A Longitudinal Study of the Effect of Full-day and Half-day Kindergarten on the Development of Literacy Skills

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Abstract

Mastering reading by the end of third grade has long been recognized as a critical milestone in success in later grades. Hernandez (2011) found that only 4 percent of students showing proficiency in reading at grade 3 failed to graduate from high school as compared to 16 percent of those who are not reading at grade level. There exists a disagreement among researchers as to the effect of the length of the day in kindergarten programming on early literacy skill development, particularly on the longitudinal effects (Meyer, Wardrop, Hastings, & Linn, 1993; Nunnely, 1996; Watson & West, 2004; West, Denton & Reaney, 2001). With the current emphasis on accountability and the fiscal demands to balance budgets by cutting unnecessary or unsuccessful programs, providing our students with the most effective programming possible is imperative.

This study adds to the literature by employing a quantitative causal-comparative, longitudinal, secondary data analysis design to investigate the impact length of the kindergarten school day has on students’ literacy achievement by third grade among 3rd, 4th and 5th grade students having attended kindergarten in a suburban town in Massachusetts. After compiling quantitative data in the form of pre- and post-tests at the kindergarten and third grade levels for the students, one-way between-groups and repeated ANOVA were conducted (after testing necessary assumptions) to compare the means of literacy scores at the end of kindergarten and then at the end of third grade. The findings indicate mixed results regarding the impact of kindergarten programming on literacy achievement. This study shows that students attending full-day kindergarten scored significantly higher on district literacy assessments at the end of kindergarten, however this advantage disappeared by the end of third grade.
Keywords: kindergarten, full-day kindergarten, half-day kindergarten, literacy

achievement
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Chapter I: Introduction

Statement of Problem

In her roles as both elementary curriculum coordinator and now elementary principal, the researcher has noticed a disproportionate number of half-day students leaving kindergarten with literacy scores on district assessments that are lower than those of their peers who attended full-day kindergarten. A data and statistical analysis of reading assessment scores for one hundred sixty-two Dedham, MA public school students was undertaken in 2005. This analysis indicated a significant difference between the performance of full-day and half-day students (Sullivan, 2005). Full-day kindergarten students performed significantly better than their half-day counterparts in beginning reading by the end of kindergarten with ninety percent as compared to fifty-five percent of students attaining district benchmarks on the Developmental Reading Assessment (DRA) (Sullivan, 2005). Similar results occurred at the end of first grade with seventy-five percent of the full-day kindergarten students reaching the benchmarks as compared to sixty-six percent of the half-day students reaching the benchmarks. Scores of half-day students from low-income families were lower, with only twenty-two percent reaching the benchmark at the end of kindergarten and fifty-six percent reaching the benchmark at the end of first grade (Sullivan, 2005).

There exists a disagreement among researchers as to the effect of the length of the day in kindergarten programming on early literacy skill development, particularly on the longitudinal effects (Meyer, Wardrop, Hastings, & Linn, 1993; Nunnelly, 1996; Watson & West, 2004; West, Denton & Reaney, 2001). Discrepancies in the impact of full-day kindergarten versus half-day kindergarten programming on the development of early literacy skills were noted among the studies reviewed. Several research studies (Watson & West, 2004; West, Denton, & Reaney,
2001) indicate greater gains in reading achievement for students attending full-day kindergarten programming. In contrast, several other studies fail to find any significant difference between full-day and half-day programming (Meyer, Wardrop, Hastings, & Linn, 1993; Nunnelly, 1996). With the current emphasis on accountability and the fiscal demands to balance budgets by cutting unnecessary or unsuccessful programs, providing our students with the most effective kindergarten programming possible is imperative.

**Significance of the Problem**

Developing strong reading skills directly affects how students perform in school, and also how well they progress throughout life (U.S. Department of Education, 2005). Through the examination of reading scores of full and half-day students within the researcher’s district over just a two-year period the difference in performance between the two subgroups is apparent. As the principal of an elementary school where historically close to eighty percent of the student population attends half-day kindergarten, conducting a more extensive analysis of this problem is of great importance to the researcher and the school district. The growing abundance of research related to the impact of full-day kindergarten suggests that this is also a problem of significance to communities across the country (Plucker et. al, 2004; Walston & West, 2004; West, Denton, & Reaney, 2001).

Over the past decade there has been a consistent increase in students attending full-day kindergarten, from close to twenty-nine percent in 1999 to nearly seventy-five percent in the year 2009 (Chester, 2009). This has followed the pattern seen by Plucker (2005) across the nation. Implementing full-day programs is a costly policy decision and therefore it is necessary to determine the impact that full-day programming has on student learning. The Massachusetts Department of Education has offered grants to towns implementing full-day kindergarten since
1999. However, the protocol for entry into the full-day kindergarten varies from town to town and on a larger scale from state to state. In some cases, at-risk students are targeted. In other cases, full-day kindergarten is tuition based resulting in a lower percentage of low-income and minority students attending (Education Commission of the States, 2005). Since its inception in the Dedham Public Schools, attendance in full-day kindergarten program has been determined by a lottery held yearly in early January. Full-day kindergarten is fee based, which originally resulted in a smaller number of low-income students attending. In order to address this difference, Dedham instituted a sliding scale for fees based on income over the past five years. This has resulted in a much higher percentage of low-income students choosing to attend full-day kindergarten.

As seen in the case of Dedham, the resulting discrepancy in reading scores for those in half-day programming places these students at a distinct educational disadvantage as they enter first and second grade. In the 2010-2011 school year, the Dedham Public Schools adopted a consistent basal literacy program, *Treasures* to use in conjunction with guided reading groups in order to ensure all students have access to consistent literacy instruction. The district curriculum utilized in each of the kindergarten programs is the same, however the full-day program offers the teachers the time to provide enrichment or extension activities whereas the half-day program requires the basic version of the curriculum.

With the current emphasis on accountability and the fiscal demands to balance budgets by cutting unnecessary or unsuccessful programs, providing our students with the most effective kindergarten programming possible is imperative. Will the longitudinal impact of full-day kindergarten prove to be worth the added fiscal demands? If a direct a connection can be made between the implementation of full-day kindergarten and the development of increased literacy
scores, a move to full-day kindergarten may in fact decrease the costs for remediation at higher grades.

The purpose of this study is to examine the effects of full-day versus half-day kindergarten programming on the development of literacy skills. The overarching research question will be: Over time do students in full-day kindergarten outperform their half-day counterparts on the development and maintenance of literacy skills?

**Practical and Intellectual Goal**

The primary goal of this research will be to inform practices in the Dedham Public Schools by examining the impact of full-day versus half-day kindergarten programming on the development of literacy skills over time. By developing a better understanding of the impact of kindergarten programming on the development and eventual maintenance of literacy skills, this project will provide this researcher's district with important information for making budgetary and programming decisions. Additionally, as the principal of the elementary school with historically the highest number of students attending half-day kindergarten, the information gained will be useful in deciding whether to advocate for district or grant funding to ensure full-day kindergarten programming for all students or to focus on providing increased services as the students move through the elementary grades.

**Positionality Statement**

As one of the elementary school administrators in the Dedham Public School District, the ability to understand the long term effects of kindergarten programming holds important practical implications. The personal bias of this researcher is that full-day kindergarten should offer the opportunity to address current curriculum demands while still allowing for the more developmental and play based activities of kindergarten programs provided to students in the
past. There is disagreement, however, among researchers as to the lasting academic effects of the benefits of full-day kindergarten.

**Research Questions**

The purpose of this study is to longitudinally examine the development of literacy skills over the first four years of school for students who have attended either full-day kindergarten or half-day kindergarten. The overarching question guiding this study is: To what extent do literacy skills vary between students enrolled in full-day or half-day kindergarten as they progress through the elementary years? The study will address the following research questions:

1. At the completion of the kindergarten year to what extent do full-day kindergarten students outperform their half-day counterparts on the acquisition of grade level literacy benchmarks?

2. As students progress through each of the primary grades to what extent do those who attended full-day kindergarten outperform their half-day counterparts on the acquisition of grade level literacy benchmarks?

**Theoretical Framework**

Two theoretical strands inform this quantitative study of kindergarten programming and the development of literacy skills. Early literacy theories, specifically reading readiness theory and emergent literacy theory, form the primary basis for examining the impact of kindergarten programming. Gaining an understanding of these theories requires a discussion of the developmental theories of Piaget and Vygotsky upon which these early literacy theories were formed.

**Child Development Theories**

According to Miller (2002), theories of development stem from the intrigue of one generation regarding the behavior of children and adults of the next. Developmental theorists
interpret these observations and form a picture of development from infancy through childhood to adulthood. The developmental theories of Piaget and Vygotsky provide important insight into the learning processes of children.

Piaget viewed children as constructors of their own structure of knowledge through their day to day interactions with objects and people. He proposed that children progress through distinct developmental stages, each characterized by its own specific kinds and ways of organizing its knowledge. The stages include the sensorimotor stage, the preoperational stage, the concrete operations stage, and the formal operations stage. Piaget stressed that these four stages were sequential, however the ages when children pass through the stages could vary and that sometimes children move back and forth between the stages during transitional periods. The child's perception of this information is affected and adapted differently as he progresses through a series of developmental stages. As the child progresses his interactions and structures are organized at each level of development establishing various schemes. (Dimitriadis & Kamberelis, 2006; Miller, 2002; Mooney, 2000).

Piaget believed that children construct knowledge from their physical and mental interactions with the environment. The child first encounters and explores an object or idea, attempting to assimilate the information into his existing schema. When he is unsuccessful or partially successful, a mental disequilibrium occurs causing the child to accommodate the new information. As the information is accommodated, a new schema is created allowing the information to be assimilated and equilibrium to be restored. This process is repeated each time the child encounters new experiences (Piaget, 1952). Similarly, Clay (2001) describes reading acquisition as learning to use all of the redundant sources of information in text to problem-solve the meaning. She explains that readers use meaning to hypothesize what an unknown word might
be, predicting and then checking. A reader monitors for sense as he or she reads and self-corrects miscues because they do not make sense.

As the child’s cognitive development proceeds through a series of stages his thinking and behavior in situations reflects a specific way of understanding and interacting with the environment, constructing knowledge through these interactions. Each experience is filtered through the child’s current understanding. (Dimitriadis & Kamberelis, 2006; Miller, 2002; Mooney, 2000). Clay (1986) reports that studies of children’s thinking and of language acquisition show that the child responds on her own theories of how things work and changes her theories to adapt to conflicting evidence. As curriculum is delivered, the child examines the present experience in terms of its meaningfulness and his theories. She suggests that learning to read and write involves creating vast networks linking known linguistic features and real world experience.

Although the learning process takes place in the social world, Piaget did not stress the influence of the social input. The importance he placed on individual construction of knowledge led him to believe that children would develop with or without instruction. He held that children could benefit from instruction only if they were cognitively ready to assimilate the information at their present cognitive level or make the necessary accommodations. Development proceeds in small steps that necessitate that the ideas or materials not be radically different from the child’s current level of understanding (Miller, 2002). Early reading instruction in the Dedham Public Schools, based on the works of Marie Clay, takes the form of guided reading. Students actively construct meaning from exposure to print in their environment and in the reading material provided by the teacher. Careful attention is paid to providing materials which are slightly out of the child’s comfort zone.
Piaget's theories have provided critical insights into the continuum of the child's cognitive development. His ideas are evident in the early literacy theories which will be later discussed in this chapter (Dimitriadis & Kamberelis, 2006; Mooney, 2000).

