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## Individual Growth Analysis of Children's Reading Performance During the First Years of School

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INDIVIDUAL GROWTH ANALYSIS OF CHILDREN'S READING PERFORMANCE  
DURING THE FIRST YEARS OF SCHOOL

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Bachelor of Music in Music Education  
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## DEDICATION

This thesis is dedicated to my son Patrick Sebastian, my step-daughter María Fernanda, my mother Veainen, and all our family and friends who encouraged me throughout this process.

Special dedication goes to my husband Patrick Rosa Brusin for his constant support and caring understanding.

## ACKNOWLEDGEMENTS

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INDIVIDUAL GROWTH ANALYSIS OF CHILDREN'S READING PERFORMANCE  
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**ABSTRACT**

Using data from the National Center for Education Statistics (Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K)), the study utilized an individual growth model (Bryk & Raudenbush, 2002), the purpose of which was to assess the nature of progress in children's reading performance between kindergarten and 3<sup>rd</sup> grade; and second, to determine the extent to which parental involvement predicts both the initial reading ability as well as the rate of progress. Children's cognitive development in reading was used as the dependent variable and parental involvement as the primary independent variable with gender and race/ethnicity as control variables. The study used four points in time (waves of data): fall kindergarten (1998), spring kindergarten (1999), spring first grade (2000), and spring third grade (2002). The data analysis was performed on 9,032 participants (White, Black and Hispanic); 87% of them had 4 waves of data, and 13% had 3 waves of data collected during a period of 7 semesters.

The measurement of early literacy and reading skills was based on an adaptive item response theory (IRT)-scaled reading assessment, which included questions designed to measure basic skills, vocabulary, and comprehension. Results indicated: (1) parental involvement was higher when children had a low initial reading performance; (2) parental involvement was statistically not significant in predicting the rate of growth

in reading achievement; (3) female children were predicted to have higher initial status in reading performance but their rate of growth was only slightly higher than that of their counterparts; (4) Hispanic children were predicted to have a statistically significant lower initial status in reading than other students, but their rate of growth was not significant. Black children were predicted to have a statistically significant low initial status and their rate of growth was statistically significant and slower than the rate of growth of the others. The study recommended that parental involvement programs should be sensitive to gender and race/ethnicity; further research should include a more comprehensive construct of parental involvement and include data on family socio-economic status (SES).

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## CHAPTER I

### INTRODUCTION

#### **The Problem**

Statistical reports document different levels of students' outcomes regarding academic achievement in reading. Many policy makers consider that there are a series of factors, besides teaching methods, that might effect the academic achievement of students. The role of parental attributions has also been investigated as predictor of involvement and influences on child achievement (Georgiou, 1999); for instance, parents of sixth-graders who believed that their own role was important for their child's achievement tended to be keener in developing the child's interests. For that specific grade it was found that there was a line of influence between the type of parental involvement and the child's actual academic achievement.

Although much research has focused on the importance of parental involvement in children's education, examining this phenomenon over time to determine the overall impact of parental involvement on the students as they grow using individual growth modeling (Raudenbush & Bryk, 2002) remains only a recent enterprise. This fact largely contributes to the limited body of knowledge regarding which aspects of parental

involvement predict students' academic achievement, specifically reading achievement, and what differences, if any, are observed between different racial groups and genders.

The individual growth analysis of students' reading achievement is represented through a two level model that is hierarchically organized. The first level – Level-1 – is a compound of individual growth parameters that represent the trajectory of each person's development such as different scores over time. The second level – Level-2 – considers characteristics of the individual's background (e.g., sex, race/ethnicity) or a specific treatment used with an experimental objective (e.g., teaching methods employed) (Raudenbush & Bryk, 2002).

Regarding academic achievement and ethnicity, previous research has documented that there were achievement differences among students from different racial groups and socio-economic levels (Desimone, 1999). In addition, the results for studies about the effects of parental involvement on minority children (examining those that represent 100% minority students) tended to be larger for African American and Latino children than they were for Asian American children. Such results highlight the consistency of the impact of parental involvement across racial and ethnic groups (Jeynes, 2005).

Similarly, gender has been the focus of researchers as a factor effecting reading achievement (Stevenson & Baker, 1987). Geske and Ozola (2009) compared the differences in reading achievement between boys and girls in different geographical contexts and countries (Spain, Russian Federation, Lithuania, Latvia and Trinidad and Tobago). More specifically, they made a comparison of standardized coefficients obtaining favorable results for girls over boys, but showing that significant gender

differences in reading achievement does not mean significant differences in standardized coefficients of structural equation models and vice versa.

The National Center for Education Statistics (NCES) and their Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), provides data on children's achievement status at birth and at various points thereafter. The ECLS-K provided descriptive information tracking their status from entry to school, their transition into school, and their progression through 3rd grade. These data were collected by using highly reliable instruments (questionnaires) in conjunction with the item response theory (IRT)-Scaled reading assessment.

Factors such as parental involvement in a child's educational life (especially as it regards gender and race/ethnicity) and how this interaction can or can not predict reading achievement are the main subjects of this study. This topic has both received and maintained the interest of many researchers because it becomes a national threat to the prosperity of the country, impacting directly or indirectly the intellectual capital of the nation at its basic levels.

