are doing worse in school and thus need help from their parents at home (Sibley & Dearing, 2014).

Traditional Involvement

Schools usually expect traditional PI practices (Shen et al., 2014), such as volunteering at the school or meeting with the student's teachers, and findings tend to suggest that this traditional involvement often boosts educational outcomes. Shen et al. (2014) estimated models that included four traditional PI variables, parent attendance at open houses, parent-teacher conferences, subject-area events (such as the science fair), and volunteering at the school; and the school control variables of percent of racial/ethnic minorities, percentage of students with subsidized lunches, and school size (divided by 100). They found that greater school-wide parent attendance at open houses, involvement in parent-teacher conferences, and involvement in special school events increased a school's likelihood of meeting adequate yearly progress (AYP) goals. McNeal (2014) found that parent-teacher organization (PTO) involvement somewhat increased math achievement, and Borgonovi and Montt (2012) found that school-based involvement does not seem to vary by socio-economic status (SES) among participating countries.

There are several hypotheses for why traditional PI might raise student scores. Primarily, school-based PI may signal to students that their parents highly value their education, which then increases student motivation. It may also signal to the teacher that

the parents care, which might make the teacher pay closer attention to the progress of that child (Pomerantz et al., 2007). In addition, parents who are involved in traditional activities can acquire information about how the child is doing and how to best help their child navigate and succeed in school (Borgonovi & Montt, 2012).

However, analyses of PISA data for 15 year olds show that traditional involvement is often associated with lower student scores. For instance, according to Borgonovi and Montt's (2012) analysis, parents of low-performing students in almost all of the countries and economies that were included are more likely to volunteer in extra-curricular activities and meet with teachers than were parents of high-performing students, even when SES was taken into account.

The PISA parental involvement data are interesting because the students in question are approximately 15 years of age. By this age, most students are working independently, and parents do not participate in as much traditional PI. Because of this, some of the traditional PI measures are negatively associated with scores. For instance, Borgonovi and Montt (2012) found that parents of older students helping with homework has a negative association with student scores in all countries and economies except for Korea. This is not interpreted to mean that parents are causing the worse scores but to mean that parents are reacting to student struggles. This is most likely indicative of the reactive hypothesis coming into play. Borgonovi and Montt (2012) concludes that parents and schools often do not meet until the student struggles. Considering previous research (e.g. Borgonovi & Montt, 2012) it seems as if these children would be struggling more if their parents were not now actively involved.

Nontraditional Involvement

Schools also often expect nontraditional involvement, such as reading to the child (for younger students). However, the intensity of home-based PI varies widely within and among countries/economies. For instance, parents in Hong Kong are often more likely to participate in home-based activities (usually nontraditional involvement) than school-based ones, including providing resources, communicating about school matters, and arranging activities for their child (E. S. C. Ho, 2010).

The effects of nontraditional PI are inconclusive, but there are some ideas as to why it might lead to positive academic achievement. Parents' time spent with children might provide opportunity for the transfer of social and cultural capital (Coleman, 1988). Activities with the child could also strengthen parent-child attachment and increase parental guidance, both of which are indirect ways that PI leads might raise achievement (Benson & Mokhtari, 2011).

In 1988, the National Educational Longitudinal Study began data collection on 8th graders, tracking 10,777 students' reading achievement from 642 schools with follow-ups every two years. Looking at the first two waves, McNeal (2014) found that parent-child discussions raised reading scores significantly after taking race, sex, SES, parent-teacher organization involvement, poverty level of the school, and structural instability of the school into account. Keith and Keith (1993) also found that greater communication between parents and their children was associated with better student outcomes. Borgonovi and Montt (2012) found that parent-child discussions about political or social issues were most strongly associated with student achievement. The researchers

concluded that those types of conversations encourage students to make connections, summarize, and communicate effectively (Borgonovi & Montt, 2012).

Many of the measures of nontraditional PI in my study are expected to be positively associated with higher reading scores. Borgonovi and Montt (2012) found that parent-child conversations and spending time together are associated with higher reading scores in many of the countries, even after controlling for SES. However, there are differences in these measures by SES with high-SES parents being more likely to have discussions with their children than parents with low-SES. In some countries, such as Portugal, this difference between conversations between parent and child for high-SES and low-SES could amount to 25 percentage points. In other countries, though, the effect was smaller or nonexistent. In the United States, advantaged and disadvantaged children generally benefit equally from PI (Lee & Bowen, 2006), but this is not necessarily the case in other countries. In fact, in most of the countries that participated in the 2009 parent survey, advantaged students seemed to benefit more from PI than did disadvantaged students (Borgonovi & Montt, 2012). If advantaged parents are more likely to be involved in and their children more likely to benefit from PI, then it might actually widen the achievement gap in these countries.

Control Variables

In a study focused on quantitatively comparing PI and student achievement, it is important to consider which variables should be controlled for. McNeal (2014) notes that there are individual and group-level factors that affect PI. I am including student, family, school, and community factors that people do not have as much control over, such as socio-economic status (SES).

Following the literature on PI, the control variables used in this study are student sex; family economic, social, and cultural status (ESCS); and school-wide parent pressure for high academic performance. I decided against using PI when the student was first entering school; previous student performance; parental agreement with school practices; parental value of school/reading; school-level PI (although I am including school-level parental pressure); immigration status; structural instability; or any country-level variables (although each regression is done within a specific country).

The first factors to consider are the age, sex, and academic performance of the student. The younger the child, the more likely his/her parents are going to be involved (Stevenson & Baker, 1987), and the school's influence becomes more prominent as the child moves into adolescence (McNeal, 2014). My study of the PISA 2009 data involves only students of approximately 15 years of age, so I do not need to control for age. I expect that the PI for this age group will be much lower than it was for these same students when they were in their first year of schooling. Stevenson and Baker (1987) point out that early PI should be important for a successfully developing student. The PISA data set includes several measures of PI when the student was entering school, but I decided against including them to manage the scope of this study.

The sex of the student appears to be significantly correlated with levels of PI. According to Stevenson and Baker (1987), parents are more involved with their younger sons than their older ones, but the levels of PI do not vary as factors of age as much for girls. There also seems to be a strong, positive correlation between PI and mother's education for boys but not for girls (Stevenson & Baker, 1987). Because of these sex

differences, my analyses control for student sex, which can be found in the student questionnaire.

Another important factor in PI is previous student performance. According to the reactive hypothesis, PI is affected by students' needs and performance such that parents become more involved if their child is struggling. So just as PI might affect student achievement, a student who needs or asks his/her parents for help and participation will more likely receive it than a student who does not (Patall et al., 2008; von Otter, 2014). This often manifests when the student is having trouble in school (Domina, 2005; Patall et al., 2008; Sibley & Dearing, 2014). However, even when previous achievement was controlled for, PI still had a positive relationship to student performance (von Otter, 2014). There are not measures of previous academic performance available in the PISA data set, so I cannot control for it. Still, it is important to make note of the reactive hypothesis because it suggests that some measures of PI may be negatively correlated with student achievement, but that does not mean that PI is causing the poorer scores.

The second set of factors, family factors, encompasses beliefs, values, and demographics, such as SES, parents' educational attainment, race, and immigration status. It is necessary to control for family factors to separate out the effects of these influential background variables on student achievement from the effects of the PI variables.