In contrast to Piaget, Vygotsky’s sociocultural theories placed a heavy emphasis on the relationship between learning and the child’s social and cultural worlds. He posited that a child’s development of higher cognitive processes such as language development, abstract thinking and memory are dependent upon the social environment. Learning is first mediated between the child and more knowledgeable others. It later moves into the intrapsychological process of internalization. Information is taken in by the child and used to manage the new skills for application in later tasks (Dimitriadis & Kamberelis, 2006).

Vygotsky is widely known for his “understanding of the importance of interaction with teachers and peers in advancing children’s knowledge” (Mooney, 2000, p. 83). He recognized the established belief that learning should be matched with the child's developmental level. However, he also recognized that the child actually displays two developmental levels. “The first is the level of development of a child’s mental functions that has been established as a result of certain already completed developmental cycles…what children can do with the assistance of others might be in some sense even more indicative of their mental development than what they can do alone” (Vygotsky, 1978, p.85). The second, the zone of proximal development is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p.86). “The actual developmental level characterizes mental development retrospectively, while the zone of
proximal development characterizes mental development prospectively” (Vygotsky, 1978, p. 86-87).

In understanding the zone of proximal development, Vygotsky (1978) stresses the important role of imitation in learning. Children are able to exceed the limits of their own capabilities through imitation in activity with peers or under the guidance of adults. Through scaffolding, teachers or other children who have already acquired a desired skill can help a child acquire a new skill or concept by providing supporting information (Mooney, 2000, p.84). Scaffolding moves the child to the edges of their incompetence, helping them to become competent there. As the child learns, the edge of their incompetence keeps moving to a higher level (Dimitriadis & Kamberelis, 2006).

In contrast to Piaget who suggested that the stages of cognitive development were tied to physical development, Vygotsky believed a child’s social surroundings and interactions affected his/her cognitive development. Thus, learning in the zone of proximal development “learning in the ZPD supports not only the learning of concepts and knowledge but also cultural practices. (Dimitriadis & Kamberelis, 2006; Mooney, 2000).

Mooney (2000) suggests that Vygotsky felt observation by teachers to be most important in determining and planning curriculum. He believed teachers need to determine “where children are in the learning process and where they are capable of going, given their individual needs and the social context that surrounds them” (Mooney, 2000, p. 84). Through observation teachers should be able to determine what is within the zone of proximal development for students and plan instruction that extends their knowledge by putting them in learning situations where their competence is stretched (Mooney, 2000).
The developmental theories of Piaget and Vygotsky set the stage for the understanding of the early literacy theories of Reading Readiness and Emergent Literacy as they relate to reading instruction in the kindergarten and primary grades. Piaget's theories explain the various stages through which the child develops and how these impact his understanding of the environment around him. The child's interactions with the environment, manipulation of the materials in order to create sense, and changing in his/her own schema to adapt to a more difficult stimulus mirror the early reading process. This dovetails with Vygotsky's social constructivist theory in which the child constructs meaning with the assistance of a more knowing individual, e.g. the teacher or a more adept peer, who provides scaffolding in order to enable the child to understand more difficult material within the zone of proximal development (Dimitriadis & Kamberelis, 2006; Mooney, 2000; Vygotsky, 1978).

Early Literacy Theories

Reading readiness. Reading readiness is loosely defined as "the time at which a child is capable of learning to read" (Smith & Chapel, 1970, p.59). Until the 1960s, educators held to the belief that children needed to have reached a point of developmental readiness before they were able to learn to read. Prior to this time, the study of child development and its application to teaching reading was based on the work of Arnold Gesell. “Readiness to read was the result of neural ripening. The mental processes necessary for reading would enfold at a certain point in development" (Teale & Sulzby, 1986, p. ix). Children progressed from one stage to the next based on maturation. If a child were to have difficulty learning to read, he or she had not yet reached the developmental stage at which success in reading was possible (Hoskisson, 1977). A mental age of six years, five months was deemed to be a prerequisite for learning to read (Durkin, 1970; Hoskisson, 1977; Smith & Chapel, 1970). Becoming ready to learn to read could
be accomplished through a program of instruction. “For those who were not ready, we used to think it was necessary to spend time on other kinds of activities until the ripening of readiness occurred” (Clay, 1989).

The reading readiness paradigm was based on several main principles. All children followed the same route to learning to read, after a series of readiness skills had been mastered. Children became proficient in oral language prior to learning to read and then write. Reading and writing were learned as abstract, separate skills. Skills in visual and auditory discrimination, letter identification and letter sound relationships were the building blocks for eventually reading (Teale, 1995).

During the late 1960’s and the 1970’s thoughts on reading readiness shifted from a purely maturational process to a combination of maturation and learning or experience (Durkin, 1970; Teale, 1995). Researchers maintained that what children did prior to reading conventionally was not “pre” reading, but rather a part of reading development (Teale, 1995). In contrast, “we found that literacy was an emerging set of knowledge and skills having its beginnings in very young children who accumulated a little here and a little there as they moved about their preschool settings” (Clay, 1989).

**Emergent literacy theory.** Emergent literacy theory refers to the developmental precursors to conventional reading as well as the environments that support this development (Whitehurst & Lonigan, 1998). The term emergent literacy, first suggested by Marie Clay, relates to the behaviors very young children exhibit showing an understanding of reading and writing before they are capable of reading and writing in a conventional manner (Rhyner, 2009; Sulzby, 1989). Contrary to previous theories of beginning reading, emergent literacy assumes the concurrent and interdependent development of reading, writing and oral language within a
social, rich print environment rather than formal instruction of pre-reading (Whitehurst & Lonigan, 1998).

Schweiker and Schweiker (1993) suggest that there are not only a variety of definitions for emergent literacy, but also that within these definitions lie a variety of theoretical perspectives. One perspective, that of Sulzby and Teale, (1991), purports that children are innately predisposed to becoming literate, given an environment rich in literary activities. “Literacy development begins long before children start formal instruction. Children use legitimate reading and writing behaviors in the informal settings of home and community” (Teale & Sulzby, 1997, p. xvii). Additionally they stress, “Literacy develops in real-life settings for real-life activities…Children learn written language through active engagement with their world” (Teale & Sulzby, 1997, p. xvii).

The second theoretical perspective, based on Piaget’s work, suggests that children are actively involved in the construction of literacy through their interaction with their environment (Schweiker & Schweiker, 1993). Marie Clay held that self-correction was vital to literacy learning. Children become intrinsically motivated to become involved in approximation, self-correction, repetitive practice and modification. Their literacy experiences are highly satisfying leading children to gradually develop powerful motives to learn how to interpret text themselves (Holdaway, 1979).

The third perspective draws upon writings of Vygotsky. Children learn literacy through their interactions and conversations with adults in literacy activities (Schweiker & Schweiker, 1993). Teale (1982) stresses that “Social interaction is the key (p. 559).” As children work through a variety of experiences in reading and writing activities, literate adults, older siblings, or more learned peers mediate and scaffold the experiences. Participating in literacy activities
within the zone of proximal development, children internalize aspects of reading and writing until they are able to conduct the activities for themselves (Teale, 1982).

The developmental theories of Piaget and Vygotsky, as well as the early literacy theories, provide an insight into the child as a learner in the early stages of literacy development. The view of the child as a constructor of his own knowledge, with the aid of a more knowing or learned adult or peer, forms the basis of guided reading instruction in the primary grades. This necessitates that the teacher provide a wide array of materials and opportunities for interacting with print at the just right level or slightly above while they carefully observe the child as he attempts to construct meaning of the print and scaffold instruction to meet the current level of the child. The current half-day program in the Dedham Public Schools provides the students with 2 ½ hours of instructional time as compared to the approximately 6 hours in the full-day session. Although the district curriculum is covered in both sessions, it would seem that the longer day would provide more opportunity to explore and interact with literacy activities and materials.

Terms and Definitions

**Literacy benchmarks**-expected level of performance at the end of a particular grade level as measured by the Developmental Reading Assessment.

**Full-day kindergarten**-kindergarten program from 8:50 a.m. to 3:00 p.m. with a one hour lunch, recess and rest period

**Half-day kindergarten**-kindergarten program in morning from 8:50 a.m. to 11:15 a.m. or in afternoon from 12:30 a.m. to 3:00 p.m.

**Literacy skills**-reading and comprehension skills as measured by the Developmental Reading Assessment
Summary

Across the state of Massachusetts, school districts yearly examine priorities and make decisions on how to best meet the needs of their students within financial constraints. In many towns, full-day kindergarten has historically been offered with an associated fee. With the national focus on early learning, districts must look to the future and make a determination whether the impact on student learning provides a strong enough rationale to prioritize the funding for full-day kindergartens. The child developmental theories of Piaget and Vygotsky set the backdrop for understanding early literacy theories. Guided reading instruction, targeted and scaffolded reading instruction which "supports each reader’s development of effective strategies for processing novel texts at increasingly challenging levels of difficulty" (Fountas & Pinnell, p. 2) at the kindergarten and primary grade levels is based on the tenets of reading readiness and emergent literacy theories. This study explores the long term literacy effects of kindergarten programming on a group of elementary students within the Dedham Public Schools using a longitudinal, causal comparative, quantitative approach. The intention of this research is to contribute to the body of literature on the lasting literacy development effect of the full-day kindergarten program by examining the literacy scores of fourth and fifth grade students through grade three. If a positive association could be determined, the evidence could be used in advocating for free full-day kindergarten.
Chapter II: Literature Review

Introduction

Full-day kindergarten programming has become an increasingly popular option over the past several decades. Baskett and others cite increases in the percentage of students attending full-day kindergarten over the past thirty-two years. “Whereas 16.8% of children attended full-day kindergarten in 1970, 63% were attending full-day kindergarten 2002” (Baskett, Bryant, White, & Rhoads, 2005, p. 419-420). This increase has continued to 80% in 2014 (U.S. Census Bureau, 2014). This trend seems to be driven by social as well as educational factors. Due to an increase in single-parent families and the fact that many intact families are no longer able to afford the luxury of one parent staying home, arranging day care around a half-day kindergarten program becomes very difficult. The wide diversity in language, skills and knowledge of the students entering into kindergarten, the increase in economically disadvantaged students, and the demands of high stakes testing trickling down into the lower grades has increased the call for full-day kindergarten programming. With the increased trend toward a higher demand for full-day kindergarten programming comes the call for studies to determine the effectiveness and benefits to be derived from such programming (Brewster & Railsback, 2002).

This section traces the history of kindergarten from its roots in Germany to current programming in the United States. It examines and discusses pertinent research comparing literacy achievement and progress of full-day and half-day kindergarten students as they progress through third grade.

History of Kindergarten

The roots of the American kindergarten can be traced to Friedrich Froebel, the founder of kindergarten in Germany. In 1837 at Blankenberg, Froebel established his school which later
became known as kindergarten (Headley, 1965). Froebel stated that the purpose of kindergarten was:

To take the oversight of children before they are ready for school-life, to exert an influence over their whole being in correspondence with its nature; to strengthen their bodily powers; to exercise their senses; to employ the awakening mind; to make them thought fully acquainted with the world of nature and of man; to guide their heart and soul in a right direction, and lead them to the Origin of all life and to union with Him.

(Froebel & Michelis, 1887, p. 3)

To Froebel, kindergarten signified more than the actual institution, but rather a philosophy of early childhood teaching. According to Shapiro (1983), Froebel envisioned the kindergarten to be a place where the child could "congregate with his peers outside the restraints of the family and the school...where the mental, physical and social faculties of the child could be cultivated, unfolded and ripened" (p. 22). The kindergarten program emphasized play, beginning with simple activities but progressing to more complex games (Froebel, 1974). Through an orderly, sequential presentation of simple geometric forms, known as "gifts", the teacher could lead the child to understand metaphysical patterns thought to be beyond the child's ability (Shapiro, 1983).

