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CHILD GENDER, PARENTAL EXPECTATIONS, AND ACADEMIC ACHIEVEMENT:  
DOES PARENTAL INVOLVEMENT MATTER?

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## ABSTRACT

Although the gender gap in educational achievement has been on the decline, gender differences in ability perceptions and career choice still exist. The present study builds on previous research regarding the interplay of child gender, parental expectations, parental involvements, and academic achievement to focus on the role parents may play in this gender socialization process. Data from the Early Childhood Longitudinal Study, Kindergarten cohort of 1998-1999, was used to conduct a series of multivariate Ordinary Least Squares regression analyses. The results indicated higher reading and math achievement among girls as well as higher parental academic expectations for girls. Additionally, mothers of girls tended to be more involved in the school setting, compared to mothers of boys. Interestingly, I found a negative association between frequency of parental homework help and academic achievement, which likely reflects the fact that parents respond to lower academic achievement with increased homework help. This study further proposes possible explanations for these findings as well as implications for future research.

Keywords: child gender, parental involvement, parental expectations, academic achievement

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## Chapter 1

### Introduction

Research suggests that significant others, such as parents, convey educational expectations for their children, which children then internalize to formulate their own aspirations (Morgan, 2005). Parents matter for children's academic achievement beyond simply communicating their educational expectations, extending a degree of parental *involvement*. Indeed, it has been shown that parental involvement leads to better academic performance in children both in terms of grades and overall academic success (Carter & Wojtkiewicz, 2000). Though existing research has focused on how the nature and extent of parental involvement helps shape children's academic achievements, relatively little research has examined whether the aforementioned relationship varies by child gender. Moreover, the limited research that does exist is ambiguous. Specifically, there are conflicting results regarding the role of the gender of the child in producing differential levels of parental involvement. For example, Muller (1998) found that boys reported more involvement from parents in their mathematics courses, while Carter and Wojtkiewicz (2000) reported that daughters actually receive more support and involvement from parents, irrespective of academic subject. These unanswered questions form the basis for the present investigation. Due to the inconsistencies in the academic literature, there are three primary research questions this honors thesis aims to address. Foremost, 1) Does child gender have an effect on academic achievement? Building on this, 2) Is the relationship between child gender and academic achievement mediated by parental involvement? And ultimately 3)

Do parental involvements mediate the effect of parental expectations on child's academic achievements?

In this honors thesis, I aim to address the aforementioned research questions hypothesizing that the gender of the child affects the amount of involvement contributed by the parent toward the child's educational achievement. In particular, I will investigate if (1) child gender will affect the child's academic achievement; (2) parental expectations will directly affect the child's academic achievement; and (3) the effect of gender will be attenuated by degree of parental involvement, and (4) the effect parental expectations will be partially mediated by parental involvement. The theoretical basis for my hypotheses is drawn from the Wisconsin Model of status attainment and Lareau's theory of parenting styles. To test these hypotheses, I employ longitudinal data from the Early Childhood Longitudinal Study (ECLS-K) 1998-1999 Birth Cohort, which sampled approximately 23,000 children as well as their parents and teachers at various ages. I focused on parental involvement and expectations in third and eighth grade and academic achievement in mathematics and reading in eighth grade.

By expanding on research in the field of sociology of education, more productive interactions and interventions can occur between the home and school setting. I will also be able to tell if there is differential treatment by parents on the basis of child's gender. This is an important topic, not only because of the potential gender-based inequalities involved, but also because parents are one of the most influential components of children's own educational expectations and successes. Identifying gender socialization or stereotypic views at a basic level can promote future changes to combat this. This study may show parents how they can effectively contribute to the education of their children and even show educators the importance of stressing home involvement (Froiland, Peterson, & Davison, 2012). Moreover, in

understanding how parents influence their children's education, pathways for reform and future research will be better informed.

## Chapter 2

### Literature Review

#### Theoretical Rationale

The Wisconsin Model of status attainment (WM) is a particularly useful theoretical framework on which to base my investigation of the relationship between parental involvement and educational achievement. Developed by William Sewell and his colleagues (1969), the WM argues that a student's academic attainment is affected by one's own ability, their family background, as well as the influence of significant others, including parents, teachers, and peers (Morgan, 2005). For the purposes of this research, the focus will be placed more on the segment ascribed to the expectations and influence of significant others. This will be captured through the analysis of parental involvement measures. Sewell and Hauser (1969) also found that parental expectations for children developed into the children's own expectations for their academic achievement. The current study will take this model, originally limited to boys, and take this a step further to see how child gender may play a role.

Though the WM articulates a clear relationship between parental involvement and educational achievement, it does not explicitly focus on the *nature* of parental involvement. Consequently, I will supplement the WM with Lareau's theory of parenting styles, namely the concerted cultivation versus natural growth. Concerted Cultivation, as defined by Lareau (2002), is a parenting approach in which parents are highly involved with their children, constructing children's schedules full of extracurricular activities and lessons. In this approach, parents tend to enroll their children in numerous activities, promoting individualism and giving them a variety of

experiences (Lareau, 2002). Parents are directly involved in the education of their child, with anything from volunteering for the school to parent-teacher association (PTA) meetings to homework assistance. These parents place a larger emphasis on child's performance and tend to verbally and academically engage their children regularly (Cheadle, 2008). Parents then also expect more academically as well as higher commitment to extra-curricular involvements out of their children. These children enter the school environment with an advantage as their parents are more hands on and involved in their education (Cheadle, 2008). Concerted cultivation is important to consider for the present research because Lareau (2002) found that children with more involved parents (defined in terms of involvement with extracurricular activities and school events) were more likely to succeed academically. In contrast, the opposing style of parenting Lareau examined was the natural growth approach in which parents provide their children with basic needs such as love, food, and safety, but let the child have their own experiences and develop their own interests organically. These children were found to be less comfortable and more confrontational in the school setting, more passive, and had a general distrust for authority figures (Lareau, 2002). Parenting through natural growth, characterized by less involved parenting produced poorer academic outcomes, for the children in Lareau's study. Although this study does not directly observe these aspects of parenting, this study will look further at child gender in order to see what role it plays in parental involvement.

### **Educational Achievement of the Child**

Children's academic achievement can be influenced by various factors, such as an individual's parents, teacher quality and interactions, peer relationships, personal ability, and

personal expectations (Froiland et al., 2012; Morgan, 2005). Additionally, parents possess different perceptions of the roles they should play and the extent of their participation with their children's education (Lareau, 2002). Although the gender gap in both academic achievement and occupational achievement has been decreasing, there is still significant evidence that gender stereotypes leading to differential gender socialization still exist to some extent.