Parental beliefs about and value of school can have significant effects on involvement practices. Parents who agree with school practices, such as curriculum choices, are less involved than those who do not (Useem, 1992). Parents' value of school or particular subjects can be a strong predictor of their students' achievement. For instance, one study from 2006 PISA results in Hong Kong showed that on one test an increase in one

unit of "parents' general value" of science was associated with an 11-point increase in their child's science score. However, this effect is decreased by about half when students' attitudes toward science are controlled for. Additionally, parents who highly valued science created more opportunities for their children to participate in interesting science activities at a younger age, which then made the children more interested in science, which then led to better science performance (Lam & Lau, 2014). This provides some context for how parent values might lead to higher achievement. Although there are some related measures of parents' reading engagement and agreement with the schools are included in this data set, I am not involving them in my study because I want to include only action-oriented PI variables and a limited number of only the most significant control variables from the literature.

Parent belief about their role in their children's education is another potentially influential factor. According to previous research, working class and ethnic minority parents in the United States are more likely to expect schools to develop students' academic and cognitive skills rather than expecting the parents themselves to do it (Lareau, 2000). Mothers with higher levels of educational attainment usually expect to and do share more of that responsibility with the school (West, Noden, Edge, & David, 1998) and intervene on behalf of their children in schools (Useem, 1992). According to Delgado-Gaitan (1991), the reason some parents exhibit higher levels of involvement than others is that they believe they are an important part of their child's education. I do not have a variable that represents parent beliefs about their roles in their child's education in the PISA data set, so I will not be including it in this analysis.

If I am to create support for a causal model of PI on student achievement, I must control for certain family background factors in order to isolate the effects of the PI factors. The factors that appear most often in the literature are socio-economic status (SES) and parent education, which often aligns closely with SES. Coleman (1987) points out that any school is more effective for children from families with substantial resources than for those without. Mother's educational status is also telling, as it is positively related to the amount of PI activities she performs. Stevenson and Baker (1987) analyzed data from the TIME USE Longitudinal Panel Study conducted in 1981 and 1982 to look at how PI is related to the education of the mother, the age and sex of the child, and the academic performance of the child. The study used a sample of 179 students aged 5 to 17 years and their teachers. Their results suggested that parents with higher levels of educational attainment were more involved in traditional PI practices. Stevenson and Baker (1987) asserted that educated mothers know more about their child's school and are more likely to address school issues than mothers with less education.

There are various theories as to why lower-SES parents are less involved in their children's education. One is the culture-of-poverty theory, which says that lower-class families do not value education as highly as higher-SES families do (Deutsch, 1967). Some researchers believe that the institutions themselves are at fault for making middle-class families feel more welcome than lower-class ones, in effect freezing out lower-class families (Lightfoot, 1978). Another theory suggests the differences in cultural capital between middle- and upper-class students produce differential school outcomes (Bourdieu, 1977).

The relative effects of PI for different SES groups are contested. McNeal (2014) states that PI is more effective for high SES students with greater resources, but Domina's

(2005) study of the data from the 2003 Parent and Family Involvement Survey suggests that PI in low-SES families has a greater positive effect on student achievement. Tang, Dearing, and Weiss (2012) assert that PI might be a way to narrow the gap between more and less socio-economically advantaged families. Von Otter (2014) points out that parents with more experience with education can better help with schoolwork, and those who have more resources can provide better environments for the students to focus on work. Parents with less education may feel less able to help and therefore not be as involved (Eccles & Harold, 1996; Lareau, 2000).

Regardless, each family factor cannot be isolated completely and analyzed. Stevenson and Baker (1987) found that mother's education does not have an impact on student achievement when PI is held constant. McNeal (2014) found that family SES is less important in schools with a lot of student turnover. In these situations, social ties within and between families become more important.

The third type of factors are macro factors, which include characteristics of the school, community, or in the case of a comparative study, country that might affect student achievement independent of PI. For example, a certain parent might be very involved in his child's education, but most other parents in the school are not heavily involved. In that case, the school's parents might not share information about teachers and school expectations at a high rate. This would result in lower levels of shared cultural capital and group social ties from which this one involved parent can draw. While the student may still benefit from his/her parent's efforts, this benefit would likely not be as large as it could be if the rest of the community is not similarly involved (Coleman, 1987). Alternately, there might be a parent who is not very involved, but there is a strong culture of PI in the rest of

the school. A robust parent teacher organization (PTO) or other PI presence benefits all students, regardless of individual PI practices (Fan & Chen, 2001). Teachers and administrators would more readily respond to the large, networked system of parents and their concerns, and the students whose parents are more heavily involved would likely reinforce and pass on beneficial behaviors, such as behaving well in class, to their peers whose parents are less involved (Coleman, 1987).

The individual-level effects of PI can be magnified or reduced due to levels of school-wide PI. McNeal (2014) points out that the relationships between SES and achievement, parent-child discussions and achievement, and PTO involvement and achievement can be significantly altered through social context. Coleman (1987) argues that religious groups can play a similar role to schools in terms of the effects of social context. He concludes that the community created by the Catholic Church encourages improved social networks, healthy adolescent norms, and social capital among its members, which reduced dropout rates among high-risk students. Coleman believes that the cross-generational ties that are made in religious communities increase social capital and eventually student achievement.

Although macro-level factors may strengthen the effects of PI on student achievement, or mitigate negative PI, highly transient student populations in a school, also known as structural instability, has been shown to weaken student achievement (McNeal, 2014). This is because high degrees of student turnover curb the creation and depth of extended social ties. For instance, a school that has a stable set of like-minded parents would address issues relevant to those particular parents and children, whereas a school with a high turnover of students might see parent concerns as temporary, soon to change with a new group of parents, so fewer specific concerns might be addressed. A highly

transient student population might also weaken the ability for parents to create strong social connections with each other and the teachers (McNeal, 2014).

However, structural instability alters the effects of some individual-level PI. It strengthens the effects of parent-child discussion and PTO involvement and weakens the individual-level effects of SES on student achievement. High levels of structural instability create a space for individual-level PI to be particularly influential on student achievement (McNeal, 2014), so it is especially important for parents whose children are in schools with high levels of structural instability to participate in PI practices.

These points show that there is a complicated and interwoven relationship between contextual factors, PI, and student achievement. While it may be important to increase individual-level PI, it is also important to increase school-wide or even community/country-level PI. This relationship is highly evident in South Korea, where there are significant macro-level influences on student achievement. There is a cultural norm that education is of the utmost importance and that parents can make an impact. This cultural mindset spills over to the school- and individual-levels, promoting macro- and micro-level PI that supports all students' achievement (McNeal, 2014).

These macro-level factors must be controlled for to answer my research question about the relationship between various measures of PI and student reading achievement. Unfortunately, there are not measures of school-wide involvement practices or structural instability in this data set, but I am able to include school-wide pressure from parents for high academic performance.

In order to control the scope of this project and because of data limitations, I am controlling for student sex; family economic, social, and cultural status; and school-level

parental pressure for high achievement. Controlling for these three factors will help separate out the interwoven effects of PI and contextual factors.

Methodology

This study is designed to analyze the relationships between PI practices and student reading achievement. It employs data from the 2009 wave of testing from Programme for International Student Assessment (PISA), which is a branch of the Organisation for Economic Co-operation and Development (OECD).

Data Set Background

The OECD was formed in 1961 as a spinoff of a European organization that was established to run the Marshall Plan after World War II. There are now 34 OECD member economies that come together to identify and explore problems in today's global economy and promote policies that advance the well being of people around the world (History, OECD).