With the banning of kindergarten in Prussia as an arm of the socialist movement in 1848, Froebel considered moving to America in hopes of spreading the program (Shapiro, 1983). Although this dream was never realized, his disciples did emigrate and brought with them the teachings of German kindergarten. In 1855, Margaretha Meyer Shurz, having studied under Froebel in Germany, established the first German kindergarten for her children and their cousins in her home in Watertown, Wisconsin (Allen, 2006; Muelle, 2013; Shapiro, 1983).
In 1860, Boston educator Elizabeth Peabody opened the first English speaking kindergarten in Boston, Massachusetts. Having met Margaretha Shurz the prior year, Peabody originally based her program on the principles from Froebel's *Education of Man* (1885). Interested in learning more about Froebel's original ideas, Peabody travelled to Germany to study at the Kindergarten Seminary, run by Baroness von Marenholtz-Nulow. Peabody brought Matilda Kriege, a student of Baroness Marenholtz, to Boston in hopes of establishing a Froebelian kindergarten but this did not prove successful (Muelle, 2013). In 1872, Maria Boelte enjoyed more success at the Haines School in Gramercy Park, New York. She recognized the need to adapt the Froebelian games and songs to the practical American social setting (Shapiro, 1983).

The kindergarten movement expanded rapidly after 1873 beginning in Saint Louis. Superintendent William Torrey Harris became interested in understanding of the operation of the urban school system. In conducting surveys he was shocked to learn that students of working parents received only about three years of education, starting at a later age and leaving by the age of ten to work. This led him to seek out an avenue for addressing this issue by extending the legal age for public education to include children under six. Under the direction of Harris and Susan Blow the Des Peres Kindergarten, the first public kindergarten in the United States, opened. This kindergarten was child-centered based on Froebel’s program. Saint Louis became the model for the training of kindergarten teachers and the operation of kindergartens. Over the next twenty years free-kindergarten associations provided funding for more than two hundred twenty-three schools across the country (Shapiro, 1983).

Between the years of 1890 and 1910, the public school adoption of kindergartens became a new priority. Enrollment in the free-kindergartens had risen significantly and the free-
kindergarten associations could not keep up with the financial burden. The development of kindergarten programs through the years had always included a social-welfare function. Home visits and mothers’ classes were considered part of the program. As the control of kindergarten came under the control of the public school systems, the need for economy prompted the desire to eliminate the charity programs. The cost of kindergartens was high based upon the need for specialized furniture and equipment. One such method of adjusting the kindergarten costs to meet school budgets was the introduction of double sessions. Rather than teaching in the morning and making home visits in the afternoon, the teaching load for kindergarten teachers was doubled (Shapiro, 1983).

Controversy existed over the form and philosophy kindergarten programming should follow. The Committee of Fifteen was established in 1903 to solve the debate over keeping the existing Froebelian principles of kindergarten or moving to more scientific principles. With no solution in sight, the Committee was changed to a Committee of Nineteen. Susan Blow continued to speak for the Froebelian principles while Patty Smith Hill, an influential kindergarten leader from the Midwest, proposed new ideas and principles based on Dewey’s concepts (Ross, 1976; Shapiro, 1983). By 1914 public kindergartens had been established in every major city in the United States (Ross, 1976). The curriculum began to shift away from the strictly Froebelian principles with subject areas such as music, literature, nature study and art now being included (Weber, 1969).

The 1920s and 1930s brought a series of new psychological theories. On one hand behaviorists, including Thorndike and Watson, stressed the need to move away from motherly love to a more professional attitude and an emphasis on both learning objectives and habit forming. Dewey, on the other hand, stressed social education. Gesell emerged in 1930s as the
leading theoretician of child development, searching to discover the pattern for “normal” growth. This left the American theory of childhood education in a confused state (Shapiro, 1983, p. 194).

Regardless of the contradicting theories, the focus on standardizing kindergarten curriculum remained. A focus on seasonal and holiday activities pervaded kindergarten programming. Kindergarten was viewed as a means of helping children acclimate to the school setting (Weber, 1969). Within the public school setting, the kindergarten curriculum began to take on characteristics of the first grade curriculum (Weber, 1976). The launching of Sputnik by the Russians in 1957 caused alarm and complaints about the United States education system. This solidified the shift in curriculum, which focused on preparing students for later academic years. The disparity of educational opportunities for the children of wealthy and poor families again came to the forefront resulting in the revival of a focus on early education as a remedy for poverty (Shapiro, 1983).

The theories of Jean Piaget, Maria Montessori and Jerome Bruner became increasingly relevant in the 1960’s. Piaget’s “distinction between imitation (the child accommodating to the external world) and play (the child assimilating new information into the existing frameworks)”(Shapiro, 1983, p. 195) were found to be useful in the classroom. Bruner’s and Erikson’s concepts of play as an intervention tool or a means of advancing children to new stages of mastery revived the concept of learning through play (Shapiro, 1983). At this time pressure was also being asserted on the schools to provide a more academically rigorous kindergarten program that included reading, writing, and arithmetic (Weber, 1969). This program later expanded to reading writing, arithmetic, social studies, science, art music, and physical education. These subjects were integrated through the daily activities, rather than in formal lessons (Headley, 1968).
The publication of *a Nation at Risk* (U.S. Department of Education, 1983), again brought focus onto the existing educational programming. “By 2000, 88% of five-year-olds in the United States were enrolled in a school-based kindergarten program.” (Rafoth, Grimes, & Buzi, 2004, p.1). Although the percentage of students attending kindergarten has consistently increased, the form of kindergarten programming offered by school systems, however, has varied considerably. Most systems have provided the traditional half-day programming while some others have offered daily full-day programs. In some districts an option begins the students with a half-day program then transitioning into full-day by the end of the year. Other districts provided full-day programming, for only three days per week. In most cases, parents have decided which option they preferred for their child.

Since its inception in 1855, kindergarten education in the United States has evolved in response to current educational theory and public need. As the most recent 2014 U.S. Department of Education report shows, enrollment in full-day kindergarten has risen to 80%. What have empirical studies found in terms of the effect on literacy achievement of full-day versus half-day kindergarten programming? The following sections delve into the existing research that has attempted to answer this question in order to determine not only the short term effects of kindergarten programming, but more importantly the lasting effects.

**Empirical Studies with Significant Findings of Full-Day Kindergarten Students' Early Literacy Development at the End of Kindergarten**

Torkelson (2008) sought to investigate the difference between full-day kindergarten and half-day kindergarten programming on early reading behaviors in emergent readers in eleven K-5 elementary schools in one Midwest city. For the purpose of this study early literacy gains in letter identification, concepts about print, word test, writing vocabulary, hearing and recording
sounds in words, and text level reading were measured using the Marie Clay's *Observation Survey of Early Literacy Achievement* (1993) at the end of the kindergarten year. In the first year of the study the students were assessed after completing a half-day kindergarten program. In the following three years, the students were assessed after completing a full-day program. The study found that the average mean scores of full-day kindergarten students were significantly higher than those of their half-day counterparts across all six tasks included in the Survey.

Torkelson (2008) further disaggregates these scores to study the literacy behaviors of at risk students i.e. students having attended Head Start and students who had been retained. Significant differences were found to exist on 17 of the 24 early literacy behaviors in the areas of concepts about print, word test, writing vocabulary, hearing and recording sounds in words, and text level reading between those students who attended Head Start followed by full-day kindergarten and those students who attended Head Start followed by half-day kindergarten. Additionally, this study found that significant differences exist between students who were retained in half-day kindergarten and students who were retained in full-day kindergarten on 20 of the 24 early literacy behaviors in the areas of letter identification, concepts about print, word test, and writing vocabulary.

Walston and West (2004) reexamined the data from the Early Childhood Longitudinal Study to specifically determine the relation between kindergarten programming in the public schools and academic gains in reading and math. Utilizing a pre-test and post-test model, the researchers attempted to control variables including race, class size, and poverty status that may have had an impact on academic achievement. The authors acknowledged a limitation in design, the impossibility of truly determining that the samples were equivalent in all important ways at the beginning of kindergarten, and expressed caution about drawing causal conclusions. Children
in the full-day programs showed greater gains in reading achievement as compared to the half-day students. Full-day program students exhibited a 10.6 point gain in reading scale scores as opposed to a 9.4 point gain for the half-day students. This represented an increase of thirty two percent of one standard deviation. These gains remained despite taking in account differences in family and class characteristics.

Cleminshaw and Guidubaldi (1979) reached a similar conclusion in their research with 96 randomly selected kindergarten students in four public lower middle-class school districts in exurban communities in northern Ohio. The included schools participating in this study represented a variety of programming options. The programs: the traditional every day, half-day; the traditional all-day, alternate day kindergarten; the open-classroom, half-day every day kindergarten; and the open-classroom, all-day alternate day kindergarten. Several factors such as motivation to achieve, social functioning, first grade readiness skills, and parental attitude were assessed. Students were administered the Metropolitan Readiness Test, Form A during the months of May and June. Through this assessment it was determined that the factor of time accounted for significant differences not only in the total scores, but also in student performance on five of the six Metropolitan subtests: Word Meaning, Listening, Alphabet, Members, and Copying. In each case, the all-day alternate day kindergarten achieved higher mean scores. In only one test, Matching, time was not found to be a significant factor.

Non-academic factors were assessed through a variety of measures. Motivation to achieve was assessed through the Animal Crackers: A Test of Motivation to Achieve. No significant differences between the full-day students and half-day students were noted. Social functioning was assessed using the Kohn Social Competence Scale. The full-day program
students achieved a mean score significantly higher in interest and participation but this was not statistically different for cooperation and compliance.

In a study similar to the one proposed by this researcher, Jose L. da Costa and Susan Bell (2001) completed a study focusing on the effects of time in kindergarten on the acquisition of literacy skills as measured by the sub-scales of the Marie Clay *Observation Survey* (1993). This study examined kindergarten students from low socio-economic or educationally deprived backgrounds from both the inner city and suburbs of Alberta, Canada, over the 1999-2000 school year. Two data sources were used from three separate elementary schools serving similar students. The quantitative data consisted of student scores on six of Clay’s (1993) *Observation Survey* subtests in October and the following June. Data from both programs was compared using six ANCOVAs corresponding to each of the subtests and the composite scale. Post-test data was then adjusted for prior knowledge as assessed through pre-test data. Two additional variables, gender and age, were utilized to adjust the post-test data. Semi-structured teacher interviews were conducted with the full-day kindergarten teachers in two buildings and the half-day kindergarten teacher in the third building. These interviews were completed near the end of the 1999-2000 school year and comprise the qualitative data that was collected. This data was analyzed to support emerging themes of teacher beliefs and emphasis in the four kindergarten classes.

In a paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001), daCosta and Bell reported that the children in the full-day kindergarten program significantly surpassed their half-day peers in the pre-requisite skills for reading. The full-day students also demonstrated greater growth in actual reading ability given their initial starting points. The full-day experience allowed low socio-economic
pupils to catch up to, and often, exceed the skills acquired by other pupils with higher socioeconomic backgrounds.

Additionally, the results of the analysis of daCosta and Bell (2001) suggest other factors impacted the student performance. Initial ability in letter identification, writing, readiness to read words and hearing and recording sounds when entering kindergarten played a significant role in the early development of all of these skills. The findings from this study led to recommendations by the authors for future study and policy development (p. 17).