## **Purpose of the Study**

The purpose of the study is two fold. The first is to assess the nature of progress in children's reading performance between kindergarten and 3<sup>rd</sup> grade. The second purpose is to determine the extent to which reported parental involvement predicts both the initial reading ability as well as the rate of progress.

The study established, using individual growth modeling, the extent of prediction of factors such as parental involvement, gender, and race/ethnicity on reading achievement of children between kindergarten and third grade. Regarding reading performance, for the k-1 reading (language and literacy) assessment this study focused on basic skills such as print familiarity, letter recognition, beginning and ending sounds, rhyming sounds, "sight" word recognition, vocabulary (receptive vocabulary), and comprehension (listening comprehension, words in context); the third grade reading assessment included the measurement of phonemic awareness, single word decoding, vocabulary (reading), and passage comprehension (NCES, 2004).

Furthermore, the study considered differences among White, Black and Hispanic students in reading achievement and whether or not parents' contact with children (operationalized as the frequency with which the parents helped children with homework) had a positive or negative impact on students' academic achievement while controlling for their race/ethnicity and gender.

For the purpose of this study and based on the information provided by the Early Childhood Longitudinal Study (ECLS-K), the kindergarten through third grade data were manipulated and analyzed and the following research questions were addressed:

1. What is the general nature of the growth trajectory in students' reading performance between kindergarten and third grade?
2. To what extent does parental involvement predict the children's reading achievement at kindergarten (initial status)?
3. To what extent does parental involvement predict the children's reading improvement (rate of change)?

### **Significance of the Study**

The prosperity of any country relies on the successful functioning of its education system. Therefore, it is of relevant significance to keep the focus on the roots of the problem in order to predict the results and take any needed action.

Parental involvement, regardless of race and gender, viewed at various points in the child's life, relates to social and also cognitive development, but more information is needed about how the effect of this involvement varies for students in terms of gender and racial/ethnic backgrounds. This study identified race, gender, and parental practices that relate to students' reading achievement and established the relevance of those factors and the extent of prediction on kindergarteners' school progress at the end of third grade because of the importance of the first years in school.

The present study used an individual growth modeling to assess children's reading gains through the early elementary years and the extent of prediction of parental involvement regardless of their children's gender and race/ethnicity on reading achievement. These factors have been the subject of international interest for many years.



Although there is a vast body of literature on this topic, the study of student achievement at a single time point may provide a completely different idea of school success and effectiveness than a model that captures students' growth over time, which is the case when using individual growth modeling. Additionally, the present study used the *Early Childhood Longitudinal Study, Kindergarten Cohort*, which is a large data set that provides generalizable information about our national population of kindergartners. In consequence, this study allows for more conclusive longitudinal findings and the generalization of the result of the analysis of data about how kindergartners perform over time considering the impact that parental involvement might have on their reading performance.

The study of such characteristics and events is a significant contribution and can help educators, parents and educational institutions to be aware of and deal with these specific factors that could cause an impact on students' success seen as reading achievement throughout the first years of formal education.

This approach may be a valuable tool in assessing and monitoring student achievement and may also be used to improve parental involvement programs.

### **Definition of Terms**

This section presents intended definitions of the basic terminology included in this study.

*Academic Achievement:* The long term level of performance outcome (Roulette-MacIntyre, 2003). In this study academic achievement, specifically reading achievement is measured by the item response theory (IRT)-scaled reading scores.

*Parent/Guardian:* Refers to those individuals with legal or quasi-legal custodianship, whether biological mother or father, adoptive, or foster parents of students who attend to school (Roulette-MacIntyre, 2003).

*Parental involvement:* Edwards (2009) defines parent involvement as the participation of parents in every facet of children's education and development from birth to adulthood. The author also recognizes that parents are the primary influence in children's lives. For the purpose of this study, parental involvement is defined as child-parent involvement (CPI). Specifically, CPI refers to the frequency with which parent helps the child with homework. In this study, parental involvement is measured using the following scale according to the frequency of parental help: 1 = "Never", 2 = "Less than once a week", 3 = "1 to 2 times a week", 4 = "3 to 4 times a week", 5 = "5 or more times a week".

*Item Response Theory (IRT):* In the data collected by NCEs(2004a), the measurement of early literacy and reading skills is based on an adaptive item response theory (IRT)-scaled reading assessment, which gives an overall assessment of reading ability that can be compared across all participating students and can be used to point out improvement in reading achievement over time. First students had to complete a 12-20 item routing test, which guided the difficulty level of the subsequent questions. IRT scaling also allows for the comparison of the reading achievement scores across the 4 waves of data considered for this study.

#### *Waves of data*

*Wave 1:* Refers to the scores and procedures conducted during the fall of the 1998-1999 school year when the participants were attending kindergarten.

*Wave 2:* Refers to the scores and procedures conducted during the spring of the 1998-1999 school year when the participants were attending kindergarten.