PISA was developed as part of the OECD in 1997 as a way to provide data on the knowledge and skills of students in OECD member countries. PISA has administered tests and surveys to random samples of students in all member countries and some partner countries/economies every three years, starting in 2000. These tests and surveys measure reading, math, and science performance as well as contextual information that relates to a student's education (OECD). According to Rutkowski, Rutkowski, and von Davier (2014), PISA is considered one of the most widely used and discussed international education assessments.

To explore the relationship between PI and student achievement, I needed to look at a contextual survey, namely the parent questionnaires, which became an optional addition for countries in 2006. That means there are data available that include the PI variables from the parents' perspective for 2006, 2009, and 2012. Although students are tested each year in math, science, and reading, different years have different focuses. The focus was science in 2006 (2006 Results, OECD), reading in 2009 (2009 Key Findings, OECD), and math in 2012 (2012 Results, OECD). According to Borgonovi and Montt (2012), reading scores are more affected by PI than are math or science scores, so I chose to use the 2009 reading scores as the measure of student achievement.

The 14 economies listed in Table 2 – Chile, Croatia, Denmark, Germany, Hong Kong (China), Hungary, Italy, Korea, Lithuania, Macao (China), New Zealand, Panama, Portugal, and Qatar – opted to participate in and completed the parent questionnaire. Poland is not included in this study because it opted into the parent questionnaire but did not administer the sections of it that involves PI (Borgonovi & Montt, 2012).

The PISA tests were given to a sample of students who were approximately 15 years old in each economy. Each student was given a paper-and-pencil test that contained both multiple choice and free response questions. The test takes about two hours to complete. The reading assessments include a passage or diagram with multiple choice or short answers questions such as, "Who are the 'imaginary beings' referred to in the last line of the passage?" and "What would **you** do if you had bought these biscuits? Why would you do this?" (Annex A1, OECD).

Each student has a variety of testing materials, which results in five plausible value scores for each student in reading, math, and science (Background and Basics, OECD).

These five plausible values are PISA's way to more accurately estimate the students' abilities in these subjects. It is not appropriate to take the average of the five scores, and it is not optimal to use only one plausible value, but due to time constraints, for this study, I randomly selected plausible value 5 in reading to be the dependent variable of student reading achievement.

After the test, the students were given the parent questionnaire to take home to their parents and return the next day. The questionnaire took about 20 minutes for a parent to finish (Borgonovi & Montt, 2012) and asked about information pertaining to factors that are potentially related to academic success, such as parent interest, involvement (listed in Table 2), and engagement with their child, the school, and personal reading. Sample non-PI questions include, "When you are at home, how much time do you spend reading for your own enjoyment (e.g. magazines, comics, novels, fiction, non-fiction)?" and "In the last twelve months, about how much would you have paid to educational providers for services?" (OECD).

Of the students who received the parent survey in the 14 economies, 106,287 students successfully returned the completed parent questionnaire. Table 2 provides this number of returned parent questionnaires in each economy. The number of respondents varied from 3,178 in Germany to 27,511 in Italy. Response rates varied from 63.8 percent in Germany to 99.6 percent in Macao, China.

Table 2: Included Economies

Country	Region	N	Parent Response Rate (%)
Hong Kong, China	Asia	4751	98.2
Korea	Asia	4936	98.9
Macao, China	Asia	5929	99.6
Croatia	East Europe	4506	90.2
Hungary	East Europe	4450	96.6
Lithuania	East Europe	4476	98.9
Germany	West Europe	3178	63.8
Denmark	West Europe	3536	59.7
Italy	West Europe	27511	89
Portugal	West Europe	4902	77.8
Chile	Latin America	*	*
Panama	Latin America	3369	84.9
New Zealand	Oceania	3481	75.0
Qatar	Middle East	6102	67.2

Source: Borgonovi and Montt (2012)
*N and Parent Response Rate not reported for Chile

Data Analysis

This study uses quantitative research methods to analyze student-level data using an international large-scale data set composed of 14 economies. Each student has identification numbers that allows him/her to be connected to the appropriate country, school, and parent. These ID numbers made it possible to merge each student's reading score with his/her parent's questionnaire answers and school principal answers (PISA 2009 Technical Report, OECD). I used the statistical software package Stata to complete the analysis of the data merged from the student, parent, and principal questionnaires.

The goal of this thesis is to look at the strength and direction of the relationship between student achievement and PI factors in each of the countries. This information will be presented through a factor analysis and ordinary least squares (OLS) regression. These

analyses ignore the nesting of students within schools. This should be corrected in future studies by using a multilevel analysis.

The factors were identified using a common factors analysis with promax rotation, the Kaiser test (eigenvalues over 1), and a scree test. I then ran the OLS regression analysis using robust standard errors due to evidence of heteroskedasticity. The dependent variable is student's reading achievement as indicated by plausible value 5. Descriptive statistics for the dependent variable are available in Table 3.

Table 3: Descriptive Statistics for Reading Achievement

Country	Mean	Standard Deviation	Minimum	Maximum
Chile	452.63	82.28	132.97	703.52
Germany	496.38	96.5	176.58	781.91
Denmark	481.17	87.6	168.8	752.83
Hong Kong	533.89	83.51	210.97	799.94
Croatia	475. 56	87.29	173.29	750.45
Hungary	499.13	86.21	202.55	739.57
Italy	491.32	92.61	37.09	788.03
Korea	541.79	76.96	150.84	757.92
Lithuania	469.20	86.7	163.51	734.56
Macao	486.38	76.51	180.43	718.51
New Zealand	523.20	101.98	113.57	832.27
Panama	376.24	96.88	76.61	699.13
Portugal	488.77	85.67	147.48	771.19
Qatar	370.75	114.4	43.26	765.86

Consistent with the literature, the regression analyses include three important control variables: student sex, parent socio-economic-cultural status, and school-wide parent pressure. Student sex is coded as male/female. PISA's index of economic, social, and culture status (ESCS) is measured using parent occupational status, the highest level of schooling between the student's parents, family wealth, home educational resources, and a PISA index of culture in the family's home. ESCS is similar to the traditionally used measure

socio-economic status (SES). The school-wide parent pressure variable comes from the question, "Which statement below best characterizes parental expectations towards your school" with answer choices: "There is constant pressure from *many parents*, who expect our school to set very high academic standards and to have our students achievement them," "Pressure on the school to achieve higher academic standards among students comes from a *minority of parents*," and "Pressure from parents on the school to achieve higher academic standards among students is *largely absent*." This is a measure of school parental climate and is answered by the school principal. Descriptive statistics for these variables can be found in the Appendix.

To better meet OLS assumptions and for ease of understanding the results, I recoded all of the items from question 08 and the school culture variable into dichotomous measures. The changes can be seen in Table 4.

Table 4: Variable Recoding

Question	Survey	Recoded
0801-0808	1 = Never or hardly ever 2 = Once or twice a month 3 = Once or twice a week 4 = Every day or almost every day	0 = Twice a month or less 1 = At least once a week
1501-1508	1 = Yes 2 = No	0 = No 1 = Yes
SEX	1 = Female 2 = Male	0 = Male 1 = Female
Par Exp	1 = Many parents 2 = Minority of parents 3 = Largely absent	0 = Minority of parents or largely absent 1 = Many parents
ESCS	Continuous variable ranging from -4.85 to 3.29	No change

My research is an expansion of the work from the PISA working paper by Borgonovi and Montt (2012). They ran regressions for each country, but the models included only one PI variable in each regression. In Borgonovi and Montt's (2012) analysis, almost all of the statistically significant nontraditional involvement coefficients (0801-0807) are positive, and almost all of the statistically significant traditional involvement coefficients (0808, 1501-1508) are negative.