In a similar study, Baskett, Bryant, White and Rhoads (2005) focused on the educational effects, parent attitudes and teacher attitudes of full-day and half-day kindergarten programming in an economically challenged suburban-rural district in Auburn, Maine. In discussing the current research, the authors pointed to the inconsistency and suggested two methodological conditions affecting the outcomes of past studies comparing the length of day in kindergarten. The first condition is the impracticability of obtaining a true random sampling. Secondly, they note that the experimental design is not articulated sufficiently enough to account for the many variables in addition to the length of day that may have contributed to the outcome. The authors suggest that elementary educators will most likely be unable to improve upon the methods due to other demands on their time. This study entailed the collaboration of a local school district and university to evaluate the results (p. 423-429).

In contrast to the daCosta and Bell (2001) study, parental input is included in the Baskett, Bryant, White and Rhoads (2005) research and the kindergarten students compared in this study attend the same school but in two consecutive years. Participants included 109 children in half-day programs the first year and 119 children from full-day programs the second year, 13 teachers and 119 parents. The students’ developmental level was measured by the Brigance screening tool
and used in conjunction with reading levels measured by the Informal Reading Inventory (McCarrier et al., 2000) in November and June and the Observational Survey in October and June. In addition, report card scores for fall and spring were utilized to compare students’ academic growth. Parents received surveys at the end of the first year of full-day programming relating to academic performance, social or maturational development and the benefits to the family. At the end of the first year of full-day programming teachers were also surveyed regarding the impact of all-day kindergarten in their classroom. Parents and teachers of the children in the half-day kindergarten the first year were not surveyed.

As found in daCosta and Bell’s research, the results of all three measures in this study support the transition to full-day programming. Significant differences favoring the full-day students were found in five of the eight child measures. These include “reading level”, “literacy skills”, “letter sounds” and “story sequencing”. “Following directions” results were also significantly different but only at a moderate level. In the categories “works left to right” and “creates patterns” the pre and post comparison scores favored full-day students but were not statistically significant. Only “alphabet recognition” improvement scores favor the half-day students, but not at a statistically significant level. The measures show a small but statistically significant association between academic achievement and the length of the school day. Both the parent and teacher surveys indicated strongly favorable reactions to full-day programming.

In a study of randomly selected students attending Chapter I schools in Southern Arizona, Rivera (1985) sought to determine whether there is a significant difference in the academic achievement of students due to the type of kindergarten programming. Students, primarily Hispanic, from four half-day and five full-day kindergartens were included. Five of the classes implemented a bilingual curriculum, one a Spanish curriculum, and three an English curriculum.
Students were pretested in November 1984 and post tested in May 1985 using the Head Start Measures Battery (Bergen & Smith, 1985) in seven areas: language, math, nature/science, perception, reading, social development, and overall score.

Mean gain scores were calculated and analyzed using a t-test. Results showed a statistically significant difference between mean gain scores that favored full-day kindergartens in the areas of language, math, and reading. No statistical difference was found in the nature/science, perception, social, and overall scores.

Empirical Studies in Partial Support of Full-Day Kindergarten Students' Early Literacy Development at the End of Kindergarten

Stubits (2005) compares increased academic achievement in literacy and math for 123 students attending full-day or half-day kindergarten in a rural school district in southern Pennsylvania. Nineteen students were purposively placed in full-day programs using parent request followed by a lottery using information from parent questionnaires and student ranking based on assessment results. Students scoring lowest on the assessment were given first preference for placement in the full-day programs. The remaining 85 students were placed in half-day programs using a random stratified method of placement mixing high, middle, and low scoring students in each of the classes (p. 47-48). All students were assessed in the areas of sounds and letters, word reading, mathematics, and listening to words/stories using the Stanford Early School Achievement Tests (SESAT) 1 (Harcourt, 2003) in October 2004 and with Test 2 in April 2005. Additional variables examined include student absence, teacher attitudes, parent attitudes, and discipline referrals.

The Analysis of Covariance (ANCOVA) was used to compare increases in student achievement with the initial scores serving as the covariate. Stubits (2005) found no significant
difference in the Sounds and Letter Identification subtest and Listening to Words and Stories subtest. However, a significantly greater difference in student achievement was found on the Word Reading subtest and the Math subtest favoring full-day students.

In addition, Stubits (2005) found no difference in the rate of student absence between full-day and half-day kindergarten. More full-day kindergarten students were reported for discipline and social issues than their half-day counterparts. Parents of both programs were pleased with their respective kindergarten programs and felt their students have made the greatest gains in learning.

**Empirical Studies with No Significant Findings of Full-Day Kindergarten Students' Early Literacy Development at the End of Kindergarten**

In the fall of 1998 the U. S. Department of Education, National Center for Education Statistics, began a national study of 22,000 kindergarten students, their schools, classrooms, parents, and teachers. The purpose of this Early Childhood Longitudinal Study (ECLS) was to track a cohort of students as they entered kindergarten and progress through fifth grade. At the very beginning of the study data was collected from the students through face-to-face individual assessments of cognitive (e.g., general knowledge, literacy and quantitative skills) and non-cognitive motor skills. The teachers responded to surveys about their own educational background, teacher practices, experience and classroom levels taught as well as information about the children’s social skills and approaches to learning. The parents were interviewed about family demographics, family structure, home educational activities, child care experience, parental education and employment status by phone. In the initial report, West, Denton, and Germino-Hausken (2000) noted many similarities between the kindergartners. A majority, 66 percent, of students was familiar with print and could recognize letters; nearly all, 94 percent,
were proficient in numbers and shapes. Most children were in good health and demonstrate prosocial behaviors with little discipline issues. Differences were noted in the skill level and knowledge that the children brought with them upon school entrance. According to this study, these differences could be attributed to home experiences and family differences such as the mother’s level of education and make-up of their family.

Throughout the kindergarten year, the students were assessed in overall reading, mathematics, and other specific skill areas such as letter recognition, ability to pay attention, and number recognition. West, Denton and Reaney (2001) analyzed the gains made by the students in these areas, focusing on whether the performance differences differed based on the child, family, and/or the kindergarten program characteristics. The researchers find no marked difference in the basic reading skills of children in full-day as compared to half-day kindergarten programs (p. viii). Throughout the school year similar gains in both groups were noted. Students in the full-day kindergarten began the school year with higher scores in letter recognition, beginning and ending sounds, and sight words. As a result, at the end of the year full-day students were found to be more likely to understand letter sound relationships at the end of words, recognize more sight words, and understand more words in context (West, Denton, & Reaney, 2001, p. 23). West et al. (2001) reported that the change score between the beginning and end of year scores for the full-day students increased by 43% as opposed to 41% for their half-day counterparts. The change scores for sight word recognition (12% for full-day, 9% for half-day), words in context (4%, 3%) and ending sounds (37%, 34%) followed similar patterns (p. 45).

Similarly, Nunnelly (1996) failed to find any significant difference between full-day and half-day kindergarten programs. Half-day students at the Pineview Elementary School and full-
day students at the Kids Garden in the Reisz Center participated in Nunnelly’s study. Both programs were located in predominantly low socioeconomic areas and were funded through the federal Title I program. Although students were randomly chosen initially, parents were then given the option to participate in either program. As a result, the sample included nine full-day students and ten half-day students. The four classrooms were evaluated using the Early Childhood Environment Rating Scale (Clifford & Harms, 1980) to ensure that the programs were comparable and that any differences were due to the length of the school day rather than curriculum. Parents were invited to participate in literacy workshops and other topics as well as given access to a lending library of materials and games for family use. In September and May students were administered the Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn & Dunn, 1980) and the Developmental Checklist of the Work Sampling System (Jablons, Marsden, & Meisels, 1993). No significant differences were found on any of the student scores using these assessment measures. The mean gain scores on the PPVT-R were slightly higher for the full-day students. The gains, as measured by the Work Sampling System, were essentially the same. Additional data was collected about student attendance, parent attendance at workshops, demographics, and frequency of material checkout from the lending library. No difference was noted in the frequency of material checkout for either group. The participation of full-day parents in the workshops was greater than the participation of half-day parents. The frequency of material checkout was essentially the same.

In another two-year study set in the Midwest, Meyer, Wardrop, Hastings, and Linn (1993) sought to determine whether the length of the school day affects reading performance or perhaps performance was affected due to other more complicated issues. As with the ECLS, several different school districts were included in this study. District A, known for its high
student performance in reading comprehension through grade 3, is a small town in the center of its state with 90 half-day students in each of the two cohorts. District B is a small town located a short drive away from a larger community with 160 half-day students in its first cohort and 145 students in the second cohort. District C is located in a suburb of a major city with many characteristics of an urban school. In the one school from this district that participated, 85 full-day children of mixed ethnic backgrounds were included in each of two cohorts. As in previous studies, Meyer et al (1993) address how the allocations of time relate to the end-of-year reading performance. This study differs, however, in that it specifically examines how teachers spend the time during the school day and how they interact with the students when both teaching reading explicitly and utilizing teacher-directed centers. Student data includes fall and spring tests of reading performance of the 650 children as measured by the decoding subtest of the Wide Range Achievement Test (Jastik, Jastik & Bijou, 1978), the Chicago Reading Test (Barr, 1983), and the Woodcock Reading Comprehension Test (Woodcock, 1973). A classroom observation system to examine activities, interactions, and feedback was developed for the study, patterned after other similar instruments used in previous studies.

The results of the report by Meyer, et al. (1993) were found to be linked with how the kindergarten teachers spend their time, how they interact with their students when explicitly teaching reading and during teacher-directed centers, and how the allocations of time and interactions relate to student performance. The time allocated to reading instruction was significantly greater in District A (three to four times greater than in District B and six times greater than in District C). Keeping in mind that District C students are the full-day students, this difference in time spent on reading instruction is significant. The amount of reading interactions is consistent with the differences between-district time allocated. District A has the
most total time dedicated to reading instruction, decoding and comprehension interactions followed by District B and finally District C. In addition, the teachers in District A provided the most sustaining feedback, such as modeling or giving hints. District A teachers provided feedback about six times as much as teachers in District C and two to three times as much as teachers in District B. The spring test results revealed District A students performed higher on all measures of decoding than Districts B and C. District C students performed better than District B. Although the results also suggest District C students performed higher in reading comprehension, the authors point to large standard deviations on all the spring measures in District C when compared to the other two districts. They note this may suggest some high-performing students in District C causing the phenomenon (Meyer et al., 1993, p. 157).

Finally Meyer, et al, examined the relationship between the length of school day, as well as entry performance, district affiliation, assignment to teacher and teacher instructional characteristics and students’ reading performance at the end of kindergarten. As in the Nunnelly (1996) report, it was determined from this study that the length of school day does not contribute to the reading performance at the end of the school year. Rather, these findings illustrate that the manner in which teachers utilize the existing time and the focus a district places on teacher directed instruction with feedback as having a greater impact (Meyer et al, p. 159).

Existing research examining the impact of programming on literacy skill development at the end of kindergarten favors full-day kindergarten (Baskett, Bryant, White & Rhoads, 2005; Clemshaw & Guidibaldi, 1979; daCosta & Bell, 2001; Rivera, 1985; Torkelson, 2008; Walston & West, 2004). Although several studies (Meyer, Wardrop, Hastings & Linn, 1993; Stubitts, 2005) cited other contributing factors such as the manner in which theme is utilized and program choices, the majority of studies did report a significant advantage for those students in full-day
kindergarten at the end of the year. In determining to make a commitment for full-day kindergarten, it is important to also examine the lasting impact of kindergarten programming. In contrast, relatively few empirical studies have examined the long term effect of kindergarten programming on literacy achievement in the later grades.