*Wave 3:* Refers to the scores and procedures conducted during the spring of the 1999-2000 school year when the participants were attending first grade.

*Wave 4:* Refers to the scores and procedures conducted during the spring of the 2001-2002 school year when the participants were attending third grade.

## CHAPTER II

### LITERATURE REVIEW

#### **Parental Involvement**

Fundamental reading skills are obtained in the early childhood years. They are also the time to build the foundations for children's school performance and cognitive development. One way to think about parental involvement is to consider what it means for students' academic success, specifically how this parental involvement might have an effect on reading achievement. Writings about the role of parent involvement in children's education include research reports, expert opinions, theory papers, program descriptions, and guidelines for setting up programs.

Parental involvement has been defined as the different ways that parents participate in their children's formal education (Cotton & Reed, 1989). This concept of parental involvement implies that parents can support their children's schooling by attending school functions and responding to school obligations (parent-teacher conferences, for example). Parents can participate in helping their children improve their schoolwork, providing encouragement, arranging for appropriate study time and space, modeling desired behavior (such as reading for pleasure), monitoring homework, and actively tutoring their children at home (Cotton & Reed, 1989).

A more recent work (Edwards, 2009) defined parent involvement as the participation of parents in every facet of children's education and development from birth to adulthood. The author also recognized that parents are the primary influence in children's lives.

### **Types of Parental Involvement**

There are different ways of considering parental involvement in their children's education. The kinds of parent involvement more commonly investigated include telephone and written home-school communications, attending school functions, parents serving as classroom volunteers, parent-teacher conferences, homework assistance/tutoring, and home educational enrichment.

Parental involvement has also been classified as active or passive (Cotton & Reed, 1989). If parents receive phone calls, read and sign written communications from the school, and perhaps attend and listen during parent teacher conferences, greater achievement benefits accrue than would be the case with no parent involvement at all. Active forms of parent involvement produce greater achievement benefits than the more passive ones.

Cotton and Reed (1989) considered that a good type of involvement is when parents work with their children at home, but also when they attend and actively support school activities and when they help out in classrooms.

Considering a different point of view, Edwards (2009) citing Epstein (2001) described six levels of involvement. Parenting, communication, volunteering, learning at home, decision making and collaboration with community are the major levels cited by Edwards (2009); where *learning at home* refers to the request and guidance from teachers

for parents to assist their own children at home on learning activities that are coordinated with the children's classwork.

### **Parental Involvement and Student Achievement**

Focusing on parental involvement in children's learning, research studies demonstrated that it is positively related to achievement (Cotton & Reed, 1989). In their study, Cotton and Reed (1989) found that there were strong indications that the most effective forms of parental involvement are those which engage parents in working directly with their children on learning activities in the home. Furthermore, their findings showed that the more intensively parents are involved in their children's learning, the more beneficial the achievement effects regardless of the types of parental involvement in children's learning and the types and ages of students (Cotton & Reed, 1989).

### **Parental Involvement and Reading Achievement**

Dickinson and Tabors (2001) in their study, suggested that parents' involvement is an important link between home and school, and the child, which supports language and literacy development of children. Likewise, Liu (2008) confirmed that parental involvement in children's literacy is statistically significant and has a positive impact on children's reading achievement and development. Researchers in the field and early childhood educators both view the parents as an integral part of the early childhood education process (Davis-Kean & Sexton, 2009). This fact keeps its value beyond the early childhood stage.

For the purpose of this study, parental involvement is defined as child-parent involvement (CPI). Specifically, the frequency with which a parent reports that he/she helps the child with homework.

## **Listening to Parents**

Edwards (1999) made an excellent analogy when comparing the relationship between teachers and parents with the one between doctors and patients. She stated that doctors as well as teachers (she also mentioned lawyers and architects) need to collect information about their patients/clients in order to get particular insights about the situation to be considered. In that sense, parental involvement should be approached in the same way. The author (Edwards, 1999) attributed the lack of effectiveness in parental involvement to a lack of communication among teachers, schools and families.

## **Gender and Achievement**

There are a number of factors used to explain students' reading achievement. Genders as well as race/ethnicity have been indicated as important factors influencing reading literacy level. Stevenson and Baker (1987) examined separately the relations for boys and girls with parental involvement, school performance, and ability to perform, and they found that there are no significant differences for boys and girls, although girls had slightly more involved parents and tended to perform better in school. It is common for teachers and parents to expect girls to outperform their male counterparts on measures of reading achievement. According to the results obtained in one study of children in kindergarten, girls gained reading skills slightly more rapidly than boys (McCoach, O'Connell, Reis & Levitt, 2006). In the same study, it was found that the reading growth for children with important gains in kindergarten slowed down significantly in first grade. There is still the need to consider whether that gain holds across the 4 first years of school.

Likewise, in the study performed by Mitchell (2002) gender was not a significant predictor of the students' rate of growth in proficiency achievement performance between the second and fourth grade levels. All the information reviewed points to gender as a neutral factor in the prediction of achievement.