Croatia, Italy, and Lithuania omitted variable *Assist Teach*, which I accounted for by taking variable 1506 out of the factor analyses regressions for those three countries. 1506 is not my primary variable of interest, so I am not concerned about slightly altering the model for it.

Results

Factor Analysis

In the exploratory factor analysis component, I found five significant factors from the 11 separate factor analyses in the included countries. Three countries did not include question 1506 ("The last academic year, have you participated in assisting the teacher in school?"), so they were removed from the analysis. The five factors are Home-Based Involvement, School-Based Involvement, Reading/Homework, Spending Time Together, and Discussions with Child. The factors and factor loadings are presented in Table 5.

Table 5: Factors and Factor Loadings

ountry	Factor Label	Item (Factor Loading)
ıile	1: School-Based Involvement (modified)	Vol Ex Cur (0.6110), Vol Lib (0.7325), Assist Teach (0.5763), Speaker (0.5837), Sch Govt (0.5476)
	2: Discussions with Child	Dis School Prog (0.5129), Talk (0.5160), Talk Read (0.4153)
ermany	1: School-Based Involvement	Vol Phys (0.7147), Vol Ex Cur (0.7816), Vol Lib (0.5896), Asisst Teach (0.7404), Speaker (0.4850), Sch Govt (0.6690)
	2: **	**
enmark	1: School-Based Involvement (modified)	Vol Phys (0.5322), Vol Ex Cur (0.6759), Assist Teach (0.5239), Speaker (0.4769), Sch Gov (0.6125)
	2: Reading/Homework (modified)	Books/Lib (0.7347), Talk Read (0.5445)
ong Kong	1: School-Based Involvement	Vol Phys (0.8369), Vol Ex Cur (0.9062), Vol Lib (0.8423), Assist Teach (0.9348), Speaker (0.4875), Sch Govt (0.4254)
	2: Discussions with Child	Dis Pol/Soc (0.7791), Dis Pop Cul (0.7706), Dis School Prog (0.4920)
roatia*	1: School-Based Involvement (modified)	Vol Phys (0.8086), Vol Ex Cur (0.9233), Vol Lib (0.7706), Speaker (0.4409)
	2: Reading/Homework	Books/Lib (0.4577), Talk Read (0.4417), Help Homewk (5436)
ungary	1: School-Based Involvement	Vol Phys (0.7876), Vol Ex Cur (0.7716), Vol Lib (0.7673), Assist Teach (0.7847), Speaker (0.7816), Sch Govt (0.7024)
	2: Spending Time Together (modified)	Dis School Prog (0.6049), Eat (0.6165), Talk (0.6733)
aly*	1: School-Based Involvement (modified)	Vol Phys (0.6331), Vol Ex Cur (0.8280), Vol Lib (0.8056), Speaker (0.7256)
	2: Spending Time Together (modified)	Dis School Prog (0.6167), Eat (0.6611), Talk (0.5231)
orea	1: School-Based Involvement (modified)	Vol Phys (0.6883), Vol Ex Cur (0.8066), Vol Lib (0.8691), Assist Teach (0.6027), Speaker (0.6831), Sch Govt (0.5910)
	2: Reading/Homework	Books/Lib (0.6476), Talk Read (0.6390), Help Homewk (0.6191)
thuania*	1: Discussions with Child	Dis Pol/Soc (0.6768), Dis Pop Cul (0.7076), Dis School Prog (0.4221), Talk Read (0.4902)
	2: School-Based Involvement (modified)	Vol Phys (0.7139), Vol Ex Cur (0.7322), Vol Lib (0.7845), Speaker (0.4496), Sch Govt (0.4868)
lacao hina)	1: School-Based Involvement (modified)	Vol Phys (0.8486), Vol Ex Cur (0.9743), Vol Lib (0.7098), Assist Teach (0.8497), Speaker (0.5808)
	2: Reading/Homework	Books/Lib (0.7452), Talk Read (0.7044), Help Homewk (0.7041)
ew ealand	1: School-Based Involvement	Vol Phys (0.7756), Vol Ex Cur (0.8766), Vol Lib (0.4994), Assist Teach (0.7129), Speaker (0.4412), Sch Govt (0.6160)
	2: Reading/Homework	Books/Lib (0.6903), Talk Read (0.6691), Help Homewk (0.5273)
anama	1: School-Based Involvement	Vol Phys (0.7509), Vol Ex Cur (0.9307), Vol Lib (0.8434), Assist Teach (0.7834), Speaker (0.7942), Sch Govt (0.5955)
	2: Home-Based Involvement (modified)	Dis School Prog (0.5544), Eat (0.6142), Talk (0.5558), Talk Read (0.5569), Help Homewk (0.7053)
ortugal	1: School-Based Involvement	Vol Phys (0.8124), Vol Ex Cur (0.8912), Vol Lib (0.8449), Assist Teach (0.7997), Speaker (0.6877), Sch Govt (0.4500)
	2: Reading/Homework	Books/Lib (0.6416), Talk Read (0.7064), Help Homewk (0.4975)
atar	1: School-Based Involvement (modified)	Vol Phys (0.8052), Vol Ex Cur (0.8199), Vol Lib (0.7959), Speaker (0.4904)
	2: Reading/Homework	Books/Lib (0.6554), Talk Read (0.6783), Help Homewk (0.4796)

*_Assist Teach_ removed from the country's survey and this analysis
**No factor loadings >.4 for Factor 2 in Germany
Modified – includes or excludes a number of items

The particularly interesting thing about this exploratory factor analysis is that in each economy analyzed except for Lithuania, Factor 1 is some form of School-Based Involvement. I believe that School-Based Involvement is the most dominant factor in each of the included economies because it is usually expected and organized by the school (Shen et al., 2014), so a parent who does one school-based involvement practice likely does others.

Regression Analysis

While the results of the factor analysis are rich in information about how to define the construct of PI in each of the included economies, the results revealed a problem for the regression analysis across countries because there was variability in the factor solutions. Similarly to Hampden-Thompson et al. (2013), I also wanted to make sure that I could look at the relationship between specific PI actions and achievement instead of the underlying constructs that the individual actions presumably measure.

I ran one OLS regression for each participating economy with the 16 PI variables and three control variables to better separate out the individual associations between the PI, control, and student achievement variables. The models use robust standard errors due to evidence of heteroskedasticity. The large number (16) of PI-related variables could create multicollinearity and, therefore, undermine tests of statistical significance due to increased variance. Therefore, I estimated the variance inflation factor (VIF) after each regression. The maximum output from this test was 1.64, which is well below 5, which suggests that no significant multicollinearity was observed in these data. Table 6 presents the regression results. See the Appendix for descriptive statistics of each of the included variables.

It is important to remember when looking at these data that there is a difference between home-/school-based involvement and nontraditional/traditional involvement. PISA uses the distinction of home- and school-based involvement. Variables 0801-0808 are home-based, and variables 1501-1508 are school-based. However, much of the literature uses the distinction of nontraditional and traditional involvement. The latter is the most useful distinction for the purposes of this paper.