**Empirical Studies with Significant Findings of Full-Day Kindergarten Students' Early Literacy Development—Through Grade Three**

McClinton and Topping (2001) examined teachers’ perceptions of students’ adjustment to first grade. Eighty students from ten public first grade classrooms in a central Colorado school district comprised their sample. The experimental group had an equal number of boys and girls having attended extended day kindergarten of 4 hours and 15 minutes per day. The control group also had an equal distribution of boys and girls but rather had students attending the regular half-day kindergarten program lasting 2 hours and 40 minutes per day. First grade teachers were asked to rate the students on a scale designed to determine whether they could detect any difference between the students in academic ability and social adjustment. The scale consisted of 21 items scored on a five point rating scale. Items included statements such as “In a stressful situation, this child will begin to cry: always, often sometimes seldom, never.” and “In relation to the other class members, how would you rate this child’s ability in reading: unusually high, above average, average for a beginning first grader, below average, unusually poor.” (McClinton & Topping, 2001, p.40) The results of the teacher surveys indicated that first grade teachers judged children coming out of the extended day kindergarten classrooms to be more capable students (McClinton & Topping, 2001).

Romines (2012) studied student achievement in reading at the end of first grade for students attending full-day and half-day kindergarten in a suburban school in Oklahoma. One
hundred two students from five public first grade classrooms were assessed at the end of kindergarten and then again first grade using the DIBELS reading test (Good & Kaminski, 1996), STAR Early Literacy, a computer assisted assessment tool by Renaissance Learning, and Successmaker, a digital learning and assessment program by Pearson. At the end of kindergarten the data indicated a negligible difference between students attending each type of kindergarten, half or full-day. At the end of first grade, students attending full-day kindergarten showed an increase in reading scores as compared to their half-day counterparts (Romines, 2012).

Plucker et al (2004) conducted several evaluations of full-day kindergartens across several towns and districts in Indiana with varying results from district to district. As in the delGaudio Weiss (2002) study, the longitudinal study in the Evansville-Vanderburgh School Corporation assessed two cohorts of kindergarten students and then followed them through third grade. At the end of kindergarten, full-day students scored higher on all but one subtest of the California Achievement Test (McMillan/McGraw Hill, 1993). The combined scores were significantly higher for the full-day group. In subsequent years, the students were assessed using the Gates McGinitie Reading Tests (McGinitie, McGinitie, Maria, Dreyer & Hughes, 2000). In first grade and again two years later the full-day students significantly outperformed the half-day students in comprehension and vocabulary skills. In third grade the initial cohort group was again assessed with the Comprehensive Test of Basic Skills (McGraw Hill, 1981). As opposed to the decreasing effect in the delGaudio Weiss (2002) study, these full-day students were reported by Plucker and others as continuing to perform significantly higher in ten of fourteen subtests. In fifth grade and in seventh grade, this Comprehensive Test of Basic Skills was administered again and the former full-day kindergarten students continued to score higher than the former half-day kindergarten students in all fourteen areas of the test. In another area in
Indiana, the Lawrence Township, however, assessments of 1530 students in full-day, and half-day kindergarten programs using the Tests of Letter Identification and Concepts About Print (Clay, 1993) showed no significant difference. Other districts in the study showed similar variances between the performance of former full-day and half-day kindergarten students.

In an Education Policy Brief, Plucker and Zapf (2005) revisited the Indiana research completed by Plucker, Eaton, Rapp, Lim, Nowak, Hansen, and Bartleson (2004), and several other studies that demonstrated the beneficial effects for students enrolled in full-day kindergarten programs throughout the later grades. The authors indicate improvement in student achievement, increased performance on standardized tests, fewer retentions and fewer special needs referrals (Romines, 2012). Additionally, full-day kindergarten was shown to help reduce the achievement gap for minority and low socioeconomic status students. However, Plucker and Zapf (2005) point to the lack of research regarding the persistence of these benefits for students as they progress through the grades. They recommend that additional longitudinal studies of the full-day kindergarten programs be commissioned throughout all the states, following the full-day students through the elementary grades similar to the Evansville-Vanderburgh and del Gaudio Weiss (2002) studies.

**Empirical Studies in Partial Support of Full-Day Kindergarten Students' Early Literacy Development–Through Grade 3**

Alber-Kelsay (1998) sought to determine whether students attending full-day kindergarten show significantly higher academic achievement in first grade than their half-day counterparts. In this study, four portfolio assessments with two groups of first grade students in one school in the East Brunswick Public School District, New Jersey were compared. Sixteen of
these students participated in full-day kindergarten while sixty-one attended half-day kindergarten.

For the purposes of Alber-Kelsay's study, achievement was measured through a standardized portfolio of assessments in four areas: sight vocabulary, phonics readiness, spelling, and a running record for reading accuracy and comprehension. The student scores were compiled and the means for full-day versus half-day attendees were determined. These means were then analyzed using a t-test to determine the significance of any differences. Alber-Kelsay (1998) found differences favoring full-day students in all four areas of the portfolio assessments. However, the only statistically significant difference at the .05 level was found in spelling.

**Empirical Studies with No Significant Findings of Full-Day Kindergarten Students' Early Literacy Development through Grade Three**

Stewart (2006) examined the reading literacy of minority kindergarteners from low-income families in two Reading First schools in Delaware. For this study the DIBELS’ test (Good & Kaminski, 1996) was used to measure 101 full-day and 77 half-day kindergarten students’ pre-and post-kindergarten reading achievement scores. Students were assessed in: initial sound fluency; letter naming facility; phoneme segmentation; nonsense word fluency; word use fluency; and oral reading fluency. Results of these assessments indicated that full-day kindergarten students tended to achieve higher scores than their half-day peers when using the DIBELS' Benchmark Levels and when comparing the subtests. Using descriptive statistics and a five-way factorial analysis of covariance, Stewart (2006) found no statistically significant difference between full-day and half-day kindergarten performance on any of the DIBELS’ subscales. However, this researcher did find a disparity on two subtests: Initial Sound Fluency and Letter Naming Facility. On the Initial Sound Fluency subtest, the data showed a significant
difference between full and half-day students in School 1 and School 2. Additionally, a statistically significant difference was shown between full and half-day students in School 1 and School 2 on the letter Naming Fluency subtest. Full-day kindergarten students who did not receive free or reduced lunch scored higher on the Letter Naming Fluency subtest than half-day students who did receive free or reduced lunch.

Votruba-Drazel and Li-Grining (2008) utilized the data from the Early Childhood Longitudinal Study-Kindergarten Class of 1998-1999 (U.S. Department of Education, National Center for Education Statistics, 2001) to study the relationship among the developmental trajectories of students and their family, preschool, and school experiences. In addition to parent and teacher surveys, “data were collected across multimethod, multisource, and in-school assessments of cognitive as well as measures of family, school, and classroom characteristics that have been associated with children’s development (p. 960)”. The sample consisted of first time kindergarten students who attended kindergarten for at least 4 days per week, and who had at least one valid observation in reading and math each year from kindergarten through fifth grade. Academic progress was measured through direct cognitive assessments designed by the study using items adapted from valid measures of cognitive and academic development such as the Woodcock-Johnson Psychoeducational Battery, the Peabody Picture Vocabulary Test, and the Peabody Individual Achievement Test (Markwardt, 1989). The researchers’ models suggested that the advantage of full- versus part-day kindergarten fade out by the spring of third grade (p. 967).

**Summary**

Two main areas of literature were reviewed to inform this causal-comparative longitudinal study’s attempt to answer the research question: To what extent do literacy skills
vary between students enrolled in full-day and half-day kindergarten as they progress through the elementary years? The first section of the chapter traced the history of kindergarten programming since its inception in Germany. The review of the literature showed that the format of kindergarten programming has evolved as it moved from private to public funding. The original full-day programming moved to half-day programs as cities and towns tried to fiscally accommodate the many students coming into the school systems. It has since shifted back to a mixture of full-day and half-day programming to meet the needs of families.

The remaining sections of this chapter review empirical studies of student academic performance, specifically in literacy development, for students in full-day versus half-day programs both at the end of kindergarten and then through later grades. Available research is heavily focused on student achievement at the end of kindergarten. The bulk of these empirical studies favor full-day kindergarten performance at the end of the kindergarten year. There are considerably fewer empirical studies comparing literacy achievement of students in varied kindergarten programming as they progress through the primary grades. Those studies are inconclusive and all point to the need for further research. The next chapter, Chapter 3, describes the research design for this study.
Chapter III: Research Design

The purpose of the study is to determine whether the Dedham Public Schools should move forward in budgeting to support free full-day kindergarten for all students. Through the use of data, the researcher will determine whether full-day kindergarten should be supported through district funding. This study will examine several data sources available within the school district. In order to answer the research question, quantitative data in the form of pre- and post-tests at each grade level through third grade will be gathered for the students attending kindergarten in the 2010-2011, 2011-2012 and 2012-2013 school years. This data will be analyzed to determine the impact of full-day and half-day kindergarten programming on student literacy development.

Research Questions

The purpose of this study is to examine the effects of full-day versus half-day kindergarten programming on the development of literacy skills. The overarching research question will be: Is there a significant difference between full-day and half-day kindergarten programming and the development of literacy skills? The research questions addressed in this study follow:

Research Question 1: At the end of the kindergarten year to what extent do full-day kindergarten students outperform their half-day counterparts on the attainment of grade level literacy benchmarks?

This question will be investigated by evaluating student performance on the end of year district assessment, the Developmental Reading Assessment, for current third, fourth, and fifth grade students who attended full-day kindergarten program versus a half-day kindergarten program. The null hypothesis is:
Hypothesis 1: There is no significant difference in the attainment of grade level literacy benchmarks by kindergarten students in full-day and half-day kindergarten.

Research Question 2: As students progress through each of the primary grades to what extent do those who attended full-day kindergarten outperform their half-day counterparts on the attainment of grade level literacy benchmarks?

This question will be investigated by evaluating student performance on end of year district assessment, the Developmental Reading Assessment, for current third, fourth, and fifth grade students who attended a full-day kindergarten program versus a half-day kindergarten program. The null hypothesis is:

Hypothesis 2: There is no significant difference in the attainment of grade level literacy benchmarks by students who attended full-day and half-day kindergarten as they progress through the primary grades.

Research Design

This study will utilize a quantitative causal-comparative, longitudinal, secondary data analysis design to determine whether the length of the kindergarten school day has any effect on kindergarten students’ achievement in literacy. In causal-comparative research studies, the researcher attempts to determine either the cause or the resulting consequence of existing differences on a variable between two groups. Unlike experimental research, in which the researcher creates a difference between groups in order to compare performance and determine the effects of the difference, causal-comparative research examines differences in groups that have already occurred and cannot be manipulated (Fraenkel, Wallen, & Hyun, 2012). The group difference in this study is the kindergarten programming. Students included as members of the sample population have previously attended either the full-day or half-day programs within the
Dedham Public Schools. The Dedham Public Schools has offered a half-day kindergarten program since the 1960s. In the past sixteen years, a fee-based, full-day program has been offered, however, Dedham has used a lottery system to equitably allot the limited number of seats. Although originally the tuition-based program presented an inequity to those families unable to pay the fee, during the years examined a sliding scale has been instituted to allow equitable access. The experimental and control groups are naturally occurring due to class placement. The results being examined are the literacy achievement, as measured by the Developmental Reading Assessment, of the students in the two groups at the end of kindergarten, first, second and third grade.