Mathematics competency/achievement is one of the most widely studied domains regarding gender differences in education. In both the United States and internationally, mathematics is still stereotypically regarded as a male dominated discipline in which females have difficulty (Muller, 1998). It is then possible that socialization practices transmitted by the home environment may be associated with gender differences in math scores (Muller, 1998). Girls tend to hold more negative attitudes towards the field of math as well as their own math abilities, affecting not only their achievement, but also their career choices (Gunderson, Ramirez, Levine, & Beilock, 2012). And even though the gap in performance between boys and girls has vastly diminished, differential treatment at home and in society may hinder females' pursuit of occupations that depend on some extent of math skills (e.g., engineering) (Gunderson, 2012).

Reading achievement is somewhat of a neglected domain in research regarding gender differences in academic outcomes. This is somewhat surprising given that reading ability is a highly significant skill in the acquisition and development of subsequent skills (Dumont, Trautwein, Nagy, & Nagengast, 2014). For example, reading is crucial in stimulating other key skills such as language and memory development. The subject of reading requires much learning and practice, not just in the classroom, but at home. Reading at home boosts school readiness and reduces risk of failure, recidivism, and risky behaviors (Dumont et al., 2014). Most, if not all,

homework assignments require some degree of reading throughout one's educational career so knowledge and understanding is vastly important beyond a single subject domain.

Carter and Wojtkiewicz (2000) report gender differences in participation in science, technology, engineering, and math (STEM) courses along with perceptions of ability, own expectations, and parent expectations. Furthermore, Eccles et al., (1990) suggest parents believe that their daughters demonstrate difficulty with these courses, lowering students' self-concepts. Girls are also less likely to enroll in higher-level STEM courses as evidence shows differentiation in occupational outcomes, favoring boys (Carter & Wojtkiewicz, 2000). Although the gender gap in subject specific skills and abilities has decreased, it is still important to look for societal-held gender socializations that can lead to the gender gaps still very apparent in the professional domain.

### **Child Gender and its Impact of Degree of Parental Involvement**

The degree parents are involved with their child's education encompasses participation in the child's education in both the school and home environment. Parental involvement has been operationalized in many different ways across studies including attendance at school events, communication with the teacher, attendance at parent-teacher meetings, and homework help (Englund et al., 2004). Having more involved parents has been shown to be an important predictor of the continuing development of children's academic skills, abilities, and academic success, irrespective of gender (Cheadle, 2008). Because parental involvement can be measured in several ways, which component of involvement contributes the most to higher academic

achievement has been highly contested (Englund et al., 2004). Based on this notion, it is highly important to further explore the degree of parental involvement afforded to both boys and girls.

Some literature suggests parents are involved differently with their sons and daughters education, leading to gender socialization through stereotyped beliefs. Carter and Wojtkiewicz (2000) found that due to societal views, parents tend to place sons above daughters. Furthermore, they found parents view daughters as more submissive and dependent on others while sons tend to be seen as more autonomous and emphatic (Carter & Wojtkiewicz, 2000). Several studies also found that girls hold lower self-concepts, such as decreased self-esteem and confidence, regarding their mathematic abilities (Carter & Wojtkiewicz, 2000; Eccles, Jacobs, & Harold, 1990). Specifically, Eccles and colleagues (1990) found parental perceptions of their child's math competencies are influenced by child gender. Even when girls tend to outperform boys, mothers still tend to underestimate their daughters' abilities (Eccles et al., 1990; Bhanot & Jovanovi, 2005). Using a measure of degree of intrusive support in homework help, these stereotypic beliefs were found to be communicated (Bhanot & Jovanovi, 2005). Stereotypic beliefs of a child's academic capabilities have been found to directly influence the child's own ability perception, hindering academic performance (Eccles et al., 1990).

Again, previous research again tends to be inconsistent as to whether sons or daughters receive more parental involvement in their academic pursuits. Using data from the National Education Longitudinal Study (NELS), Carter and Wojtkiewicz (2000) found that parents actually do tend to help daughters in some ways and sons in others. For example, daughters received more attendance at school events while sons received more supervision such as homework checking, which tended to benefit daughters more academically (Carter & Wojtkiewicz, 2000). Overall, across the various levels of involvement measured, daughters

experienced a higher degree of involvement pertaining to academics, leading to higher performance (Carter & Wojtkiewicz, 2000). However, this could possibly be due to the fact that girls in this study tended to outperform boys.

Conversely, Bogenschneider (1997) found that regardless of parent or child gender, adolescents who had more involved parents were advantaged and performed better in school. Muller (1998) further found that in a longitudinal study of eighth grade students followed through their twelfth grade years, parental involvement lessened until it no longer had an effect on academic achievement, although mathematic achievement scores did show a slight gender difference.

Whether involvement is due to intrusive support, mistrust in ability, or higher previous performance, literature strongly suggests that girls receive additional involvement beyond that of boys. It is clear then that parental involvement matters for children's academic achievement and may actually impact the relationship between child's gender and academic performance.

### **Parental Expectations and their Impact on Academic Achievement**

The concept of parental expectations refers to how far parents expect their child to go in their schooling, along a continuum of achievement, such as graduating from high school, attending a four-year college, or pursuing postgraduate education. Parental expectations can also be specific such as what school subjects parents expect their child to excel in or what profession they believe their child will adopt. These expectations are in fact distinctive from types of parental involvement because expectations are held beliefs and attitudes while involvements are captured through one's actions and behaviors (Englund et al., 2004). Parental expectations have

been found to be essential to children's subsequent academic success. For example, Froiland et al. (2012) found that parents' expectations for children's 8<sup>th</sup> grade performance had a direct effect on the children's 8<sup>th</sup> grade achievement. Children's self-reports of their academic abilities were also found to mirror parental appraisals of their abilities rather than their actual performance (Bhanot & Jovanovic, 2005).

A number of studies have found that parental expectations of academic achievement are even stronger predictors of achievement than measures of parental involvement (Englund et al., 2004; Froiland et al., 2012; Morgan, 2005; Zhan, 2006;). A study by Halle et al. (1997) discovered that in a sample of 41 economically disadvantaged African Americans, parental beliefs regarding the child's achievement potential were strongly linked to child educational outcomes. They found that even when controlling for prior child achievement, parental expectations still impacted the child's achievement (Halle, Kurtz-Costes, & Mahoney, 1997). They concluded that parental beliefs were more strongly related to educational outcomes than parental achievement-oriented behaviors (Halle et al., 1997).

Many studies also assert that parental expectations encompass a variety of dimensions that affect academic performance. For example, Seginer (1983) claims that parental expectations are both a cause and effect of child academic achievement. She concluded from prior research that parental expectations are formed by three important factors: parental knowledge, parental aspirations, and feedback or communication with the school. These three factors suggest a combination of both realistic and idealistic expectations for the child (Seginer, 1983). These beliefs in turn are reflected on the child, affecting their success. Seginer (1983) also argues that children's actions in line with the parent's held attitudes tend to be reinforced, engraining these attitudes in the child.