### **Race/Ethnicity**

The National Center for Education Statistics (2002) defines ethnicity based on the following categorization: *Hispanic or Latino*: A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term "Spanish origin" can be used in addition to "Hispanic or Latino." Race is based on the following five categorizations: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. *Black or African American*: A person having origins in any of the black racial groups of Africa. Terms such as "Haitian" or "Negro" can be used in addition to "Black or African American." *White*: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

To contextualize the issue of race, it is important to place it within the government's discussion of race/ethnicity in education. The No Child Left Behind Act of 2001 in the Sec. 1101. Stat. 1440. (2002b) states in the Title 1 that the purpose of this act is, among other things, to improve the academic achievement of the disadvantaged by:

(3) "Closing the achievement gap between high- and low-performing children, especially the achievement gap between minority and nonminority students, and between disadvantaged children and their more advantaged peers".



For McCoach et al. (2006) the average kindergarten reading growth rate for African Americans is slightly lower than that of Hispanics even when the Black-White achievement gap has been reported by NCES (2002) to have decreased.

## CHAPTER III

### RESEARCH METHODOLOGY

#### **Data Sources**

Data were collected from the National Center for Education Statistics, specifically from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K). The ECLS-K's researchers selected a nationally representative sample of kindergartners in the fall of 1998 and followed these children through the spring of third grade. The longitudinal Kindergarten-third grade public use data file combines data from the base year (fall and spring kindergarten), first grade (fall and spring) and third grade (fall and spring). The data are child-level and include information about children, their families, teachers, and schools. The full K-3 longitudinal data file has 17,401 records of children who attended kindergarten programs during the 1998-99 school year and were released from third grade in spring 2002.

#### **Data Collection Procedures**

The present study used four points in time where measurements were performed, which are referred as four waves of data: fall kindergarten (1998), spring kindergarten (1999), spring first grade (2000), and spring third grade (2002). In the data analysis, the sample size of the students collected across the US considered those students who did not

change schools during the recollection of the data and who belong to one of the following racial/ethnic groups: White, Black or Hispanic. Furthermore, the study included those participants who responded to the questionnaires and also had at least three/four waves of data in order to have sufficient points in time to follow the students' progress. As a result of this selection, the data analysis was performed on 9,032 participants: 87% of the students had 4 waves of data, and 13% of the total had 3 waves of data collected during a period of 7 semesters, which represents the entire period of study.

## **Instruments and Measures**

### *Reading Assessments*

The measurement of early literacy and reading skills is based on an adaptive item response theory (IRT)-scaled reading assessment, which gives an overall assessment of reading ability that can be compared across all participating students and can be used to point out improvement in reading achievement over time. First, students had to complete a 12-20 item routing test, which guided the difficulty level of the subsequent questions. IRT scaling also allows for the comparison of the reading achievement scores across the 4 waves of data considered for this study.

The k-1 reading (language and literacy) assessment included questions designed to measure basic skills (print familiarity, letter recognition, beginning and ending sounds, rhyming sounds, "sight" word recognition), vocabulary (receptive vocabulary), and comprehension (listening comprehension, words in context). Comprehension items were targeted to measure skills in initial understanding, developing interpretation, personal reflection, and demonstrating critical stance. The k-1 reading assessment contained five proficiency levels. If a child had mastered one of the higher proficiency levels, he or she

was very likely to have passed the items that made up the earlier levels as well (NCES, 2004a).

The third grade reading assessment measured phonemic awareness, single word decoding, vocabulary (reading), and passage comprehension. The comprehension items measured skills in initial understanding, developing interpretation, personal reflection, and demonstrating a critical stance. The passage reading section examined comprehension of sentences, paragraphs, and context comprehension, and it comprised a variety of literary genres including poetry, letters, informational text, and narrative text. In comparison with k-1, higher proficiency levels were added at the third grade level: literal inference, extrapolation, and evaluation (NCES, 2004a).

Thus the third grade reading assessment contained five proficiency levels, which reflected a progression of skills and knowledge: if a child had mastered 1 of the higher levels, he or she was very likely to have passed the items from the earlier levels as well. The third grade proficiency levels were as follows: (1) recognizing common “sight” words; (2) reading words in context; (3) making inferences using cues that were directly stated with key words in text (literal inference); (4) identifying clues used to make inferences (extrapolation), and using personal background knowledge combined with cues in a sentence to understand use of homonyms; and (5) demonstrating understanding of an author’s craft and making connections between a problem in the narrative and similar life problems (evaluation) (NCES, 2004a). The categorization of early literacy proficiencies represented in the ECLS-K assessment is consistent with the skills that have been identified as the building blocks of reading mastery (Center for the Improvement of Early Reading Achievement, 2001).

The adaptive nature of the test, in conjunction with the IRT scaling, ensured that although students were administered different subsets of items, their scores could be compared. The pattern of right and wrong answers, as well as the characteristics of the assessments items themselves, was used to estimate a point in an ability continuum (theta) which provided the basis for criterion-referenced and norm-referenced scores (NCES, 2004a). The IRT scaling allows for the comparison of the reading achievement scores across the 4 waves of data considered for this study.