Table 6: Regression Results

	Chile	Germany	Denmark	Hong Kong	Croatia	Hungary	Italy
Nontraditional Involvement							
0801: *Dis Pol/Soc*	19.442** (2.341)	1.729** (3.355)	14.488** (3.200)	5.283* (2.828)	21.161** (2.504)	10.084** (2.198)	21.144** (1.162)
0802: *Dis Pop Cul*	5.485* (2.767)	1.735 (3.654)	9.772** (3.756)	0.844 (2.977)	7.772** (2.851)	1.021 (3.477)	4.419** (1.431)
0803: *Dis School Prog*	10.556** (3.982)	-5.305 (4.577)	-10.089 (5.397)	2.641 (3.024)	2.312 (6.309)	-4.178 (7.522)	1.171 (2.703)
0804: *Eat*	3.044 (3.892)	11.575 (9.573)	-3.526 (9.729)	8.822 (6.917)	-10.029 (5.368)	-1.079 (4.940)	7.689* (3.894)
0805: *Talk*	-1.284 (3.058)	29.518 (16.970)	3.900 (9.800)	8.268 (4.629)	-4.094 (4.721)	12.291* (6.036)	-2.978 (2.129)
0806: *Books/Lib*	-3.771 (4.425)	1.713 (6.168)	-7.606 (6.844)	10.072** (3.452)	-2.650 (5.092)	-2.380 (4.264)	1.271 (1.864)
0807: *Talk Read*	8.527** (2.333)	8.037* (3.316)	3.106 (2.683)	-1.349 (2.894)	-3.755 (2.539)	8.290** (2.277)	9.347** (1.070)
Traditional Involvement							
0808: *Help Homewk*	-20.221** (2.284)	-40.525** (3.293)	-20.016** (2.633)	-16.953** (2.858)	-32.659** (2.592)	-29.136** (2.226)	-31.706** (1.079)
1501: *Dis Par Init*	-3.387 (2.318)	-28.074* (3.264)	-24.681** (2.576)	-1.978 (2.642)	-7.322* (2.874)	-10.578** (2.175)	1.352 (1.049)
1502: *Dis Teach Init*	-12.574** (2.222)	-33.444** (3.272)	-1.096 (2.980)	-14.825** (2.552)	-18.430** (2.515)	-20.952** (2.341)	-26.693** (1.023)
1503: *Vol Phys*	-3.049 (3.950)	-10.111 (6.434)	-.616 (5.857)	-5.577 (7.175)	-16.556** (4.846)	0.592 (5.338)	-28.947** (2.555)
1504: *Vol Ex Cur*	11.512** (3.052)	1.023 (4.060)	4.882 (3.462)	1.238 (5.920)	-9.926** (3.488)	2.292 (3.441)	-0.838 (1.402)
1505: *Vol Lib*	-19.782** (6.427)	16.300 (10.767)	24.453 (18.876)	-20.452* (8.805)	-25.108** (8.385)	-28.462** (8.059)	-11.915** (2.398)
1506: *Assist Teach*	-16.956** (3.863)	-2.226 (5.054)	-3.427 (4.838)	-16.603** (6.345)	/////	-5.292 (3.686)	/////
1507: *Speaker*	-3.443 (4.652)	-25.322 (15.016)	-3.027 (8.878)	-19.369** (7.343)	0.953 (7.182)	-13.674 (9.677)	-23.743** (2.406)
1508: *Sch Govt*	-.984 (2.937)	-1.748 (4.331)	8.333** (3.154)	-7.390 (5.451)	2.233 (3.545)	0.862 (5.267)	-1.845 (1.392)
Controls							
SEX	17.446** (2.100)	36.348** (3.004)	30.468** (2.516)	28.391** (2.297)	43.329** (2.250)	35.440** (2.082)	33.275** (0.989)
ESCS	23.540** (1.018)	38.231** (1.784)	30.104** (1.532)	18.896** (1.206)	27.777** (1.274)	33.331** (1.205)	24.411** (0.529)
Par Exp	28.912** (2.586)	19.203** (6.422)	11.990** (2.969)	3.334 (6.997)	20.361** (4.218)	49.608** (2.688)	37.068** (1.261)
_cons	453.982** (5.109)	470.914** (17.728)	484.952** (12.245)	531.810** (6.884)	485.021** (8.244)	490.296** (8.497)	475.489** (4.400)
N	4323	2680	3273	4438	4337	4195	25315
F	91.94	71.6	52.57	34.02	96.66	172.95	564.73
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.2854	0.3229	0.2306	0.1288	0.2671	0.4016	0.2721

**p<.05, **p<.01*

	Korea	Lithuania	Macao	New Zealand	Panama	Portugal	Qatar
Nontraditional Involvement							
0801: *Dis Pol/Soc*	12.345** (2.976)	13.974** (2.490)	6.872** (2.324)	19.168** (3.633)	17.744** (3.547)	20.903** (2.343)	14.765** (3.014)
0802: *Dis Pop Cul*	-1.056 (2.478)	-1.981 (3.062)	2.578 (2.287)	6.380 (4.566)	4.202 (3.918)	9.902** (2.940)	9.981** (3.088)
0803: *Dis School Prog*	2.316 (2.540)	15.368* (6.693)	1.384 (2.298)	-0.258 (4.866)	8.602 (4.819)	-6.785 (4.783)	18.467** (3.879)
0804: *Eat*	6.198 (4.613)	-1.532 (5.038)	21.632** (3.986)	-9.290* (4.085)	10.344* (5.078)	17.534* (8.901)	18.939** (5.895)
0805: *Talk*	6.091* (3.052)	6.617 (5.036)	4.920* (2.471)	13.660 (9.018)	4.645 (5.121)	4.378 (4.357)	2.265 (4.506)
0806: *Books/Lib*	10.470** (3.960)	-6.664 (4.035)	2.678 (3.824)	11.698* (4.649)	-8.027* (4.832)	-4.311 (3.268)	-28.476** (3.301)
0807: *Talk Read*	4.165 (3.229)	4.144 (2.527)	-2.304 (2.795)	6.418 (3.394)	-6.108 (3.769)	5.864* (2.316)	10.820** (3.156)
Traditional Involvement							
0808: *Help Homewk*	-13.299** (3.274)	-25.291** (2.365)	-12.375** (2.370)	-21.165** (3.219)	-28.323** (4.055)	-29.243** (2.223)	-18.131** (2.999)
1501: *Dis Par Init*	-6.889** (2.426)	-7.559** (2.406)	-9.333** (2.385)	-12.821** (3.168)	0.370 (3.701)	-16.606** (2.391)	7.448* (3.307)
1502: *Dis Teach Init*	2.298 (2.545)	-15.630** (2.390)	-13.145** (2.048)	-19.510** (3.041)	-21.463** (3.472)	-23.213** (2.124)	-6.011 (3.238)
1503: *Vol Phys*	3.189 (2.855)	-19.440** (4.841)	-1.883 (4.151)	-15.668* (6.667)	-3.778 (5.258)	-13.111 (7.229)	3.935 (5.249)
1504: *Vol Ex Cur*	-8.226* (3.313)	4.823 (3.368)	-5.962 (3.196)	10.158** (3.390)	-0.517 (4.805)	-6.363 (4.813)	8.049* (4.029)
1505: *Vol Lib*	1.724 (3.930)	-33.965** (12.721)	-3.804 (5.741)	-13.997 (14.910)	-29.053** (6.937)	-11.041 (9.111)	-16.675** (5.295)
1506: *Assist Teach*	6.304 (3.933)	/////	-8.903** (3.417)	-3.236 (6.378)	-8.027 (4.832)	-3.965 (4.549)	-30.667** (3.230)
1507: *Speaker*	-21.369** (6.680)	-14.898* (6.147)	1.415 (6.964)	-12.159 (14.734)	-8.323 (6.994)	-0.262 (6.061)	-24.934** (4.497)
1508: *Sch Govt*	-1.114 (3.101)	2.351 (3.060)	-0.195 (2.442)	8.975 (6.533)	-8.654* (3.826)	2.763 (2.850)	-3.151 (4.562)
Controls							
SEX	28.982** (2.048)	53.911** (2.309)	31.316** (1.970)	35.208** (3.019)	21.632** (3.219)	31.932** (2.129)	36.352** (2.953)
ESCS	27.693** (1.354)	28.216** (1.213)	10.326** (1.211)	40.116** (2.053)	25.010** (1.405)	23.290** (0.930)	24.237** (1.463)
Par Exp	28.272** (3.260)	12.975** (3.898)	23.498** (8.677)	15.694** (3.087)	31.331** (4.098)	18.165** (3.402)	35.309** (2.888)
_cons	516.248** (4.967)	443.314** (7.321)	468.657** (4.265)	507.431** (9.897)	400.491** (6.666)	487.490** (9.775)	312.852** (5.952)
N	4653	4051	5442	3086	2526	4579	5494
F	48.31	100.86	36.81	49.88	64.5	98.58	78.22
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.171	0.295	0.1112	0.223	0.3252	0.288	0.1977