In another longitudinal study by Zhan (2006), parental expectations for their children's post-secondary educational achievement strongly predicted children's later reading and math success. Furthermore, parental expectations mediated the effect of parental assets of children's achievement (Zhan, 2006). Zhan (2006) asserted that these expectations and attitudes were significant, as they also comprised an assessment of the child's ability as well as their own personal investment in the child's education.

### **Parental Expectations and the Degree of Parental Involvement**

Parental expectations for the child may further influence the parent's degree of involvement with the child's education. Parents who express high expectations to their children also consider themselves to be teachers of their education (Froiland et al., 2012). According to Morgan (2005), rational choice theory assumptions illustrate that observed behaviors expose one's perceptions and beliefs. In other words, parental expectations are reflected through their involvement behaviors, which are apparent and realized by children. With this in mind, the effects of parental expectations may be attenuated to some degree by how involved the parents are.

Indeed, in a study conducted by Englund and colleagues (2004), parents with higher academic expectations for their children's future educational attainment were more likely to be involved with their education and demonstrate more school participation. The researchers also found that more parental involvement in third grade led to high grades and achievement at the end of the year (Englund et al., 2004). However, in the study conducted by Englund and colleagues parental involvement measures were taken from teacher reports, possibly negating

some of the home environment portion encompassed in parental involvement. Many studies have also found parent and child reports to be better measure of parental involvement. Although illustrating the bidirectional relationship of parental expectations and parental involvements, this study from Englund and colleagues relied heavily on correlational data and one must temper their conclusions regarding causality.

Few studies have looked at the impact of both parental expectations and involvement on academic achievement. For this reason, it is important to expand on research in this domain in the present study. One of the contributions of the present research is that I develop a model that contains all three variables and this will allow us to shed more light on their interrelationships.

## **Hypotheses**

Building off of previous literature as well as the Wisconsin Model of status attainment and Lareau's theory of parenting styles, I ask the following question: does child gender affect the degree to which parents are involved with their child's education? From this underlying question, I formulated four relevant hypotheses, which are addressed in the following discussion.

Although the academic gender gap has been decreasing, gender differences are still seen within specific subject domains and occupations. This leads me to expect that the gender of the child will also affect academic ability in math and reading. *(H1) Specifically, I hypothesize that girls will be more likely to receive higher ability ratings.*

Given that parental expectations are strongly related to academic outcomes, I would expect that parental expectations in third grade will directly impact the academic achievement of

the child in 8<sup>th</sup> grade. *(H2) Thus, children whose parents hold higher expectations for them will be more likely to succeed academically in 8<sup>th</sup> grade.*

As previously mentioned, research as to whether sons or daughters actually receive more involvement from their parents has been somewhat contested. However, various studies found that daughters tend to receive more involvement, whether it be due to previous academic performance or stereotypic biases, I would expect that girls will receive slightly more parental involvement than boys. *(H3) Due to these findings, I predict the effect of gender will be fully attenuated after considering parental involvement in school and in the home.*

Because parents with higher expectations for their children tend to view themselves as teachers, I would expect that parents with higher expectations for their child will also be more involved in their education. *(H4) Therefore, I hypothesize that the effect of parental expectations on children's academic performance will be mediated by the degree of parental involvement.* In testing these four research hypotheses, I hope to improve our understanding of influence of parents' beliefs and actions on children's academic achievement based on teachers' ratings.

## Chapter 3

### Data, Methods, and Analysis

#### Sample

The data used in this study came from the Early Childhood Longitudinal Study (ECLS) Kindergarten cohort of 1998-1999, a nationally representative survey on children's early schooling experiences. These data were collected by the National Center for Education Statistics (NCES) during the participants kindergarten, first, third, fifth, and eighth grade school years by way of questionnaires administered to children, families, teachers, and school administrators. Approximately 23 children from each of 1,000 public and private schools were randomly selected to participate. Sample size fluctuates by each cohort wave due to attrition as well as by respondent, with teacher respondent rates being the lowest.

For the purposes of the present research, parent questionnaires taken from trained evaluators conducting telephone interviews were used as the data in this analysis. Questionnaires administered to families and educators when the child was in his/her third and eighth grade years were used to capture possible variations in parental involvements and expectations. In the absence of standardized achievement scores, teachers' ratings of students' abilities for different mathematics and reading skills were used from the eighth grade wave to capture the outcome of the child's educational achievement.

The ECLS data has several strengths, foremost being that it is nationally representative, affording it generalizability. The sample collected is also reasonably large which is highly significant. This data also spans several scholastic subjects, which is important for comparison as the gendered nature of achievement may be present among math scores and not among reading

scores. And finally, the ECLS consists of longitudinal data which allows us to track trajectories at the individual level across various time periods.

However, there are a few limitations of these data to be discussed at length subsequently, such as the absence of relevant questions. For example, the quality of parental involvement is not addressed in the ECLS questionnaires, which has been shown to be an important factor influencing the child's achievement (Dumont, Trautwein, Nagy & Nagengast, 2014). Another major limitation is that the great majority of parental respondents were mothers, so fathers' expectations, involvements, and opinions were essentially neglected.

### **Scale Items**

The parental involvement independent variable in my study was identified through two dimensions: parental school involvement and parental home involvement. I defined home involvement as frequency of assistance with the child's homework, as various studies have captured parental quality of instruction using homework-related variables (Englund et al., 2004; Froiland et al., 2012). The home involvement dimension was classified using a series of questions about the parent's contribution to the child's homework. Specifically, (1) how often has the respondent helped the child with their math homework and (2) how often has the respondent helped the child with their reading homework. Respondents were given 5 possible response statements (1=Never, 2= Less than once a week, 3= 1 or 2 times a week, 4= 3 or 4 times a week, and 5= 5 or more times a week).

For the purposes of the present study, I defined parental school involvement as participation in in-school events or volunteering opportunities (e.g., parent teacher conferences,

seeing a school play, attending a school sporting event, etc.). To construct this measure, the school involvement dimension included questions that focus on the ways in which the parent interacts with the school. For example, questions focused on whether the parent (1) attended you attended an open house or back to school night, (2) attended a PTA meeting, (3) attended to a parent-teacher conference, (4) attended a school or class event, and (5) volunteered for the school, and (6) fundraised for the school? The response option for these questions were either Yes or No.

To assess for my independent variable of parental expectations, the parent interview included a question specifically targeting the parent's expectation for the child's educational achievement. The parents were asked, "How far do you expect the child to go in school?" For this question, response options included 1= less than a high school diploma, 2=graduate from high school, 3= attend two or more years of college, 4=finish a four or five year degree, 5= to earn a master's degree or equivalent, and 6=to finish a Ph.D., MD, or other advanced degree.