In addition, the ECLS-K user's manual reported reliabilities of the reading assessments. The measured IRT-based reliabilities of the reading assessments (based on repeated estimates of theta, estimated ability) are 0.93 in fall of kindergarten, 0.95 in spring of kindergarten, 0.96 in spring of first grade, and 0.94 in spring third grade.

### **Variables**

Dependent Variable:

*Students' Reading Achievement*

Independent Variables:

*Parental involvement: Child-parent involvement (CPI):* Frequency parent reported helping with homework

Control Variables:

*Gender and Race/Ethnicity.* For the variable race/ethnicity the study will only consider White, Black and Hispanic students from the national sample.

## **Data Analysis**

Individual Growth Modeling (Raudenbush & Bryk, 2002) was the statistical method used in this study in order to analyze the data, considering the students' IRT scores observed for the following four time periods: Initial status (fall-kindergarten), kindergarten growth (spring-kindergarten), first-grade growth (spring-first grade), and third-grade growth (spring-third grade). This model allowed the subject repeated observations that vary independently from other subjects, while permitting within subject and between subject comparisons across the repeated observations. In other words, this model was used to predict individual growth during the period under study and could be used to predict future growth. Also, the children's individual change in reading achievement over the four time periods was shown to vary according to other personal characteristics such as gender, race/ethnicity, and parental involvement.

## **Model Specification**

### Level-1 (within subjects) Model

At Level-1 each child's growth trajectory was modeled according to his/her IRT scores over the following four periods:

- At the kindergarten entry, fall 1998 (Initial status)
- The kindergarten school year, 1998-1999 ( spring term, IRT scale score)
- The first grade school year, 1999-2000 (spring term, IRT scale score)
- The third grade school year, 2001-2002 (spring term, IRT scale score)

At Level-1 of this study, an investigation of child's achievement growth, as measured by the IRT (Item Response Theory) scale score for the time span of kindergarten (entry and spring measurements), first grade, and third grade was performed.

It was expected that there would be an improvement in reading achievement for each time period.

The following Level-1 equation (1) represents the performance growth trajectory for student  $i$  over time (seven semesters).

$$Y_{it} = \pi_{0i} + \pi_{1i}(\text{period})_{it} + e_{it} \quad (1)$$

Here  $Y_{it}$  represents the IRT scale score at time  $t$ , for the  $i^{\text{th}}$  student as a function of his/her IRT score (growth trajectory) plus the random error. The parameter  $\pi_{1i}$  is the growth rate in reading per semester for the  $i^{\text{th}}$  student during the kindergarten, first and third grade data collection period.

$\pi_{1i}$  is the expected change in IRT score for each semester. The parameter  $\pi_{0i}$  (the y-intercept parameter) is the initial status (or fall kindergarten measurement) IRT measured by the score received on the fall kindergarten initial evaluation of the student.

#### Level-2 (Between student) Model

The individual growth parameters were nested in the context of parental involvement and individual characteristics. The intercept ( $\pi_0$ ) as well as the growth parameter ( $\pi_1$ ) are allowed to vary for each child as a function of the parental involvement variable. At this Level-2 we can observe how the initial growth parameter (y-intercept), is related to the measured parental involvement for each child. To establish the extent to which the parental involvement (*Child-parent involvement*), as well as *gender* and *race/ethnicity* predict the initial status in IRT scores, this study used the following Level-2 model (2):

$$\pi_{0i} = \beta_{00} + \beta_{01}(CPI_i) + \beta_{02}(Gender_i) + \beta_{03}(Black_i) + \beta_{04}(Hispanic_i) + r_{0i} \quad (2)$$

$\pi_{0i}$  is the corresponding Level-2 random effect; the regression coefficient  $\beta_{00}$  is associated with the predicted initial status (average initial performance) for a typical child. The regression coefficients –  $\beta_{01}, \beta_{02}, \beta_{03}$ , and  $\beta_{04}$  – represent the relationship between the *parental involvement, gender, and race/ethnicity*, predictor variables and the child's initial status, respectively. Here,  $r_{0i}$  is the random error associated with the initial status of student  $i$  that is assumed to be independently and normally distributed with mean 0, variance  $\tau_{00}$  and covariance  $\tau_{01}$ .

Likewise, the prediction of the rate of growth in IRT score from Kindergarten through third grade by the parental involvement variables and student characteristics is modeled by the following equation (3):

$$\pi_{1i} = \beta_{10} + \beta_{11}(CP_i) + \beta_{12}(Gender_i) + \beta_{13}(Black_i) + \beta_{14}(Hisp_i) + r_{1i} \quad (3)$$

The rate of growth for the given time span is  $\pi_{1i}$ , and the parameter is associated with the estimated intercept, the mean rate of change in the IRT score, achievement is  $\beta_{10}$ . The accelerator parameters –  $\beta_{11}, \beta_{12}, \beta_{13}$ , and  $\beta_{14}$  – represent the contribution of the parental involvement variable, gender, and race/ethnicity (in the rate of growth), respectively. The term  $r_{1i}$  is the random error associated with the growth rate for student  $i$  which is assumed to be independently and normally distributed with a mean equal to 0, variance  $\tau_{00}$  and covariance  $\tau_{01}$ .