Table 6 shows that the model is statistically significant and explains between 11 and 40 percent of the variation in student reading achievement in each economy. With the exception of parent pressure in Hong Kong, the control variables are all statistically significant and indicate that in each country females perform better than males, higher levels of ESCS perform better than lower levels, and students in schools with high levels of school-level parent pressure perform better than those from low levels of parent pressure.

As for the parental involvement variables, it appears that PI matters in student achievement. In general, nontraditional involvement has a positive association with student achievement, and traditional involvement has a negative association with student achievement. *Dis Pol/Soc* and *Help Homewk* are prime examples of this. *Dis Pol/Soc* is statistically significant in every country and has a minimum coefficient of 1.729 (3.355) in Germany and a maximum coefficient of 21.161 (2.504) in Croatia. *Help Homewk* is also statistically significant in every country but with a negative association, perhaps following with the reactive hypothesis. These coefficients range from -12.375 (2.370) in Macao to -40.525 (3.293) in Germany. As a note, *Books/Lib* and *Vol Ex Cur* are mixed, not always following the general pattern of traditional involvement coefficients being positive and nontraditional involvement coefficients being negative.

While the conclusions from the economies in this analysis cannot necessarily be generalized to the surrounding region, it can be useful to organize the analysis by geographic region to find trends and manage the size of each analysis. As such, I am focusing on only 10 economies. I exclude Chile, New Zealand, Panama, and Qatar in this discussion because they do not fit neatly with more than one other country into a region.

Asia

The economies in this region are Korea, Hong Kong (China), and Macao (China). For nontraditional involvement, parents spending time with their parents, just interacting and talking, is associated with higher student achievement. In Hong Kong, *Books/Lib* is the most associated with high achievement with a coefficient of 10.072 (3.452), but *Dis Pol/Soc* is also statistically significant. *Dis Pol/Soc* is the most associated with high achievement in Korea with a coefficient of 12.345 (2.976) with *Books/Lib* close behind and *Talk* statistically significant. In Macao, *Eat* is most highly associated with achievement with a 21.632 (3.986) coefficient, and *Dis Pol/Soc* and *Talk* are also statistically significant. For all three, *Dis Pol/Soc* and for two of the three *Talk* and *Books/Lib* are positively associated with reading outcomes, holding the other PI variables and the three controls constant.

In these three economies, none of the traditional involvement variables are positively associated with student achievement. It is possible that the reactive hypothesis is important when observing traditional involvement practices for students of this age. It seems as if parents in Hong Kong are waiting to *Help Homewk*, *Dis Teach Init*, *Vol Lib, Assist Teach,* and *Speaker* until their child is doing poorly. It is interesting to note in Hong Kong that *Par Exp*, the school expectations climate variable, is not statistically significant, perhaps because parental pressure is homogenous in Hong Kong. In Korea, *Help Homewk, Dis Par Init, Vol Ex Cur,* and *Speaker* are statistically significant. It seems as if parents are waiting to reach out to their child's teacher until their child is doing slightly worse. However, the variable of teachers contacting the parent (*Dis Teach Init*) is not statistically significant, perhaps because there is more of a culture of teachers reaching out to parents even if the student is not doing poorly. Or maybe the effect is washed out if teachers

frequently talk to parents of both high and low performing students. In Macao, parents do not seem to let their children get too far behind before becoming involved. *Help Homewk, Dis Par Init, Dis Teach Init,* and *Assist Teach* are all statistically significant.

These three Asian economies are unique in the *Help Homewk* coefficients because the coefficients are smaller in magnitude compared to the other economies in this study. The coefficients are -16.953 (2.858), -13.299 (3.274), and -12.375 (2.370) for Hong Kong, Korea, and Macao, respectively. The *Help Homewk* coefficients for the countries in the other economies range from -18.131 (2.999) for Qatar to -40.525 (3.293) for Germany. Perhaps Asian parents have a different threshold of what "doing poorly" is, so they might reach the point of thinking their help is required more quickly than other parents.

The R-squared values for the Asian economies are also interesting. They explain the least amount of variance in student achievement out of all of the included economies with 12.88%, 17.10% and 11.12% for Hong Kong, Korea, and Macao, respectively. This is surprising because of the famous Asian "tiger" parent method of parenting (controlling much of the child's life) and the pressure many Asian parents put on their children to succeed. I would have expected for these parenting practices to account for more of the variance in student scores in these three economies. An explanation might be that education and teachers are held in higher esteem in Asian countries, so the students do not need the traditional signals of PI to know that education is important. According to the literature review, a lot of the importance of traditional involvement practices is signaling, whereas some of the nontraditional involvement has more to do with scaffolding to help student form complex thoughts and arguments, which then helps reading achievement.

Another explanation might be that there is not a lot of variation in PI in these economies, so other factors that are not included in this model might have more importance.

Eastern Europe

The Eastern European countries are Hungary, Lithuania, and Croatia. *Dis Pol/Soc* is statistically significant for all three countries, and Lithuania and Croatia's coefficients are higher in magnitude than the coefficients for all three of the Asian economies. The variables that are most associated with student achievement are *Talk* for Hungary with a coefficient of 12.291 (6.036), *Dis School Prog* for Lithuania with 15.368 (6.693), and *Dis Pol/Soc* for Croatia with 21.161 (2.504).

The traditional involvement practices are associated with lower reading scores in these Eastern European countries. *Help Homewk* has a larger negative magnitude by more than 10 points over the Asian economies, which I take to mean that the Eastern European parents wait to respond to comparatively lower achievement from their children than do the Asian parents. Discussions with the teacher (*Dis Par Init* and *Dis Teach Init*) are statistically significant in all three countries, but in each case, the coefficient is lower for *Dis Teach Init* than for *Dis Par Init*, which might mean that the teacher responds to a lower point of student achievement by initiating contact with the parent than does the parent to initiate contact with the teacher. This could mean that the parents are more sensitive to their children's poor performance than the teachers are or that teachers take a different approach to addressing the students' struggles.

The R-squared values are comparable to those for the Western European countries, but they are higher than those for the Asian economies. Because of this, parent involvement practices as measured in this study seem to play a bigger role in these Eastern European

countries than they do in the Asian economies. The highest R-squared in the entire sample is in Hungary, where these variables explain 40.16% of the variation in student reading achievement.