To capture the child's academic achievement in 8<sup>th</sup> grade, teachers' ability ratings were utilized, as this is what is provided in the public data set. Both the students' math and English teachers rated students across a variety of indicators. The mathematics indicators consisted of (1) ability to apply math concepts to real world problems, (2) ability to conduct proofs, (3) ability to verbally reason through problems, (4) ability to reason through problems in writing, (5) ability to use mathematical representations, (6) ability to use a calculator to solve problems, and (7) ability to use a computer to solve math problems. The reading ability indicators were as follows; (1) ability to organize ideas logically, (2) ability to use correct grammar and conventions, (3) ability to conduct and use research, (4) ability to write various types of compositions, and (5) ability to use stylistic aspects in writing. Students' ability was rated by teachers according to the following

scale; 1=Outstanding, 2=Very good, 3=Good, 4=Fair, 5=Poor, and 6=Not applicable/not observed.

### **Dependent Variable**

*Educational achievement* of the child serves as the dependent variable. For the purposes of the present study, educational achievement will be defined by higher ability ratings in math and reading from the student's respective teachers during the 8<sup>th</sup> grade school year. To construct this measure 8<sup>th</sup> grade teacher ratings of students' abilities on various math skills (e.g., ability to apply math concepts, reason through problems verbally, utilize mathematical representations, etc.) were used to create an index of overall math ability rating. 8<sup>th</sup> grade English teachers' ratings (e.g., ability to use grammar and conventions, conduct research, organize ideas, etc.) were also used to create a reading ability index of students' abilities. Table 5. presents the summary statistics of these indicators.

### **Focal Predictor Variables**

*Child gender* is the main independent variable in the present study and was captured in parent responses during the parental questionnaires. *Parental expectations* were defined as the degree level the parent believes their child will achieve in the future. This variable was constructed through parental responses to a question directly establishing this belief, both in 3<sup>rd</sup> and 8<sup>th</sup> grade. Finally, *parental involvement* was operationalized as the parents' involvement both in the school and in the home to capture various dimensions of educational involvement. This was then broken down by grade into two indices including school event attendance (e.g.,

fundraising, volunteering, attendance at a parent-teacher conference, etc.) and frequency of homework help in both math and reading. Tables 3. provides the summary statistics for these variables.

### **Analytic Strategy**

My analysis was conducted in three phases. The first phase is strictly descriptive statistics, where I analyzed correlations to determine if there are associations among the variables of interest. Summary statistics were estimated between child gender and each of the parental involvement indicators at 3<sup>rd</sup> and 8<sup>th</sup> grade. Means/percentages between child gender and parental expectations both in 3<sup>rd</sup> grade with child gender and in 8<sup>th</sup> grade were also examined to get a basic sense of the relationships in the data. The results of these correlations are presented in Table 1. and Table 2. Both illustrate how parents expect both boys and girls to reach a higher level of education overall, however, parents of girls were more likely to hold higher expectations than did parents of boys.

**Table 1. Parent self-report of expected child achievement taken at 3<sup>rd</sup> grade**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	Total		Boys		Girls	
	n	Mean	n	Mean	n	Mean
Receive less than a high school degree	78	0.58	56	0.81	22	0.34
Graduate from high school	1,173	8.73	709	10.30	464	7.09
Attend college for 2+ years	1,671	12.44	886	12.87	785	11.99
Finish a 4/5 year college degree	7,222	53.77	3,310	52.44	3,612	55.16
Earn a Masters degree or equivalent	1,722	12.82	872	12.67	850	12.98
Finish a Ph.D., MD, or other advanced degree	1,566	11.66	751	10.91	815	12.45
Total (%)	13,432	100	6,884	100	6,548	100

**Table 2. Parent self-report of expected child achievement taken at 8<sup>th</sup> grade**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	Total		Boys		Girls	
	n	Mean	n	Mean	n	Mean
Receive less than a high school degree	44	0.50	25	0.56	19	0.44
Graduate from high school	663	7.54	411	9.23	252	5.81
Attend college for 2+ years	1,358	15.45	737	16.54	621	14.33
Finish a 4/5 year college degree	4,249	48.34	2,140	48.04	2,109	48.65
Earn a Masters degree or equivalent	1,368	15.56	667	14.97	701	16.17
Finish a Ph.D., MD, or other advanced degree	1,108	12.61	475	10.66	633	14.60
Total (%)	8,790	100	4,455	100	4,335	100

Presented in Appendix A1-4 are the correlation matrices generated among the aforementioned 3<sup>rd</sup> grade involvement indicators, 8<sup>th</sup> grade parental involvement indicators, math teacher student ability ratings, and English teacher student ability ratings, respectively. Results of the 3<sup>rd</sup> grade indicators show that school event attendance indicators (eg. attend PTA meeting, open house, volunteer, etc.) tend to inter-correlate, while frequency of homework help in both math and reading are highly correlated. This would be logical as each group of events occurs in different educational environments. These findings were similar using the variables measured in the 8<sup>th</sup> grade as well. Correlates for math ability ratings showed all indicators producing high

correlations except for the indicator ability to use a computer to solve math problems. This item will be included in the next step of factor analyses to affirm that it is not as explanatory as the other indicators. And lastly, the correlations among the English or reading ability indicators are all highly correlated.

In phase two of my analysis, I evaluated the indicators I intend to use, decomposing their inter-relationships with a series of exploratory factor analyses (EFA). Because the variables the present study aims to examine were made up of multiple items, EFA was necessary to reduce the data into common latent dimensions for future analysis. EFAs are useful in showing the appropriate number of latent dimensions and which items are reasonable indicators for those dimensions. Three separate EFAs were conducted for 3<sup>rd</sup> grade involvement measures, 8<sup>th</sup> grade involvement measures, and 8<sup>th</sup> grade ability ratings for both math and reading to identify their loading patterns. I used the Kaiser-Guttman criterion which denotes the number of variables that exist amongst the indicators based on how many Eigenvalues are greater than 1.0. Eigenvalues show the amount of variation accounted for by a single latent factor. A .40 threshold was implemented to insure that high relationships among factor loadings are included in further analyses. From here, new variables were created depending on the number of latent constructs produced in each analysis. These constructed variable were 3<sup>rd</sup> grade school involvement, 3<sup>rd</sup> grade frequency of homework help, 8<sup>th</sup> grade school involvement, 8<sup>th</sup> grade frequency of homework help, 8<sup>th</sup> grade reading ability, and 8<sup>th</sup> grade math ability.

Lastly, in phase three, I estimated a series of multivariate Ordinary Least Squares (OLS) regression models, which allowed me to evaluate the relationships between variables. Four separate regression equations were estimated to test the present hypotheses. Regression 1 tested math ability regressed on child gender, 3<sup>rd</sup> grade parental expectations, 3<sup>rd</sup> grade parental school

involvement, and 3rd grade parental homework help. First, Model 1 included math ability regressed on child gender and 3<sup>rd</sup> grade parental expectations, testing H1 and H2, respectively. This shows the effect, if any, gender has on math ability as well as the effect of higher parental expectations on math ability. Next, in Model 2, 3<sup>rd</sup> grade parental school involvement was added. And finally, 3<sup>rd</sup> grade parental homework help was added in Model 3, which tested both H3 and H4. This shows the degree to which parental involvements mediates the effect of child gender on academic ability as well as if there is a mediation effect on parental expectations. Regression 2 focuses on reading ability, regressed in the same sequential Model order on the three 3<sup>rd</sup> grade variables to illustrate differences among subject matter for each hypothesis.