In general, the Level-1 equation (1) models how each student's performance growth trajectory varies on the reading IRT scale scores in the U.S. from kindergarten through first and third grade during the years 1998- 2002.



In addition, the Level-2 equation (2 and 3) permits an observation of whether or not the parental involvement and child characteristics will be significant predictors of the growth trajectory.

## CHAPTER IV

### RESULTS

#### **Results**

In this section, results of the two-level individual growth analyses of children's reading performance during the first years of school are reported. The research findings are presented according to the research questions addressed in the study.

For research question number one, the analysis and results of participants' demographic characteristics, description of the dependent variable reading achievement and parental involvement, including means and standard deviations, are summarized in Table 1.1 and Table 1.2.

#### Research Question 1

*What is the general nature of the growth trajectory in students' reading performance between kindergarten and third grade?*

Table 1.1

*Means and Standard Deviations for Level-1 and Level-2 Variables*

Level-1 variable	N	Mean	SD	Minimum	Maximum
Reading	34996	0.02	1.00	-3.48	8.13
Level-2 variable	N	Mean	SD	Minimum	Maximum
Child/ Parent Involvement (CPI)	9032	3.82	1.02	1.00	5.00

Table 1.2

*Number and Percentage of Participants by Race/Ethnicity and Gender*

Variable		N	%
Race/ethnicity	White	9032	63
	Black	9032	12
	Hispanic	9032	7
Gender	Male	9032	50
	Female	9032	50

**Descriptive Statistics**

After the final cleaning of data, considering the responses to the data collection instruments, the number of participants in the study was 9,032. Demographics for the participants showed that, in terms of race/ethnicity 63% of the respondents were White, 12% were Black and 7% were Hispanics. Additionally, 50% of the participants were female and 50% were male. The mean for parental involvement, using a scale from 1 to 5, was 3.82 (See Figure 1).

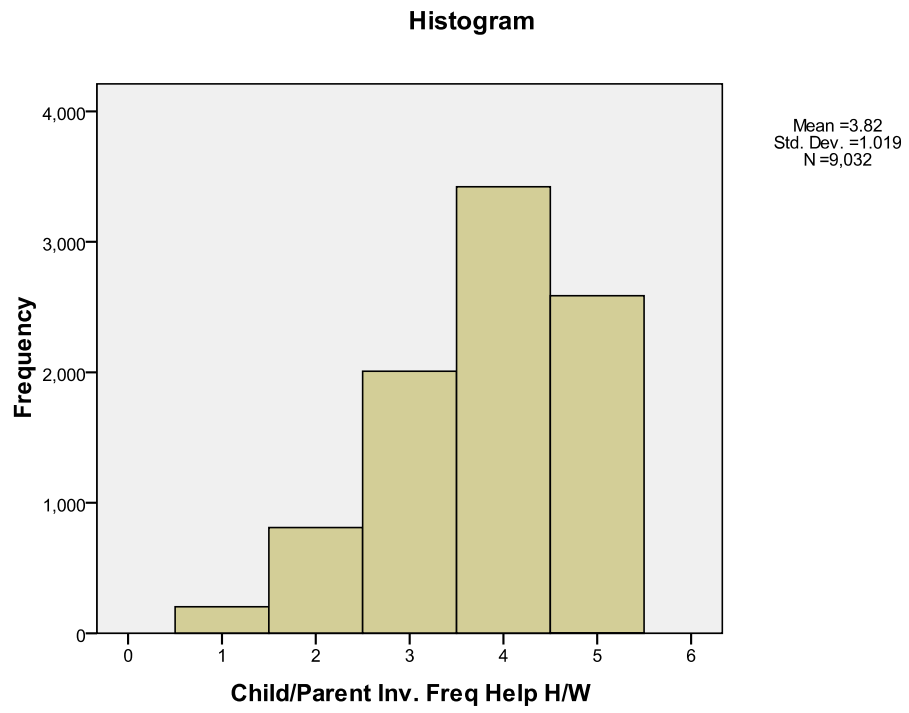
Parental involvement, which was defined according to how frequently parents reported they helped their children with their homework, was measured using the following scale: 1 = “Never”

2 = “Less than once a week”

3 = “1 to 2 times a week”

4 = “3 to 4 times a week”

5 = “5 or more times a week”



*Figure 1. Frequency of Parental Help with Homework*

In order to standardize IRT scores across grade levels, each student's IRT scores for fall-kindergarten, spring-kindergarten, spring first grade and spring third grade for reading were converted to z-scores before being used in the hierarchical data analysis. Based on the Ordinary Least Squares (OLS) estimate of the initial status ( $\pi_0$ ) and the growth rate ( $\pi_1$ ) for each student, mean growth trajectories were determined by the average of these estimates for reading.