The choice of secondary data analysis was made in order to gain a substantial sample size. “Using large secondary data sets provides an alternative to the collection of primary data, often giving the researcher access to more information than would be available in primary data sets (Vartanian, 2011, p.3).” The researcher will not be directly involved with any of the subjects as the review of student records will provide the necessary data.

This research includes the independent or treatment variable across all research questions. One group of students will have participated in full-day kindergarten and the other group will have participated in half-day kindergarten. In all research questions, the dependent variables are in the form of scores on reading assessments, the Developmental Reading Assessment (DRA) (Beaver, 2001). In all cases, the same curriculum will be utilized by the classroom teachers and the assessments will be administered following strict protocols.

Although a causal-comparative design is most appropriate for this study, it is not without limitations. The most serious limitation is the lack of control over threats to internal validity (Fraenkel et al., 2012). Because student enrollment in kindergarten programs is controlled by
parent selection, there is a lack of randomization in the formation of the groups. The manipulation of the independent variable has already occurred and, therefore, considerable caution must be utilized in interpreting the outcomes of a causal-comparative study. Relationships can be identified, but causation cannot be fully established (Fraenkel et al., 2012). As Fraenkel et al. (2012) warn, ‘... the alleged cause may really be an effect, the effect may be a cause, or there may be a third variable that produced both the alleged cause and effect (p. 367).”

Although it may not be possible to prove a causal relationship between literacy achievement and kindergarten programming, the results of this study will potentially contribute to the discussion in this area as past studies have provided conflicting results. The question being considered may not be fully answered to the satisfaction of all, however, a finding of a positive relationship between full-day kindergarten and literacy achievement could strengthen the arguments in favor of providing no cost full-day kindergarten and assist decision makers in setting priorities for school funding.

**Research Site and Sampling.** This research will be conducted in Dedham, a suburban town of close to 25,000 inhabitants located south of Boston, where the researcher has been employed as a teacher and now administrator for more than three decades. At the elementary level, the district consists of a centralized early childhood center housing preschool and kindergarten classes and four neighborhood schools housing grades one through five. The target population for this study will be the 658 third, fourth and fifth grade students currently enrolled in the four neighborhood elementary schools.
Table 1

*Demographics for Student Sample*

<table>
<thead>
<tr>
<th></th>
<th>Gr. 3 2015-2016</th>
<th>Gr. 4 2015-2016</th>
<th>Gr. 5 2015-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>176 (243)</td>
<td>152 (203)</td>
<td>141 (212)</td>
</tr>
<tr>
<td>Full-day Kindergarten</td>
<td>124</td>
<td>106</td>
<td>90</td>
</tr>
<tr>
<td>Half-day Kindergarten</td>
<td>52</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>Low Income</td>
<td>28%</td>
<td>31%</td>
<td>29%</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>13%</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>ELL</td>
<td>9%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>White</td>
<td>72%</td>
<td>75%</td>
<td>73%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>African American</td>
<td>5%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Asian</td>
<td>3%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Native American, Hawaiian, Pacific Islander</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Multiple Races</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
</tbody>
</table>

The researcher will conduct this study using these groups as a sample in order to access longitudinal assessment data for the targeted grade levels. The use of these instrument is part of the Dedham Public Schools assessment protocol, therefore all students who were enrolled during the targeted time period will have been tested. The participants in this study are students from the school district who were enrolled as of October 1 in their kindergarten year and remained through third grade. As a result the sample will include 480 of the total 658 students currently enrolled. This site was chosen in hopes that the results of this study would have a positive impact on the researcher’s home district, specifically in increasing funding to provide full-day kindergarten programming for all students. A random sampling of students is not possible as...
participation in full-day or half-day kindergarten is optional and the determination of programming predates this study. The sample of 480 students and four years’ worth of data is an adequate setting for this type of study. Because this study is being conducted at a site that was accessible to the researcher, a convenience sample (Creswell, 2003), the generalizability of study findings to other populations has limitations. However, convenience sampling may provide information useful in answering problems of practice (Creswell, 2003; Fraenkel et al., 2012).

**Instrumentation.** Students are administered the *Developmental Reading Assessment (DRA)* in a one-on-one conference format in the beginning of October and June in kindergarten and again in June in first through third grades. The purpose of the *Developmental Reading Assessment* is to determine a student’s independent reading level in order to match reading materials that are in the child’s *zone of proximal development* for instruction. The *Developmental Reading Assessment* consists of a series of twenty books of increasing levels of difficulty. Running records of oral reading are used to record and analyze reading behaviors. These are used to determine an accuracy percentage and a fluency rate. Student comprehension is assessed through the oral or written retelling of the story. A student’s reading level is determined through a combination of accuracy, comprehension, and fluency scores. A student is considered to be independent if his accuracy falls in the 95% to 100% range, he scores 18 to 24 on comprehension, and the fluency rate is judged to be a 3 or 4. A student is determined to be at an instructional level if her accuracy falls in the 90% to 94% range, she scores 16 to 17 on comprehension and the fluency rate is judged to be a 2 or 3. A student is determined to be at a frustration level if his accuracy falls in the below 90%, he scores between less than 16 on comprehension and the fluency rate is judged to be a 1 or 2. The test is designed to be used by classroom teachers to measure how well students read literature, monitor student growth and
help diagnose students’ needs for instructional planning. A sample of a DRA passage and scoring sheet is included in the Appendix.

The DRA was originally developed and field-tested by primary classroom teachers and then revised in collaboration with Joetta Beaver in the Upper Arlington City School District in Ohio between 1988 and 1996. Then in May 1996, it was once again field tested by 84 primary teachers across the United States and in one province in Canada. Based on the feedback, further revisions were made during the summer of 1996 and approved by the Upper Arlington teachers in the fall of 1996 (Beaver, 2001, p.4).

E. Jane Williams (1999) completed a reliability study of the DRA examining the inter-rater agreement and the internal consistency of the instrument. Additional data provided information about the construct validity. Primary teachers from across the United States participated. The Rasch Scale analyses revealed strong reliability or inter-rater agreement between the first two raters at 0.80. The inter-rater agreement among three raters was good at 0.74. The internal consistency was found to be quite strong across all raters. Construct validity was established by correlating ending second grade scores on the DRA with the students’ fall scores on the Iowa Test of Basic Skills Subscales: Vocabulary, Reading Comprehension, and Total Reading. All correlations were significant with the highest for Total Reading.

**Data collection.** In order to determine if there is a correlation between kindergarten programming and literacy achievement, student archival data will be examined. Preexisting data sets for the students involved include Developmental Reading Assessment scores over a four year period. Permission to collect and use this data will be requested from the Superintendent of Schools, and the researcher will then gain access to the data for the 2010-2011, 2011-2012, 2012-2013, 2013-2014, and 2014-2015 school years.
For this study, the Developmental Reading Assessment is administered by the kindergarten classroom teacher during initial screening in October. Examiners determine an independent reading level based on an accuracy rate of 94% or above and an adequate comprehension score of sixteen or above. The assessment is repeated near the end of kindergarten and the subsequent grades in the beginning of June. Following each testing session, the student scores are recorded on a standardized score sheet.

Data analysis. The first step in the data analysis will be to review the student data printouts and enrollment lists to determine which students will be included in the study. Only students who were enrolled in the school district as of October 1 in their kindergarten year, and remained through third grade will be included in the study. Any student not attending school in the district for all four years or for whom data is missing will be excluded. After the data has been collected, students’ names will be removed and replaced with unique identification numbers.

In order to analyze the data sets provided by the Dedham Public Schools, an examination of the types of data will be used to determine the use of parametric or nonparametric measures. The use of a parametric measure requires that the dataset meet certain assumptions. The data being retrieved through the Developmental Reading Assessment is normally or nearly normally distributed and based on an interval scale rather than an ordinal or nominal scale.

According to Best and Kahn (2003), the analysis of variance (ANOVA) is appropriate in examining the means of more than two samples and determining whether the means are too different to attribute to sampling error. In this study, the sample members will be assessed at four intervals using the Developmental Reading Assessment. Several assumptions must be met when utilizing a repeated measures ANOVA. The first assumes that the dependent variable is
measured on continuous intervals. Scoring on the Developmental Reading Assessment meets this requirement (scores range from 0-70). Secondly, the independent variable should consist of at least two related groups. The same students in each of the two groups will be assessed on four occasions over the four year period being examined. The remaining assumptions; no significant outliers in the related groups, normal distribution of the dependent variable, and sphericity will be examined and addressed through the course of the study.

In order to answer the proposed research question 1, a 2 Factor ANOVA will be utilized. For research question 2, a 2 Factor 2 way repeated measures ANOVA will be used to analyze the data. Once data collection is complete, the raw scores from the questionnaires will be entered into SPSS v24.0 and frequencies will be run in order confirm the integrity of the data and to identify and address any missing data issues. Data cleaning, computation, and/or transformation will occur at this point as well. For the current study the independent variable is full-day versus half-day kindergarten (between-subjects) with their Literacy proficiency scores over the first 3 grades as the within-subjects variable. The analysis will proceed by first investigating whether there are significant between group differences at the end of kindergarten followed by investigating if there is a significant group by time interaction. Prior to interpretation of the results, data will be checked for violations of ANOVAs assumptions.

Validity, Reliability, and Generalizability

Inherent threats to validity, reliability, and generalizability may exist in any research. This section will review those threats and discuss the steps taken in order to minimize these threats in this research.
Validity and reliability are important to consider when choosing or designing instruments to use in research because the conclusions researchers draw are based on the information they obtain from these instruments. Validity refers to the appropriateness, correctness, meaningfulness, and usefulness of inferences researchers make based upon their data. It refers to the degree to which evidence supports the inferences researchers make based upon the data they collect (Fraenkel et al., 2012). The validity and reliability of the instrument utilized has been previously discussed in the Instrumentation section.

**Validity.** Fraenkel et al. (2012) provide a comprehensive listing of potential extraneous variables. These extraneous variables are: mortality, location, instrumentation, subject characteristics, implementation, data-collector characteristics, and data-collector bias.

Ari, Jacobs, Sorenson & Walker (2014) note that “selection bias is most likely to occur when the researcher cannot assign subjects randomly but must use intact groups” (p. 299). The best way to control selection bias is to use random groups. In the event that this is not possible, the groups should be made as similar as possible. Given that the sampling for this study could not be random, threats to the internal validity may be present due to differences in student characteristics. The sample, however, is demographically similar to the overall population.

Mortality could also present an internal threat to validity due to the longitudinal form of the research. Although the data will be collected for all students, only those who attend the Dedham Public Schools for all four years will be included in the data analysis. Data related to students leaving the system or those entering after October 1 of kindergarten will be maintained to determine if it is meaningful to the results of this study.

Content validity will be obtained by utilizing the same commercial reading assessment which has been empirically and field tested. Internal validity in relation to instrumentation will
be addressed. Although there will be a large number of teachers involved in the study, all staff are trained by the district in administering and scoring the *Developmental Reading Assessment*. The teachers will be following the district curriculum and using the same instructional materials in teaching reading. With the exception of the initial screening in kindergarten to provide a baseline, all further end of year assessments will occur at the beginning of June. Threats to internal validity related to data-collector characteristics and bias and location will be minimized by utilizing the district established protocols for administering the tests. Staffing has remained stable throughout the four years which will result in a consistent cadre of teachers having administered the test. All assessments will be administered in the classroom setting. In order to mitigate any data entry errors made in transferring the student scores to the district score report, the information was examined to ensure accuracy. Any inconsistencies or outliers in scores will be cross-checked with student test protocols and files.