Next, Regression equations 3 and 4 used the 8<sup>th</sup> grade predictor variables to assess changes across grade level. Regression 3 consisted of math ability regressed on child gender, 8<sup>th</sup> grade parental expectations, 8<sup>th</sup> grade parental school involvement, and 8<sup>th</sup> grade parental homework help. Similar to the previous regression equations, variables were again added in the same sequential order to test the appropriate hypotheses in the 8<sup>th</sup> grade year. Finally, Regression 4 included reading ability regressed on the four previous independent variables. Variables were similarly added in successive equations to observe any differences from subject and 8<sup>th</sup> grade parental variables. Using 3 models for each regression helped show the influence of each independent variable, net of the influence of the others, on the dependent variables of either math ability or reading ability. Descriptive and inferential statistics were all analyzed using STATA 14 (StataCorp, 2015).

## Chapter 4

### Results

#### Descriptive Statistics

Table 3. below presents summary statistics that were computed across all previously selected indicators for parental involvement, parental expectations, and ability measures across child gender. In the 3<sup>rd</sup> grade, mothers of girls expected they would attain a higher degree than mothers of boys did. Mothers of girls were also more involved in both the home and school on average than mothers of boys, although only slightly more so when it came to homework help. In the 8<sup>th</sup> grade, mothers again expected girls would attain a higher degree more so than mother of boys. Mothers of girls again tended to be more involved with school events. However, mothers of boys reported more frequent homework help on average in the 8<sup>th</sup> grade. Looking at parental school involvement, mothers of daughters reported more attendance at open houses, school events, volunteering, and participation in fundraising. Across achievement indicators, girls received higher ability ratings on average in both math and reading.

**Table 3. Summary statistics of main variables**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

	Total		Boys		Girls		t-test
	n	Mean	n	Mean	n	Mean	t
<b>Dependent Variables</b>							
Reading ability teacher rating index	8,932	15 (.06)	4,505	13.66 (.08)	4,427	15.82 (.08)	18.87 ***
Math ability teacher rating index	4,440	17 (.09)	2,235	16.91 (.13)	2,205	17.84 (.13)	4.94 ***
<b>Independent Variables (3rd Grade)</b>							
Parental expectations	13,432	4.04 (.01)	6,884	3.99 (.01)	6,548	4.11 (.01)	6.65 ***
Parental involvement with school events index	13,436	4.22 (.01)	6,881	4.17 (.02)	6,555	4.28 (.02)	4.24 ***
Frequency of parental homework help index	12,733	7.41 (.02)	6,501	7.41 (.02)	6,232	7.42 (.02)	0.17
<b>Independent Variables (8th Grade)</b>							
Parental expectations	8,790	4.00 (.02)	4,455	4.00 (.02)	4,335	4.18 (.02)	8.10 ***
Parental involvement with school events index	8,774	2.57 (.02)	4,446	2.54 (.03)	4,328	2.61 (.03)	2.07 *
Frequency of parental homework help index	7,831	5.22 (.02)	3,952	5.25 (.03)	3,879	5.12 (.03)	-1.57

Note: Standard errors in parentheses.  $p < .05^*$   $p < .01^{**}$   $p < .001^{***}$ 

Mothers of girls also tended to help them more frequently with math homework than mothers of boys. There was also a high correlation between the frequency parents helped with reading homework and the frequency parents helped with math homework in 3<sup>rd</sup> grade ( $r^2 = .673$ ) shown in Appendix A1-2. There was a weak to slightly moderate correlation between parental expectations in the 3<sup>rd</sup> grade and parental expectations in the 8<sup>th</sup> grade ( $r^2 = .486$ ). In the 8<sup>th</sup> grade, mothers also reported attending open houses and fundraising events more so for daughters than for sons. Mothers of boys tended to help them more frequently with reading homework than parents of girls. However, significantly, mothers of girls tended to help them more often with math homework than they helped boys. Frequency of parental help with math

homework in 8<sup>th</sup> grade was also highly correlated with frequency of parental help with reading homework ( $r^2 = .583$ ).

Overall, in these data it appears mothers tend to be slightly more involved with their daughters' education than with their sons', especially regarding volunteer-related variables (eg. attending a school event such as a sport or play, volunteering, fundraising, and open house), as indicated by the significant t-tests findings. They also expected daughters to reach a higher degree level relative to boys.

### **Exploratory Factor Analyses**

Appendix B1-3 depicts the results of the EFAs for 3<sup>rd</sup> grade parental involvement indicators, 8<sup>th</sup> grade parental involvement indicators, and 8<sup>th</sup> grade academic ability indicators. The results indicate two latent dimensions for parental involvement indicators as there are two Eigenvalues greater than 1.0. The first made up of school event attendance indicators (eg. attendance at an open house, PTA meeting, volunteering, etc) and the second comprises homework help (eg. frequency of math homework help and frequency of reading homework help). Although the item attending a parent-teach conference is slightly under the .40 threshold for factor loadings, it will be used in the creation of the indexes to maintain consistency across 3<sup>rd</sup> and 8<sup>th</sup> grade variables. The results of this EFA supported the generation of an index for the two primary independent variables for future analyses. The first being school involvement capturing the first factor loadings and the second being homework help from the second factor loadings. When an EFA was run using the same indicators but taken from 8<sup>th</sup> grade, the same

two latent dimensions were again identified. An index was also generated for the same two variables, school involvement and homework help, for the 8<sup>th</sup> grade findings.

Analyzing teachers' ability ratings for students in 8<sup>th</sup> grade, EFA results again outlined two latent dimensions, as there are two eigenvalues greater than 1.0 when the Kaiser-Guttman rule is applied. This is a substantive conclusion as the items that load on to factor one tend to capture teacher ratings of math ability such as ability to apply math concepts to real world problems, ability to use mathematical proofs, ability to use mathematical reasoning in conversation and writing, ability to create mathematical depictions, and ability to solve problems using a calculator. The establishment of these two latent dimensions is also supported as the items loading on to factor two capture English related skills such as ability to logically organize ideas, ability to write a variety of compositions, ability to conduct research, and ability to use various stylistic writing aspects. However, in further analyses the item capturing ability to use a computer to complete math assignments will be excluded, as it does not load strongly onto either factor and previously demonstrated weak correlations with the other items. It also does not meet the predetermined .40 threshold for factor loadings. The decision to allocate two factors is also supported when conducting separate factor analyses for math and reading. The items all load on to a single factor for math skill ability and a single factor for English skill ability. Two indexes were then generated from these EFA findings, the first including math ability items and the second including reading and writing ability items, with the exclusion of the item on computer use.