The results are summarized as follows: for research questions numbers 2 and 3: *To what extent does Parental Involvement predict the children's reading achievement at kindergarten (initial status)?* and *To what extent does Parental Involvement predict the children's reading improvement (rate of change)?*,

Table 2

*Individual Growth Model Results for the Prediction of Reading Achievement*

Predictors of Reading Achievement	Indicators of Reading Achievement			
	Initial Status		Rate of Growth	
	$(\pi_0)$		$(\pi_1)$	
	Coefficient	P-value	Coefficient	P-value
Child/Parent Involvement (CPI)	-0.091	0.000**	-0.001	0.613
Black (1 = Black, 0 = others)	-0.321	0.000**	-0.059	0.000**
Hispanic (1 = Hisp, 0 = Others)	-0.237	0.000**	0.000	0.962
Gender (1= Female, 0 = Male)	0.142	0.000**	0.007	0.016*

\* $p < .05$ , \*\* $p < .01$

The results showed that parental involvement with the child, regarding how frequently parents help their children with homework, is a significant predictor of the initial status (CPI  $\beta = -0.091$ ,  $p < 0.01$ ) but not significant as predictor of the rate of growth (CPI  $\beta = -0.001$ ,  $p: 0.613$ ). Parents whose children had a lower initial status in reading performance were more involved than those whose children had a higher initial status. However, parental involvement (CPI) was not a statistically significant predictor of the rate of growth in reading performance. (Refer to Table 2)

*Race/ Ethnicity*

For the analysis of the initial status and the rate of growth in reading of the variable *race/ethnicity*, Black and Hispanic students were labeled as follows:

Black = 1, Others = 0

Hispanic = 1, Others = 0;

Although Hispanic students started in a statistically significant average initial performance in reading ( $\beta = -0.237, p < 0.01$ ), which was slightly higher than that for Black students, their rate of growth was also higher but statistically not significant ( $\beta = 0.000, p = 0.962$ ).

Black students had a statistically significant average initial performance in reading ( $\beta = -0.321, p < 0.01$ ) and their rate of growth was also statistically significant ( $\beta = -0.059, p < 0.01$ ). The findings of the analysis performed to determine the extent of prediction of parental involvement in reading achievement according to race/ethnicity revealed that the achievement gap between Black and Hispanic students was very small when compared with non-Hispanic students. (See Table 2)

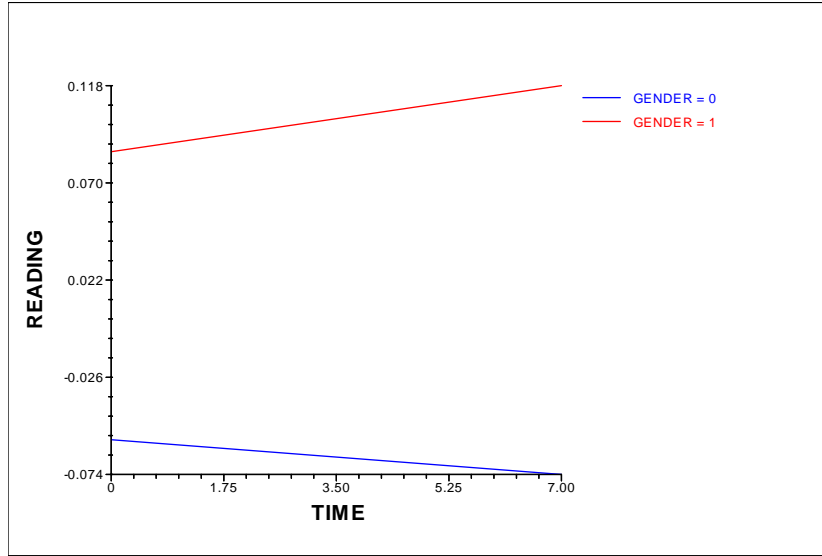
### *Gender*

For the analysis of the initial status and the rate of growth of the variable *gender* female and male were labeled as follows:

Female = 1 Male = 0

For the control variable *gender*, female was found to be a significant predictor of student's initial status in reading ( $\beta = 0.14, p < 0.01$ ). Specifically, the data show that female students are predicted to start 0.14 standard deviations higher in kindergarten reading performance than their counterparts. The rate of growth for female students is slightly higher than for male students ( $\beta = 0.01, p < 0.05$ ), progressing approximately 0.01 standard deviations per semester faster than boys. (See Table 2 and Figure 2)





*Figure 2. Initial Status and Rate of Growth for the Variable Gender*

## CHAPTER V

### CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

#### **Conclusions**

The findings of this study present the necessity of providing a guide for parental involvement regarding quality/efficacy of that involvement. Teachers have methods for how to teach specific subjects; they also have a curriculum and pre-established policies to follow. Conversely, parents do not have a proven effective guide on how to help their children to succeed in school, according to the present findings.

In summary, this study showed that when children have an evident low initial performance in reading, their parents are more likely to help them with homework, regardless of the students' race/ethnicity or gender. This type of parental involvement is not significant in predicting the rate of growth in reading achievement. Moreover, parental involvement, instead of predicting the initial status in reading, it begins in conjunction with low initial performance.