**Reliability.** Reliability refers to the consistency of scores from one administration of an instrument to another (Fraenkel et al., 2012). The reliability of this study depends heavily on that of the instruments utilized. Although the potential for some degree of administrator subjectivity in scoring has been noted, the evaluation tool is highly regarded in the assessment of reading skills. As a means of controlling any subjectivity all teachers are trained by the district in administering and scoring the *Developmental Reading Assessment*. In the case of the assessment tool, the *Developmental Reading Assessment*, research studies (Williams, 1999) have shown the instruments to have a high degree of reliability.

Although the sample was not random, internal reliability was maintained by using the same evaluators in assessing the students, the same curriculum across all classes, and the same assessments. All assessments were performed during the same window (first week of June). The
teachers involved in the study will be trained by the district in administering and scoring the

*Developmental Reading Assessment.*

**Generalizability.** Generalizability is another key factor. Quantitative researchers seek to establish relationships between variables and look for or explain the causes of these relationships (Fraenkel et al., 2012). The site for this study was determined due to researcher access and the problem of practice for the district. The sample was drawn from the accessible population of students and is therefore a convenience sample. The sample did comprise 71% of the target population of 3rd, 4th, and 5th grade students. This will limit the generalizability of study findings to other populations, however, it is reasonable to assume that the findings would be generalizable to the remaining accessible population. The nature of the study, causal-comparative, also limits the generalizability. In spite of these limitations, it is believed by the researcher that the study can still have a positive impact on the education of students.

**Protection of Human Subjects**

The nature of data collection, archival literacy data, and the removal of student names from the data provide protection to the children involved in the study. No student or teacher names will appear in any of the data. The assessments being utilized in this study are part of the yearly assessment protocol for the district. The study will center on providing an analysis of the effects of kindergarten programming on literacy achievement. Permission from the Superintendent of Schools will be sought by the researcher to access the necessary data. The researcher is a principal in the district where the sample is being obtained.

**Summary**

This section indicates how the research project will address the problem of practice identified. This study will be conducted in Dedham, a suburban town of close to 25,000
inhabitants located south of Boston. The 658 third, fourth and fifth grade students enrolled in the four neighborhood elementary schools during the 2015-2016 school year will be used as the sample. Archival data collection will consist of the student scores on the Developmental Reading Assessment (2001) at the end of kindergarten through third grade. The researcher will employ a 2 Factor ANOVA to analyze the data from research question 1 and a 2 Factor repeated measures ANOVA to analyze the data for research question 2. The researcher will establish a process and procedure ensure validity and reliability as well as identify any limitations. The research design and data collection will be evaluated and analyzed in the next chapter.
Chapter Four: Report of Research Findings

This study was undertaken to investigate the effects of the length of the kindergarten school day on the literacy development through third grade among 3rd, 4th, and 5th grade students in four grade 1-5 elementary schools in Massachusetts. The study employed a quantitative causal-comparative, longitudinal, secondary data analysis design to determine whether the length of the kindergarten school day has any effect on kindergarten students’ achievement in literacy. For practical reasons, a causal-comparative research approach was used as students could not be randomly assigned to groups. This study examined differences in groups that have already occurred and could not be manipulated (Fraenkel, Wallen, & Hyun, 2012). In this study, three cohorts of students (N=443) were assessed by their classroom teachers to determine a guided reading level at the beginning of kindergarten and the end of each academic year, kindergarten through grade 3. One group of students attended half-day kindergarten and one group attended full-day kindergarten. The researcher was not involved in assessing the students, but rather analyzed archival data provided by the school district.

The following chapter provides a summary of the findings as they relate to the research questions: At the end of the kindergarten year to what extent do full-day kindergarten students outperform their half-day counterparts on the attainment of grade level literacy benchmarks? As students progress through each of the primary grades to what extent do those who attended full-day kindergarten outperform their half-day counterparts on the attainment of grade level literacy benchmarks?

Demographics of Schools, Population, and Sample

At the time of the study, the population of the four elementary schools was 1069 students with males representing 52% of the population and females representing 48% of the overall population. The target population for this study was the 658 third, fourth and fifth grade students
currently enrolled in the four neighborhood elementary schools. Of these students only 480 are students from the school district who were enrolled as of October 1 in their kindergarten year and remained through third grade. Finally, the Special Education and ELL students were not involved in the data collection phase because their scores may have skewed the results. A total of 342 students, 121 half-day students and 221 full-day students were included. Students were grouped into three cohorts, dependent upon their grade level in the 2015-2016 year. A comparison of income level for each cohort and in the aggregate was performed to ensure the classes were not disparate in terms of socioeconomic level.

The 3rd Grade Cohort represents Dedham Public School third grade students who entered in kindergarten in the fall of 2010 and were continuously enrolled through the entire third grade academic year. Table 2 provides a summary of the total number and percentage of students in this cohort who attended full-day and half-day kindergarten by income status. As shown in Table 2, there are no significant differences in low income status ($p=0.574$) between students enrolled in the half-day and full-day programs for the 3rd Grade Cohort.

Table 2

<table>
<thead>
<tr>
<th>Low Income Status by Kindergarten Type for 3rd Grade Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Low Income</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Low Income $X^2 (1, N=115)=0.391, p=0.574$

The 4th Grade Cohort represents Dedham Public School students in kindergarten in the fall of 2011 and were continuously enrolled through the entire fourth grade academic year. Table
3 provides a summary of the total number and percentage of students in this cohort who attended full-day and half-day kindergarten by income status. As shown in Table 3, there are no significant differences in low income status ($p=0.748$) between students enrolled in the half-day and full-day programs for the 4th Grade Cohort.

Table 3

*Low Income Status by Kindergarten Type for 4th Grade Cohort*

<table>
<thead>
<tr>
<th></th>
<th>Full-Day (n=77)</th>
<th>Half-Day (n=38)</th>
<th>Total (n=115)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Low Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>11%</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>68</td>
<td>89%</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>100%</td>
<td>38</td>
</tr>
</tbody>
</table>

Low Income $X^2$ (1, N=115 =0.391, p=0.748

The 5th Grade Cohort represents Dedham Public School students in kindergarten in the fall of 2012 and were continuously enrolled through the entire fifth grade academic year. Table 4 provides a summary of the total number and percentage of students in this cohort who attended full-day and half-day kindergarten by income status. As shown in Table 4, there are no significant differences in low income status ($p=0.574$) between students enrolled in the half-day and full-day programs for the 5th Grade Cohort.

Table 4

*Low Income Status by Kindergarten Type for 5th Grade Cohort*

<table>
<thead>
<tr>
<th></th>
<th>Full-Day (n=60)</th>
<th>Half-Day (n=38)</th>
<th>Total (n=98)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Low Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>5%</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 5 provides a summary of the total number and percentage of students in the Aggregate who attended full-day and half-day kindergarten by income status. As shown in Table 5, there are no significant differences in low income status ($p=0.254$) between students enrolled in the half-day and full-day programs for the 5th Grade Cohort.

Table 5

*Low Income Status by Kindergarten Type for Aggregate*

<table>
<thead>
<tr>
<th></th>
<th>Full-Day</th>
<th>Half-Day</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=221)</td>
<td>(n=121)</td>
<td>(n=342)</td>
</tr>
<tr>
<td>Low Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23 10%</td>
<td>12 10%</td>
<td>35 10%</td>
</tr>
<tr>
<td>No</td>
<td>198 90%</td>
<td>109 90%</td>
<td>307 90%</td>
</tr>
<tr>
<td>Total</td>
<td>278 100%</td>
<td>121 100%</td>
<td>342 100%</td>
</tr>
</tbody>
</table>

Low Income $\chi^2 (1, N= 129)=0.505, p=0.5740$

**Assumption Testing**

ANOVA is an inferential, statistical test which allows the researcher to test if each of several independent variables has an effect on the dependent variable as well as is the main effects are independent of each other. Assumptions must be met before the tests are run if they are to be considered accurate.

**Independence of Observation-Assumption Met**

Each participant was included as a member in only one group, either the full-day group or the half-day group. All assessments were performed in a 1:1 setting and therefore subjects were not interacting with other participants.
Level of Measurement- Assumption Met

Parametric approaches assume that the dependent variable is measured on a continuous scale. The Developmental Reading Assessment, the instrument used in this research to assess students’ literacy levels, meets this requirement.

Random Sampling-Assumption Not Met

The target population for this study were the third, fourth and fifth grade students enrolled in the four neighborhood elementary schools. Students were assigned to the two groups, full-day and half-day kindergarten based upon registration by parents. Therefore the participants in each group were not randomly assigned by the researcher. The sample is a convenience sample.

Normality-Assumption Met

A histogram was created through SPSS to determine if the data from the sample was normally distributed. The bell shaped curve in Figure 1 provides evidence that the majority of the scores fall around the center of distribution. The assumption of normality is met through this test.
Figure 1. DRA end of kindergarten frequency distribution

To further determine normality descriptive statistics also provide information concerning skewness and kurtosis. Table 6 demonstrates that the level of skewness and kurtosis at the end of each year. Although the level of skewness at the end of grade three is getting higher, all results fall within the recommended +/-2 which can be handled by the statistics in ANOVA.
Table 6

Normality Check for DRA End of Year Grades K, 1, 2, and 3

<table>
<thead>
<tr>
<th></th>
<th>DRAKEOY</th>
<th>DRA1EOY</th>
<th>DRA2EOY</th>
<th>DRA3EOY</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>342</td>
<td>342</td>
<td>342</td>
<td>342</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skewness</td>
<td>.513</td>
<td>-.128</td>
<td>-.750</td>
<td>-1.508</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.392</td>
<td>-.732</td>
<td>1.154</td>
<td>1.482</td>
</tr>
</tbody>
</table>

The ANOVA family in general is pretty robust to violations- results not violated by slight or moderate violation as seen (Glass, Hopkins, 1996).

**Homogeneity of Variance-Assumption Met**

ANOVA testing assumes that variances are equal across groups and samples. The Levene’s Test of Equality of Error Variances was performed to verify this assumption (Field, 2009). No violations were noted.

**Sphericity-Assumption Met**

In using repeated-measures, the scores come from the same participants over time. In order to test that the level of dependence between experimental conditions is fairly equal, sphericity, was met. Mauchly’s Test of Sphericity was performed (Field, 2009). No violations were noted.

**ANOVA Analysis**

As demonstrated above, the data for this study met all assumptions necessary to run an ANOVA.

**Hypothesis Testing**
The first hypothesis for this study was: At the end of the kindergarten year to what extent do full-day kindergarten students outperform their half-day counterparts on the attainment of grade level literacy benchmarks?

A one-way between-groups analysis of variance was conducted to explore the impact of length of day on end of year literacy achievement, as measured by the Developmental Reading Assessment (DRA). An investigation of the data revealed separate means on the DRA for each group. The two groups are summarized in Table 7.

Table 7

*ANOVA Results for the Dependent Variable DRA End of Kindergarten*

<table>
<thead>
<tr>
<th>DAY</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half</td>
<td>3.42</td>
<td>2.906</td>
<td>121</td>
</tr>
<tr>
<td>Full</td>
<td>5.24</td>
<td>4.081</td>
<td>221</td>
</tr>
<tr>
<td>Total</td>
<td>4.59</td>
<td>3.804</td>
<td>342</td>
</tr>
</tbody>
</table>

From Table 7, and as depicted in Figure 2, it follows that students attending the full-day kindergarten scored higher on the end of year DRA than the students attending half-day kindergarten.
As shown below in Table 8, in the statistical test ANOVA, a statistical significance $F(1, 340) = 36.41, p = .000$ was found for length of day between students who participated in full-day kindergarten and students who participated in half-day kindergarten. The effect size, however, is $\eta^2_p = .097$, which is considered small (Salkind, 2010).