Western Europe

The Western European countries that are included in this study are Denmark, Portugal, Germany, and Italy. In Denmark, Portugal, and Italy, *Dis Pol/Soc* is most highly associated with student reading achievement with coefficients of 12.488 (3.200), 20.903 (2.343), and 21.144 (1.162), respectively. *Dis Pop Cul* is also statistically significant in these three countries. In Germany, the highest coefficient is 8.037 (3.316) for *Talk Read*, which is also statistically significant in Portugal and Italy. Parent actions such as spending time with their children, talking to them in ways that involve complex skills such as recall and making connections are associated with higher student performance. This is similar to what is happening in Asia except that in Western Europe, the more recreational conversation topics – pop culture and reading – are statistically significant as well as the more serious topics, such as political and social issues.

For traditional involvement, the practice with the largest (or second largest) magnitude for all of the Western European countries is *Help Homewk* with coefficients of -20.016 (2.633), -29.243 (22.3), -31.706 (1.079), and -40.535 (3.293) for Denmark, Portugal, Italy, and Germany, respectively. These magnitudes are 5 or 10 points larger than those in Asia and are comparable to the Eastern European countries. Again, this suggests that parents are waiting to help with homework until their child is doing poorly, and parents in Europe are waiting longer than are parents in Asia. Because of the magnitudes of these coefficients, it seems as if parents are waiting longer to do this practice than to do

other traditional involvement practices, perhaps preferring to have conversations with the child's teacher about his/her progress first. German parents in particular appear to be waiting to intervene by helping with homework over parents in all of the other countries.

In Denmark, Portugal, and Germany, *Dis Par Init* is statistically significant, but in Italy it is not. Perhaps in Italy, there is more of a culture of parents initiating contact with the teachers no matter how their child is doing or a culture of not initiating contact at all. *Dis Teach Init* is statistically significant in Portugal, Italy, and Germany, but the negative coefficients have a comparatively large magnitude, which suggests the teachers are waiting a long time to reach out to the parents. Denmark is an anomaly in these Western European countries (and in most of the sample) for having a positive relationship between a traditional involvement variable, *Sch Govt*, and student achievement. It is not particularly large at 8.333 (3.154), but it is statistically significant. This might reflect the emphasis on citizenship and participation in government that is important in Denmark.

As mentioned in the previous section, the R-squared values for these Western Europe countries are comparable to those in the Eastern Europe countries and are higher than those in the Asian economies. These PI practices seem to play a bigger role in Western Europe than they do in Asia.

Limitations

There are several limitations that should be acknowledged when drawing inferences from this study. Only 13 economies were used in the analysis, so the results cannot be easily generalized to other countries. Bias could be present in the questionnaire if certain kinds of students are most likely to remember to bring the questionnaire home

and return it the next day. Also, only certain parents might be most likely to fill out the questionnaire (Borgonovi & Montt, 2012).

Although the data are available for certain PI factors when the child enters their first year of school, I am not including that information in this analysis. That would help control for school effects, reducing a bias on, in particular, school-based PI. There are also other control variables, such as school-wide structural instability, that I am not including because they are not available in this data set. I also did not account for the hierarchical structure of the data with students nested between schools.

Conclusion

Summary of Research Questions

The results of this study provide insight into parental involvement and student reading achievement on an international level based on the following research questions:

1. What is the relationship between various measures of both traditional and nontraditional parental involvement (PI) and student reading achievement in the included 14 countries?
2. Does the relationship between PI and student reading achievement vary across these 14 countries?

In summary, nontraditional PI is typically positively associated with student achievement, and traditional PI is usually negatively associated with student achievement. The strength of these relationships do vary somewhat from country to country, but the

directions of the associations are generally the same, which fits with past literature using these data.

Recommendations

Due to the nature of the study, this model is correlational instead of causal. However, in conjunction with the literature review, analysis of these data may provide tentative suggestions to parents and policymakers. Based on my results, in the three Asian economies, parents might want to spend more time talking to their children about complex topics, such as political and social issues and generally spending time with them. In schools, policymakers could encourage teachers to create assignments in which students discuss complex issues in the classroom. I do not think parents necessarily need to respond even more quickly to low achievement with traditional involvement practices because parents seem to be reacting more quickly than parents in other countries without the extra encouragement. While many PI practices in these economies are statistically significant and some have practical significance for achievement, PI does not explain as much of the variance in student achievement as it does in other countries. As such, PI practices are not as important to the success of these Asian students, perhaps because there is not much variation in PI.

Similarly, parents and teachers in the included Eastern European countries should try to spend more time talking about complex political and social issues with their children. In Hungary, stakeholders should also spend more time talking to the child about what he/she is reading and in Croatia, about books, television, and films. The R-squared for Hungary is 0.4016, which is unusually high, which suggests that PI has a great impact on their children's reading achievement in Hungary. The R-squared values in Lithuania and

Croatia are also rather high, so these PI practices appear to be important for reading achievement.

Talking about complex political and social issues in all four of the Western European countries also seems to be important, as does discussing pop culture in all but Germany. Western European parents might notice a difference in their children's reading achievement if they generally spend more time talking to their children about complex topics. Western European parents may be waiting a long time to step in by helping with homework when their child is performing poorly, and teachers seem to wait to reach out to the parents, so parents and teachers might make a difference by intervening more quickly. The R-squared values for these four countries are pretty high, ranging from 0.2306 to 0.3229, which suggests that these involvement practices should be making a significant difference in their children's reading achievement.

As of now, I do not have evidence that any or all of the coefficients are or are not due to the reactive hypothesis. However, from previous studies, I believe that the negative associations from traditional involvement practices (primarily *Help Homewk, Dis Par Init,* and *Dis Teach Init*) are due to the reactive hypothesis. As such, I cannot comment well on any existing positive effects of traditional involvement to give recommendations. The comments I did make for traditional involvement practices, particularly about *Help Homewk* and *Dis Teach Init*, should be taken as exploratory. Perhaps to raise student achievement, parents should react more quickly and help with homework, and teachers should be quicker to initiate a discussion with the parents of students who are performing poorly. These recommendations might, in fact, raise student achievement.

Future Studies

If I did this same study again, I would include immigrant status as a control variable, as do Borgonovi and Montt (2012), and I would like a measure of school-level structural instability. I would also probably include some country-wide control variables. In addition, I would like to track student achievement as it relates to PI over time to better explore the reactive hypothesis. I would also like to do a study that uses non-cognitive measures as the dependent variables. I could also use approaches to quantitatively study the patterns in the results instead of considering them non-quantitatively.

A related study I would like to do would further explore the reactive hypothesis. My hypothesis is that if I do a separate regression for different achievement levels (such as each quartile or the top and bottom ten percent), then all of the PI practices will have positive associations to student scores. My assumption is that, if PI improves student scores, then of the lowest performing students, those whose parents are involved, even with traditional PI, will have higher scores than their peers with slightly lower scores. It would also be interesting to go into depth with Hungary because it has the highest R^2 in this model.

Final Thoughts

This study looks at associations between very specific parental involvement practices and student reading achievement, and I have included several recommendations to potentially raise reading achievement. However, is student academic achievement the ultimate goal? By the time students are 15, perhaps better goals are autonomy and responsibility. Maybe parents and teachers should, in fact, be slow to become involved in

their students' academic lives if the student is doing poorly to allow the student to develop into a more autonomous, responsible person in reaction to their own achievement.