## Regression Analyses

Parameter estimates for the multivariate analyses I conducted are presented in Tables 4-7. To begin, Table 4. shows the results obtained for regression model 1, predicting 8<sup>th</sup> grade math ability from 3<sup>rd</sup> grade predictor variables. In Model 1, both child gender and 3<sup>rd</sup> grade parental expectations were found to be significant predictors of 8<sup>th</sup> grade math ability ratings. Specifically, girls were rated on average one point more than boys on the math ability scale. Similarly, children who had parents with higher expectations scored an average of one point higher on the math ability scale. Once school involvement in 3<sup>rd</sup> grade was added in Model 2, girls' advantage in math ability was slightly reduced. This was also the case for 3<sup>rd</sup> grade parental expectations. As for parental school involvement in 3<sup>rd</sup> grade, results show a statistically significant positive relationship. Despite the reduction in coefficients between Model 1 through Model 2, the effect of both gender and parental expectations on 8<sup>th</sup> grade math ability were still statistically significant.

**Table 4. Ordinary Least Squares parameter estimates for math ability regressed on 3<sup>rd</sup> grade predictor variables (n=3,927)**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

	Model 1		Model 2		Model 3	
Child gender (female)	0.91	***	0.87	***	0.91	***
	(.20)		(.20)		(.19)	
Parental expectations	0.99	***	0.84	***	0.83	***
	(.10)		(.10)		(.10)	
Parental school involvement			0.56	***	0.57	***
			(.07)		(.07)	
Parental homework help					-0.54	***
					(.05)	
Constant	17.01	***	16.95	***	16.90	***
	(.14)		(.14)		(.14)	
R-squared	0.03		0.05		0.07	

Note: Standard errors in parentheses. p<.05\* p<.01\*\* p<.001\*\*\*

Model 3 included 3<sup>rd</sup> grade parental homework help in the regression equation. Results indicated a slight increase in girls' advantage in math ability compared to boys. On the other hand, the effect of higher parental expectations on math ability rating was slightly reduced. Results showed a negative relationship between frequency of homework help in 3<sup>rd</sup> grade and children's math ability rating. Another interesting finding is the negative effect more homework help had on children's ability ratings. The full model accounts for 7% of the total variation in the data.

A similar pattern was observed when looking at reading ability. Table 5. below presents the parameter estimates obtained for regression model 2, with reading ability regressed on 3<sup>rd</sup> grade predictor variables. In the first Model, both child gender and 3<sup>rd</sup> grade parental expectations were found to be significant predictors of 8<sup>th</sup> grade reading ability. Girls' ratings were two points higher compared with boys. Similarly, higher parental expectations had a positive relationship with reading ability rating. Girls' advantage in reading ability was very

slightly reduced with the addition of 3<sup>rd</sup> grade parental school involvement to the regression equation. Higher parental expectations also exhibited a 14% reduction in Model 2. Results showed a significant positive relationship between 3<sup>rd</sup> grade parental school involvements and reading ability score. Although a slight reduction in coefficients occurred, relationships remained statistically significant. Once parental homework help was added in Model 3, girls' advantage in reading ability slightly increased, similar to the results of regression equation 1. Although still statistically significant, parental expectations were slightly attenuated. As for frequency of parental homework help in 3<sup>rd</sup> grade, results showed a statistically significant negative relationship with reading ability ratings. Again, it was interesting that homework help had a negative effect on reading ability ratings as well. Across the entirety of regression equation 2, the variance accounted for by the model increased significantly ( $r^2 = .14$ ). It is interesting that my model was a better fit for reading ability ratings than for math ability ratings.

**Table 5. Ordinary Least Squares parameter estimates for reading ability regressed on 3<sup>rd</sup> grade predictor variables (n=7,870)**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999						
	Model 1		Model 2		Model 3	
Child gender (female)	2.01	***	2.00	***	2.02	***
	(.12)		(.12)		(.11)	
Parental expectations	1.22	***	1.08	***	1.05	***
	(.06)		(.06)		(.06)	
Parental school involvement			0.65	***	0.65	***
			(.04)		(.04)	
Parental homework help					-0.44	***
					(.03)	
Constant	13.86	***	13.76	***	13.72	***
	(.08)		(.08)		(.08)	
R-squared	0.09		0.11		0.14	

Note: Standard errors in parentheses. p<.05\* p<.01\*\* p<.001\*\*\*

Moving on to analyze the differences presented among 8<sup>th</sup> grade independent variables, estimates obtained for regression model 3 are shown in Table 6. below, wherein math ability was regressed on the 8<sup>th</sup> grade predictor variables. Looking at Model 1, 8<sup>th</sup> grade math ability was regressed on child gender and 8<sup>th</sup> grade parental expectations. Net of parental expectations, girls were rated on average a little over half a point higher on math ability than boys. Comparably, higher parental expectations had a statistically significant positive relationship with math ability rating. The addition of 8<sup>th</sup> grade parental school involvement in Model 2 had no effect on girls' advantage. There was a slight reduction in the effect 8<sup>th</sup> grade parental expectations on 8<sup>th</sup> grade math ability rating, although this was still statistically significant. As for parental involvements in the school, results showed a significant positive relationship.

**Table 6. Ordinary Least Squares parameter estimates for math ability regressed on 8<sup>th</sup> grade predictor variables (n=3,582)**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999						
	Model 1		Model 2		Model 3	
Child gender (female)	0.62	**	0.62	**	0.61	**
	(.20)		(.20)		(.20)	
Parental expectations	1.65	***	1.63	***	1.52	***
	(.10)		(.10)		(.10)	
Parental school involvement			0.08		0.12	*
			(.06)		(.06)	
Parental homework help					-0.48	***
					(.05)	
Constant	17.43	***	17.43	***	17.40	***
	(.14)		(.14)		(.14)	
R-squared	0.08		0.08		0.10	

Note: Standard errors in parentheses. p<.05\* p<.01\*\* p<.001\*\*\*

Results of Model 3 indicated a slight reduction in the advantage girls' possessed in math ability. This finding was reciprocated for 8<sup>th</sup> grade parental expectations. Although both coefficients were slightly attenuated, the results are still statistically significant. In accordance

with the previous two regression equations, there was a significant negative relationship between frequency of parental homework help in 8<sup>th</sup> grade and math ability rating. The variance accounted for in Model 3 with the inclusion of all the predictor variables was again higher than the variance accounted for in the other two models ( $r^2 = .10$ ).

Table 7. below displays the results from the final regression equation in which reading ability was regressed on the 8<sup>th</sup> grade independent variables. Again, girls' were on average rated higher in reading ability than boys. Higher parental expectations were positively related to reading ability as well. With the addition of 8<sup>th</sup> grade parental involvement at school events, girls' advantage remained stable. On the other hand, the effect of high parental expectations was reduced considerably, although it did remain statistically significant. Turning to parental school involvements, there was a significant positive relationship with reading ability rating.