#### **Discussion**

In their study, Cotton and Reed (1989) found that there were strong indications that the most effective forms of parental involvement were those that engaged parents in working directly with their children on learning activities in the home. The present study

indicates that this involvement happens when there is already a low performance in reading and parental involvement is the reaction to this initial low reading achievement.

The findings replicate the results obtained by Geske and Ozola (2009) where they compared the differences in reading achievement between boys and girls in different contexts, and also countries (Spain, Russian Federation, Lithuania, Latvia and Trinidad and Tobago), obtaining favorable results for girls over boys.

In this study, the findings show an important effect of parental involvement due to the initial reading performance that is indirectly proportional: a lower reading achievement brought about higher parental involvement. It might be due to a lower level of independence of the child to perform and respond to reading activities because of the constant parental help. On the other hand, the findings might be explained by the common notion that parents tend to check their child's homework only when the child is already performing below average in school. These findings confirmed the results obtained by Jeynes (2005), who highlighted the consistency of the impact of parental involvement across racial and ethnic groups. Moreover, in the study performed by Desimone (1999), parental help with homework was associated negatively with achievement for students from all races/ethnicities and income levels.

Conversely, the results found in Smith, Stern & Shatrova's (2008) study confirmed that more involved parents in helping with homework was related to a higher academic achievement for Hispanic students, which completely contradicts the results of the present study. In this case it would be helpful to analyze specific factors that could have been taken into account for such findings.

Edwards (2009) considered in *Tapping the potential of parents* that learning at home was the request and guidance from teachers for parents to assist their own children at home on learning activities that are coordinated with the children's class-work. The present findings reflect the lack of an effective guidance in homework learning activities.

### **Recommendations Based on the Findings of the Study**

The findings of this study suggest that an action plan and guide for helping children with homework should be developed by teachers as recommended by Edwards (2009). On the other hand, if there is already one guide for parents, it should be improved and made available for all parents. Based on the findings, the guide "A child becomes a reader" published by The National Institute for Literacy (2006) is suggested be widely distributed. In this publication, there are a series of recommendations about what to do at home to help children learning to read and write. It also recommends that parents should discuss program planning with their children's teachers as well as monitor the completion of homework, encourage reading, and set high expectations for their children and their children's teachers.

Additionally, in order to use parental involvement as a mechanism to improve reading achievement, educators and parents must gain a better understanding of how parental involvement effects differ by gender and race/ethnicity. For example, according to the findings, girls start at a higher initial reading status than boys and their rate of growth also stays above that for their counterparts. This fact should alert not only parents but also educators to take action to help boys in reading and improve this pattern. Furthermore, it is also recommended in the case of Hispanic students that teachers, or the school system, make available information to guide parental involvement in both

languages, Spanish and English, to make sure that the exact same information is being received by all the parents.

In this study, information about parental involvement effects on reading achievement by gender and race/ethnicity was addressed. However, there might be a series of other factors to be considered in order to have a wider perception of this matter, such as the stage of development in which the children are at the moment of the study, which might give parents a better idea of what to expect from their children as they develop so they have the appropriate expectations about them at a given age. It would be important that program materials and instructions be provided by teachers, which involve parents in reading with their children, supporting their work on homework assignments, or tutoring.

### **Recommendations for Further Research**

For further investigation on gender differences in factors influencing reading achievement, more specific and comprehensive data are needed, such as information about different possibilities provided for boys and girls, specifically information about the methods used by parents to help boys/girls with homework. Although the observed differences were smaller than expected, recommendations can be developed for parents about how to treat both genders in reading instruction. Specifically, there should be special attention paid to the frequency that help with homework is offered by parents, given that many parents might want to be involved in their children's education but do not have a precise idea of how much help is really needed.

Another important fact to take into consideration for further research is related to Hispanic students. It would be necessary to establish whether the fact that Hispanic

students usually have Spanish speakers at home might also influence their status in different moments in reading achievement.

It is also recommended to include a more comprehensive construct of parental involvement, with multiple dimensions, besides parent-child interaction. A final recommendation for further research is to include data from parents or guardians' socio-economic status (SES).

### **Limitations of the Study**

The study depended on the data from NCES. These data had a limited construct of parental involvement only based on the parent-child interaction, specifically based on the frequency that parents reported they helped their children with homework. This construct could have been improved with some items cited in Edwards' (2009) book, such as parent-teacher contact and other items related to parent-school involvement.

A limitation of this study might be the lack of information about teacher-parents' communication practices, which in the specific case of Hispanic students' parents becomes a major challenge that is illustrated by the language barrier and the parents' perception of teachers as authorities (Smith, Stern & Shatrova, 2008) which might slow down the effectiveness of the involvement between parents and teachers. Another fact to consider is the lack of data about the parents of Hispanic students, specifically their level of proficiency in English, and if this characteristic could affect the quality and/or effectiveness of parental involvement while helping with homework.

Regardless of race/ethnicity or gender, there is a need for knowing whether there is a teacher practice that triggers the level of involvement of parents with their children and influences the purpose of the parental intervention.

The last limitation involves the absence of data concerning the socio-economic status of parents or guardians (SES). A comparison between high SES and low SES parents/guardians could have enriched the findings of the study.

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