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Appendix: Descriptive Statistics of Variables

Appendix: Mean (Standard Deviation)

	Chile	Germany	Denmark	Hong Kong	Croatia	Hungary	Italy
Dependent Variable							
PV5READ	452.63 (82.28) Min: 132.97 Max: 703.52	496.38 (96.50) Min: 176.58 Max: 781.91	481.17 (87.60) Min: 168.80 Max: 752.83	533.89 (83.51) Min: 210.97 Max: 799.94	475. 56 (87.29) Min: 173.29 Max: 750.45	499.13 (86.21) Min: 202.55 Max: 739.57	491.32 (92.61) Min: 37.09 Max: 788.03
Nontraditional Involvement							
Dis Pol/Soc	.44 (.50)	.61 (.49)	.69 (.46)	.55 (.50)	.40 (.49)	.54 (.50)	.66 (.47)
Dis Pop Cul	.77 (.42)	.74 (.44)	.81 (.39)	.64 (.48)	.76 (.43)	.88 (.32)	.82 (.38)
Dis School Prog	.92 (.28)	.86 (.35)	.94 (.24)	.68 (.47)	.96 (.20)	.98 (.15)	.96 (.20)
Eat	.91 (.28)	.97 (.18)	.98 (.13)	.96 (.19)	.95 (.22)	.95 (.21)	.98 (.14)
Talk	.83 (.38)	.99 (.12)	.98 (.12)	.90 (.30)	.92 (.27)	.96 (.20)	.93 (.25)
Books/Lib	.06 (.23)	.07 (.25)	.04 (.20)	.15 (.36)	.06 (.23)	.07 (.26)	.08 (.28)
Talk Read	.42 (.49)	.38 (.49)	.48 (.50)	.33 (.47)	.36 (.48)	.40 (.49)	.42 (.49)
Traditional Involvement							
Help Homewk	.55 (.50)	.35 (.48)	.51 (.50)	.27 (.44)	.28 (.45)	.42 (.50)	.33 (.47)
Dis Par Init	.68 (.47)	.68 (.47)	.56 (.50)	.43 (.49)	.82 (.38)	.51 (.50)	.64 (.48)
Dis Teach Init	.63 (.48)	.37 (.48)	.77 (.42)	.52 (.50)	.32 (.47)	.37 (.48)	.42 (.49)
Vol Phys	.09 (.29)	.06 (.24)	.05 (.22)	.05 (.21)	.07 (.26)	.05 (.23)	.05 (.22)
Vol Ex Cur	.17 (.37)	.19 (.39)	.15 (.36)	.08 (.27)	.15 (.36)	.13 (.33)	.19 (.39)
Vol Lib	.04 (.18)	.02 (.13)	.00 (.05)	.03 (.17)	.02 (.15)	.02 (.14)	.07 (.25)
Assist Teach	.10 (.30)	.13 (.33)	.08 (.27)	.07 (.26)	///	.12 (.33)	///
Speaker	.07 (.25)	.02 (.13)	.02 (.15)	.03 (.17)	.02 (.14)	.02 (.12)	.06 (.24)
Sch Govt	.17 (.37)	.17 (.38)	.21 (.40)	.06 (.23)	.11 (.31)	.05 (.21)	.16 (.37)
Controls							
SEX	.49 (.50)	.49 (.50)	.51 (.50)	.47 (.50)	.47 (.50)	.50 (.50)	.49 (.50)
ESCS	-0.51 (1.16) Min: -4.25 Max: 2.88	.17 (.91) Min: -4.81 Max: 3.16	.14 (.94) Min: -3.87 Max: 3.29	-0.82 (1.01) Min: -3.926 Max: 2.51	-.18 (.90) Min: -3.62 Max: 2.65	-.16 (.95) Min: -3.53 Max: 2.93	-.10 (.98) Min: -3.96 Max: 3.02
Par Exp	.24 (.42)	.04 (.19)	.20 (.40)	.03 (.16)	.06 (.24)	.18 (.38)	.15 (.35)

	Korea	Lithuania	Macao	New Zealand	Panama	Portugal	Qatar
Dependent Variable							
PV5READ	541.79 (76.96) Min: 150.84 Max: 757.92	469.20 (86.70) Min: 163.51 Max: 734.56	486.38 (76.51) Min: 180.43 Max: 718.51	523.20 (101.98) Min: 113.57 Max: 832.27	376.24 (96.88) Min: 76.61 Max: 699.13	488.77 (85.67) Min: 147.48 Max: 771.19	370.75 (114.40) Min: 43.26 Max: 765.86
Nontraditional Involvement							
Dis Pol/Soc	.18 (.39)	.51 (.50)	.32 (.47)	.68 (.47)	.46 (.50)	.55 (.50)	.53 (.50)
Dis Pop Cul	.36 (.48)	.78 (.41)	.53 (.50)	.84 (.37)	.69 (.46)	.81 (.39)	.61 (.49)
Dis School Prog	.68 (.47)	.96 (.20)	.61 (.89)	.88 (.33)	.81 (.40)	.93 (.25)	.80 (.40)
Eat	.93 (.26)	.94 (.24)	.93 (.25)	.84 (.36)	.84 (.36)	.98 (.14)	.93 (.25)
Talk	.81 (.39)	.93 (.26)	.68 (.47)	.97 (.18)	.85 (.56)	.93 (.25)	.87 (.34)
Books/Lib	.09 (.29)	.09 (.28)	.09 (.28)	.14 (.35)	.16 (.37)	.13 (.33)	.29 (.45)
Talk Read	.17 (.38)	.41 (.49)	.21 (.41)	.45 (.50)	.57 (.50)	.49 (.50)	.52 (.50)
Traditional Involvement							
Help Homewk	.14 (.35)	.43 (.50)	.31 (.46)	.47 (.50)	.73 (.44)	.41 (.49)	.53 (.50)
Dis Par Init	.35 (.48)	.58 (.49)	.29 (.45)	.62 (.49)	.67 (.47)	.74 (.44)	.64 (.48)
Dis Teach Init	.70 (.41)	.53 (.50)	.58 (.49)	.53 (.50)	.54 (.50)	.62 (.49)	.51 (.50)
Vol Phys	.25 (.43)	.07 (.25)	.09 (.29)	.07 (.26)	.18 (.38)	.03 (.18)	.10 (.29)
Vol Ex Cur	.17 (.38)	.15 (.35)	.20 (.40)	.32 (.47)	.21 (.41)	.07 (.26)	.20 (.40)
Vol Lib	.10 (.30)	.01 (.10)	.05 (.22)	.02 (.13)	.10 (.30)	.02 (.14)	.10 (.31)
Assist Teach	.09 (.29)	///	.16 (.37)	.09 (.28)	.21 (.41)	.08 (.27)	.29 (.45)
Speaker	.03 (.16)	.04 (.20)	.03 (.17)	.02 (.13)	.10 (.30)	.04 (.20)	.12 (.32)
Sch Govt	.17 (.38)	.16 (.36)	.21 (.41)	.08 (.27)	.28 (.45)	.19 (.39)	.14 (.34)
Controls							
SEX	.48 (.50)	.49 (.50)	.49 (.50)	.48 (.50)	.51 (.50)	.52 (.50)	.50 (.50)
ESCS	-.13 (.82) Min: -3.72 Max: 2.38	-.04 (.97) Min: -4.85 Max: 2.75	-.70 (.87) Min: -3.23 Max: 2.35	.10 (.78) Min: -3.23 Max: 2.71	-.76 (1.28) Min: -4.85 Max: 2.47	-.30 (1.17) Min: -3.13 Max: 3.22	.51 (.91) Min: -3.30 Max: 2.88
Par Exp	.12 (.33)	.08 (.27)	.01 (.11)	.49 (.50)	.22 (.41)	.11 (.31)	.42 (.49)