**Table 7. Ordinary Least Squares parameter estimates for reading ability regressed on 8<sup>th</sup> grade predictor variables (n=7,220)**

Early Childhood Longitudinal Study-Kindergarten, 1998-1999						
	Model 1		Model 2		Model 3	
Child gender (female)	1.75	***	1.75	***	1.74	***
	(.12)		(.12)		(.12)	
Parental expectations	1.61	***	1.55	***	1.44	***
	(.06)		(.06)		(.06)	
Parental school involvement			0.21	***	0.26	***
			(.04)		(.04)	
Parental homework help					-0.45	***
					(.03)	
Constant	14.18	***	14.16	***	14.16	***
	(.08)		(.08)		(.08)	
R-squared	0.13		0.13		0.16	

Note: Standard errors in parentheses. p<.05\* p<.01\*\* p<.001\*\*\*

As frequency of parental homework help in 8<sup>th</sup> grade was added to the regression equation in Model 3, girls' advantage in reading ability was reduced slightly. Similarly, the

effect of parental expectations on reading ability also decreased. Although both coefficients were attenuated to some degree, they remained statistically significant. Again, frequency of homework help had a significant negative effect on reading ability rating. The variance accounted for in the complete regression equation 4 again increased across models ( $r^2 = .16$ ).

## Chapter 5

### Discussion

Using longitudinal data from the ECLS-K 1998-1999 cohort, this paper sought to increase the understanding of the relationship between child gender and parents' degree of involvement and expectations for their child's education. Drawing upon previous literature from the Wisconsin Model of Status Attainment and Lareau's theory on parenting styles, it was hypothesized that parents who hold higher expectations for their children and are more involved with their children's academics will lead to children having higher academic ability ratings in reading and math. Child Gender was also hypothesized to have a sizeable effect on the child's academic achievement, congruent with previous findings in the field. Furthermore, depending on the gender of the child, parents will be more or less involved and hold different academic expectations, taking into account that some literature suggests parents engage in gender socialization through stereotypic beliefs (Carter & Wojtkiewicz, 2000; Eccles, Jacobs, & Harold, 1990).

The results of the present study suggest that there are differences in the level of parental involvement and parental expectations depending on the gender of the child, leading to more academic success. There was support for my first hypothesis that girls would receive higher academic ability ratings than boys during the 8<sup>th</sup> grade year. Across all analyses, girls received higher ability ratings from both math and English teachers. The difference among genders was slightly larger in reading ability than it was in math ability ratings. With the addition of parental school and home involvements to the model, a portion of the difference in girls' achievement was explained. However, the hypothesis that girls would have higher academic achievement remained statistically significant after controlling for these variables.

I found support for my second hypothesis that greater parental degree expectations would lead to higher academic achievement in adolescence. When parental school involvement and frequency of parental homework help were added to the model however, the effect of parental expectations was partially attenuated. This finding also warrants support for hypothesis 4 that parental expectations would be partially mediated by parental involvement at home and in the school. This could possibly be because parents who expect their children to reach a higher degree level engage more with their child's academics to assist them in reaching this goal. Previous research also supports this finding, noting that parents with higher expectations tend to view themselves as teachers for their children (Froiland et al., 2012). Accounting for parental involvement variables, the effect of parental expectations on academic achievement in 8<sup>th</sup> grade remained statistically significant, which supports previous findings (Zhan, 2006; Englund et al., 2004).

I also found support for hypothesis 3 that the gender effect on academic achievement would be fully attenuated with the addition of parental home and school involvement to the model. Although the effect of gender tended to decrease slightly across models with the addition of parental school involvement, it tended to then increase slightly when considering frequency of parental homework help. A possible reason for this could be that children of parents who are more involved with the school tend to have a generally positive relationship with the school, wanting their parents to be involved. For example, especially in elementary school ages, chaperones are frequently required at a variety of events and the child is generally the one with the responsibility of volunteering their parent. A higher frequency of parental homework help in both math and reading possessed a negative relationship with academic achievement across analyses. As previous literature has suggested, this relationship may be because children find this

homework help intrusive and conclude that it is because their parents actually doubt their abilities (Bhanot & Jovanovi, 2005). In summation, I found a gender effect across parental expectations and parental involvements, favoring girls over boys also which partially explains the gender gap in math and reading achievement.

Another interesting, yet unexpected finding was that a higher frequency of homework help had a significant negative relationship with reading and math ability ratings across regression models. One possible explanation could be that more homework help from parents was viewed as intrusive to children in both the 3<sup>rd</sup> and 8<sup>th</sup> grades. This supported previous findings that intrusive support led children to then doubt their own abilities leading to poorer academic performance (Bhanot & Jovanovi, 2005). Another possible reason for this negative relationship could be that these children are already performing poorly academically, requiring more homework assistance from parents to even remain at that educational level. Future studies should further investigate why parental homework help may be disadvantageous to children's academic competency and achievement.

Though informative, the present study does possess several limitations worth discussing. First, the data presents a few limitations, including the fact that the majority of parent respondents were mothers, leading fathers' involvements and interactions to be largely neglected. Although this is quite typical among studies in this area, it would have been interesting to see if fathers' were involved in some ways that mothers were not (eg. extracurricular activities). As previously mentioned, several questions central to this research were also omitted. For example, the quality of parental involvement was not addressed during parental questionnaires and previous research suggests this may be a more influential factor than simply the number of times a parent was involved (Dumont et al., 2014).

Another limitation of the analyses was that socioeconomic status was not controlled for. Central to Lareau's theory is that social class and household income lead to the creation of distinct parenting styles. This is a major limitation as there could have been a strong SES effect not accounted for in the analyses. Although these variables were not accessible in the public data set, future studies should make an effort to include these important variables.

A third limitation is the varying response size across questionnaire type and cohort wave. For example, English teachers tended to respond more frequently than math teachers, affording the reading ability dependent concept a higher sample size across models. There was also a significant attrition rate due to the extensive nature of the questionnaires, with highest response rates occurring earlier in the longitudinal study.

Despite these limitations, this study presents significant evidence for the significance of parental school involvement and expectations on education. Furthermore, it highlights the gender gap in academics, with girls outperforming boys across multiple gender-stereotyped fields. These findings provide support for the significant role parents play in children's academic success in the school, while their help with academics in the home may not be as constructive. Future research should focus on the interplay of SES on parental involvements and expectations to discern more effective ways to combat educational inequality and further reduce the gender gap.

## Appendix A

### Correlation Matrices

Appendix A1. Correlation matrix of parent 3rd grade involvement indicators  
Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	1	2	3	4	5	6	7	8
1 Attend open house	1							
2 Attend PTA meeting	0.1846	1						
3 Attend parent-teacher conference	0.1691	0.0629	1					
4 Attend a school or class event	0.2703	0.1329	0.1496	1				
5 Volunteer at the school	0.2532	0.2241	0.1242	0.2836	1			
6 Fundraise for the school	0.2166	0.1771	0.0958	0.2229	0.305	1		
7 Frequency of reading homework help	-0.0055	0.0354	0.0212	-0.0237	-0.0291	0.0108	1	
8 Frequency of math homework help	-0.0049	0.0304	0.0124	-0.0188	-0.0369	0.0085	0.6732	1

Appendix A2. Correlation matrix of parent 8th grade involvement indicators  
Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	1	2	3	4	5	6	7	8
1 Attend open house	1							
2 Attend PTA meeting	0.2653	1						
3 Attend parent-teacher conference	0.216	0.2492	1					
4 Attend a school or class event	0.2085	0.1893	0.2023	1				
5 Volunteer at the school	0.2189	0.3195	0.1099	0.2897	1			
6 Fundraise for the school	0.2292	0.2001	0.1301	0.2549	0.3134	1		
7 Frequency of reading homework help	0.0214	0.0791	0.1078	-0.004	-0.002	-0.016	1	
8 Frequency of math homework help	0.0332	0.0585	0.0931	0.0233	0.0107	-0.0102	0.591	1

Appendix A3. Correlation matrix for 8th grade math teacher student ability ratings  
Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	1	2	3	4	5	6	7
1 Ability to apply math concepts	1						
2 Ability to conduct proofs	0.7032	1					
3 Ability to reason through problems (verbal)	0.7677	0.6667	1				
4 Ability to reason through problems (write)	0.6926	0.6034	0.7332	1			
5 Ability to use mathematical representations	0.6939	0.6013	0.6509	0.6461	1		
6 Ability to use a calculator to solve problems	0.4764	0.3868	0.4468	0.4446	0.4234	1	
7 Ability to use a computer to solve problems	0.2047	0.193	0.1967	0.2199	0.2293	0.2295	1

Appendix A4. Correlation matrix for 8th grade English teacher student ability ratings  
Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	1	2	3	4	5
1 Ability to organize ideas logically	1				
2 Ability to use grammar and conventions	0.8523	1			
3 Ability to conduct and use research	0.8132	0.7873	1		
4 Ability to write various types of compositions	0.6308	0.6148	0.6566	1	
5 Ability to use stylistic aspects in writing	0.7501	0.7316	0.8083	0.6299	1

## Appendix B

### Exploratory Factor Analyses

Appendix B1. Results of exploratory factor analysis for 3rd grade parental involvement indicators: Factors and factor loadings

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	Factor		Uniqueness
	1	2	
Attend open house	0.63		0.60
Attend PTA meeting	0.49		0.76
Attend parent-teacher conference	0.38		0.86
Attend a school or class event	0.62		0.61
Volunteer at the school	0.68		0.53
Fundraise for the school	0.61		0.63
Frequency of reading homework help		0.91	0.17
Frequency of math homework help		0.91	0.17

Note: although variable Attend PTA meeting is under the .40 threshold it is included to maintain consistency for analyses across 3rd and 8th grade indicators

Appendix B2. Results of exploratory factor analysis for 8th grade parental involvement indicators: Factors and factor loadings

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	Factor		Uniqueness
	1	2	
Attend open house	0.59		0.65
Attend PTA meeting	0.62		0.60
Attend parent-teacher conference	0.47		0.73
Attend a school or class event	0.60		0.63
Volunteer at the school	0.66		0.56
Fundraise for the school	0.61		0.62
Frequency of reading homework help		0.88	0.22
Frequency of math homework help		0.88	0.23

Appendix B3. Results of exploratory factor analysis for 8th grade ability rating indicators: Factors and factor loadings

Early Childhood Longitudinal Study-Kindergarten, 1998-1999

Variable	Factor		Uniqueness
	1	2	
Ability to apply math concepts		0.82	0.22
Ability to conduct proofs		0.76	0.35
Ability to reason through problems (verbal)		0.81	0.24
Ability to reason through problems (write)		0.79	0.29
Ability to use mathematical representations		0.79	0.32
Ability to use a calculator to solve problems		0.62	0.60
Ability to use a computer to solve problems		0.40	0.83
Ability to organize ideas logically	0.88		0.16
Ability to use grammar and conventions	0.86		0.19
Ability to conduct and use research	0.89		0.15
Ability to write various types of compositions	0.78		0.38
Ability to use stylistic aspects of writing	0.85		0.22

## **Appendix C**

### **IRB Approval**

Principal Investigator: Lauren Hammer

Study ID: STUDY00003373

Title of Study: The Effect of Differential Parental Involvement and Expectations by Child

Gender on Children's Academic Achievement

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## ACADEMIC VITA

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### EDUCATION

The Pennsylvania State University **May 2016**  
B.A. Degree Sociology, expected May 2016  
B.A. Degree Psychology, expected May 2016

Central Bucks High School South **2009-2012**

### PROFESSIONAL/TEACHING EXPERIENCE

Educational Assistant  
Central Bucks School District, Doylestown, PA **2015**  
Worked with non-verbal elementary school age students on maintaining skills specified in Individualized Educational Plans. Assisted teacher in running classroom activities and teaching.

Friendship Group Coach  
The Pennsylvania State University, Bennett Family Center **2014-2015**  
Counseled high risk youth in cultivating social competency skills. Learned and applied behavioral interventions. Met with parents to discuss progress and future developments.

Research Assistant  
Cognitive and Social Development Lab **2013-2015**  
The Pennsylvania State University  
Aid Graduate students in research, Worked on developing coding systems and coding behavior. Learned skills required for graduate school

FLEX Language Program Student Teacher  
Central Bucks School District, Titus Elementary School **2012**  
Taught basic-level Spanish to sixth grades in an after-school program. Created and taught lesson plans. Gained valuable experience resolving common classroom issues.

### SCHOLARSHIPS

Schreyer Ambassador Travel Grant  
College of Liberal Arts Enrichment Award  
Enrichment Award from the Department of Sociology  
Undergraduate Recognition Award  
Shine Scholarship

## **COMMUNITY SERVICE**

Big Brothers Big Sisters **2015-Present**  
Centre County Youth Services Bureau, State College, PA  
Mentor an at-risk little brother. Play games and promote social skill development.

English as a Second Language Aid **2015**  
Volunteers in Public Schools, State College, PA  
Tutor eighth grade exchange student in English proficiency. Work on vocabulary and grammar.

## **FOREIGN LANGUAGES**

Conversational in Spanish  
Conversational in Italian

## **SKILLS**

Proficient in Interact, SPSS, STATA, and Microsoft Offices

## **HONORS**

Paterno Fellow, Schreyer Honors College **2012-Present**  
The Pennsylvania State University