Table 8

**Tests of Between-Subjects Effects Dependent Variable DRA End of Kindergarten**

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>2.708^1</td>
<td>1</td>
<td>2.708</td>
<td>36.411</td>
<td>.000</td>
<td>.097</td>
</tr>
<tr>
<td>Intercept</td>
<td>87.925</td>
<td>1</td>
<td>87.925</td>
<td>1</td>
<td>.000</td>
<td>.777</td>
</tr>
<tr>
<td>DAY</td>
<td>2.708</td>
<td>1</td>
<td>2.708</td>
<td>36.411</td>
<td>.000</td>
<td>.097</td>
</tr>
<tr>
<td>Error</td>
<td>25.291</td>
<td>340</td>
<td>.074</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>134.266</td>
<td>342</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The second hypothesis was: As students progress through each of the primary grades to what extent do those who attended full-day kindergarten outperform their half-day counterparts on the acquisition of grade level literacy benchmarks?

A one-way repeated measures ANOVA was conducted to compare the scores of the same students on the Developmental Reading Assessment at the end of first grade, the end of second grade, and the end of third grade. This data was analyzed by cohort, grade 3 students, grade 4 students, and grade 5 students and in the aggregate. The means and standard deviations for the third grade, fourth grade, and fifth grade cohorts and aggregate are presented in Tables 9, 12, 15, and 18.

Table 9

3rd grade cohort DRA End of Year grades 1-3

<table>
<thead>
<tr>
<th>Day</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA1EOY</td>
<td>Half</td>
<td>18.89</td>
<td>6.516</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>20.74</td>
<td>5.348</td>
</tr>
<tr>
<td>DRA2EOY</td>
<td>Half</td>
<td>29.69</td>
<td>5.134</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>31.57</td>
<td>4.830</td>
</tr>
<tr>
<td>DRA3EOY</td>
<td>Half</td>
<td>37.60</td>
<td>3.374</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>37.74</td>
<td>3.101</td>
</tr>
</tbody>
</table>

As noted in Tables 9, 15 and 18, and demonstrated in Figure 3, 5 and 6, the mean DRA scores for students in the grade 3 and grade 5 cohorts and the aggregate who attended full-day were consistently higher than for those attending half-day kindergarten. Table 12 and Figure 4 show that in the grade 4 cohort, the mean DRA score for the half-day students rose above the
full-day students in grades 4 and 5. However, by the end of grade three, the difference in mean scores was minimal across all cohorts and in the aggregate.

![Figure 3. Longitudinal Comparison of Mean DRA 3rd Grade Cohort.](image)

To determine any differences between the means of the two groups in each cohort, Wilks’ Lambda was calculated. As reported in Table 10, there was a significant difference between the mean scores for the students attending full-day kindergarten and the students attending half-day kindergarten, Wilks’ Lambda = .946, F (2, 126) = 3.630, p = .029 for the third grade cohort. The mean scores for students in the full-day were significantly higher. Further examination of the Between-Subject Effects, however, indicates there was not a significant difference in effect F (1, 127) = 2.902, p = .091. Examining the Tables 13, 16 and 19 demonstrates there was not a significant difference in the mean scores or effect of length of day, Wilks’

Table 10

3rd Grade Cohort Multivariate Tests

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA</td>
<td>.054</td>
<td>3.630</td>
<td>2.000</td>
<td>126.000</td>
<td>.029</td>
</tr>
<tr>
<td>Day</td>
<td>.946</td>
<td>3.630</td>
<td>2.000</td>
<td>126.000</td>
<td>.029</td>
</tr>
<tr>
<td>Day</td>
<td>.058</td>
<td>3.630</td>
<td>2.000</td>
<td>126.000</td>
<td>.029</td>
</tr>
<tr>
<td>Day</td>
<td>.058</td>
<td>3.630</td>
<td>2.000</td>
<td>126.000</td>
<td>.029</td>
</tr>
</tbody>
</table>

Table 11

3rd Grade Cohort Tests of Between Subject Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>303331.721</td>
<td>1</td>
<td>303331.721</td>
<td>6017.237</td>
<td>.000</td>
</tr>
<tr>
<td>DAY</td>
<td>146.274</td>
<td>1</td>
<td>146.274</td>
<td>2.902</td>
<td>.091</td>
</tr>
<tr>
<td>Error</td>
<td>6402.129</td>
<td>127</td>
<td>50.410</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12

4th grade cohort DRA End of Year grades 1-3

<table>
<thead>
<tr>
<th></th>
<th>Day</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA1EOY</td>
<td>Half</td>
<td>19.21</td>
<td>6.747</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>19.61</td>
<td>6.314</td>
<td>77</td>
</tr>
<tr>
<td>DRA2EOY</td>
<td>Half</td>
<td>32.11</td>
<td>5.260</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>30.90</td>
<td>6.908</td>
<td>77</td>
</tr>
<tr>
<td>DRA3EOY</td>
<td>Half</td>
<td>36.95</td>
<td>3.533</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>36.65</td>
<td>3.575</td>
<td>77</td>
</tr>
</tbody>
</table>
Figure 4. Longitudinal Comparison of Mean DRA 4th Grade Cohort.

Table 13

4th Grade Cohort Multivariate Tests

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA Pillai’s Trace</td>
<td>.024</td>
<td>1.358²</td>
<td>2.000</td>
<td>112.000</td>
<td>.261</td>
</tr>
<tr>
<td>Day Wilks’ Lambda</td>
<td>.976</td>
<td>1.358²</td>
<td>2.000</td>
<td>112.000</td>
<td>.261</td>
</tr>
<tr>
<td>Hotelling’s Trace</td>
<td>.024</td>
<td>1.358²</td>
<td>2.000</td>
<td>112.000</td>
<td>.261</td>
</tr>
<tr>
<td>Roy’s Largest Root</td>
<td>.024</td>
<td>1.358²</td>
<td>2.000</td>
<td>112.000</td>
<td>.261</td>
</tr>
</tbody>
</table>
Table 14

4th Grade Cohort Tests of Between Subject Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercep</td>
<td>260980.764</td>
<td>1</td>
<td>260980.764</td>
<td>3760.706</td>
<td>.000</td>
</tr>
<tr>
<td>DAY</td>
<td>10.399</td>
<td>1</td>
<td>10.399</td>
<td>.150</td>
<td>.699</td>
</tr>
<tr>
<td>Error</td>
<td>7841.833</td>
<td>113</td>
<td>69.397</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15

5th grade cohort DRA End of Year grades 1-3

<table>
<thead>
<tr>
<th>Day</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA1EOY</td>
<td>Half</td>
<td>19.26</td>
<td>6.517</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>20.43</td>
<td>6.074</td>
</tr>
<tr>
<td>DRA2EOY</td>
<td>Half</td>
<td>31.00</td>
<td>5.556</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>31.30</td>
<td>6.312</td>
</tr>
<tr>
<td>DRA3EOY</td>
<td>Half</td>
<td>37.68</td>
<td>3.137</td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>37.93</td>
<td>3.293</td>
</tr>
</tbody>
</table>

Figure 5. Longitudinal Comparison of Mean DRA 5th Grade Cohort.
Table 16

5th Grade Cohort Multivariate Tests

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA Day</td>
<td>.007</td>
<td>.353</td>
<td>2.000</td>
<td>95.000</td>
<td>.261</td>
</tr>
<tr>
<td>Pillai’s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilks’</td>
<td>.993</td>
<td>.353</td>
<td>2.000</td>
<td>95.000</td>
<td>.261</td>
</tr>
<tr>
<td>Lambda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotelling’s</td>
<td>.007</td>
<td>.353</td>
<td>2.000</td>
<td>95.000</td>
<td>.261</td>
</tr>
<tr>
<td>Trace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roy’s</td>
<td>.007</td>
<td>.353</td>
<td>2.000</td>
<td>95.000</td>
<td>.261</td>
</tr>
<tr>
<td>Largest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 17

5th Grade Cohort Tests of Between Subject Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercep</td>
<td>244648.230</td>
<td>1</td>
<td>244648.230</td>
<td>4422.123</td>
<td>.000</td>
</tr>
<tr>
<td>DAY</td>
<td>22.924</td>
<td>1</td>
<td>22.924</td>
<td>.414</td>
<td>.521</td>
</tr>
<tr>
<td>Error</td>
<td>5311.076</td>
<td>96</td>
<td>55.324</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 18

Aggregate DRA End of Year grades 1-3

<table>
<thead>
<tr>
<th>Day</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA1EOY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half</td>
<td>19.11</td>
<td>6.537</td>
<td>121</td>
</tr>
<tr>
<td>Full</td>
<td>20.47</td>
<td>5.708</td>
<td>221</td>
</tr>
<tr>
<td>DRA2EOY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half</td>
<td>30.78</td>
<td>5.325</td>
<td>121</td>
</tr>
<tr>
<td>Full</td>
<td>31.39</td>
<td>5.891</td>
<td>221</td>
</tr>
<tr>
<td>DRA3EOY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half</td>
<td>37.42</td>
<td>3.341</td>
<td>121</td>
</tr>
<tr>
<td>Full</td>
<td>37.48</td>
<td>3.320</td>
<td>221</td>
</tr>
</tbody>
</table>
Table 19

**Aggregate Multivariate Tests**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRA Day</td>
<td>.007</td>
<td>$2.576^2$</td>
<td>2.000</td>
<td>339.000</td>
<td>.078</td>
</tr>
<tr>
<td>Wilks’ Lambda</td>
<td>.993</td>
<td>$2.576^2$</td>
<td>2.000</td>
<td>339.000</td>
<td>.078</td>
</tr>
<tr>
<td>Hotelling’s Trace</td>
<td>.007</td>
<td>$2.576^2$</td>
<td>2.000</td>
<td>339.000</td>
<td>.078</td>
</tr>
<tr>
<td>Roy’s Largest Root</td>
<td>.007</td>
<td>$2.576^2$</td>
<td>2.000</td>
<td>339.000</td>
<td>.078</td>
</tr>
</tbody>
</table>

*Figure 6. Longitudinal Comparison of Mean DRA Aggregate.*
Chi-square Test for Independence Analysis

To further determine if there was a significant relationship between length of kindergarten day and student attainment of district benchmarks by grade 3, a Chi-Square Test of Independence was performed. This test compared the frequencies of cases occurring in the established categories; meeting the benchmark, not meeting the benchmark, and exceeding the benchmark. Students were assigned to each category based on their end of third grade DRA score.

Table 20

Chi-Square Tests-Did Not Meet Benchmark

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymptotic Significance (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.000</td>
<td>1</td>
<td>.999</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>.000</td>
<td>1</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.000</td>
<td>1</td>
<td>.999</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td>.000</td>
<td>1</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>.000</td>
<td>1</td>
<td>.999</td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>352</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 7. Chi-Square Graph-Did Not Meet Benchmark.

As demonstrated in Table 20 and Figure 7, a chi-square test for independence indicated no significant association between length of kindergarten day and not meeting district benchmarks, $X^2(1, N=352)=.000$, $p=.999$.

Table 21

**Chi Square Tests - Met District Benchmark**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymptotic Significance (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.928(^1)</td>
<td>1</td>
<td>.165</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction(^2)</td>
<td>1.610</td>
<td>1</td>
<td>.204</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.910</td>
<td>1</td>
<td>.167</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.189</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.922</td>
<td>1</td>
<td>.166</td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>352</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As demonstrated in Table 21 and Figure 8, a chi-square test for independence indicated no significant association between length of kindergarten day and not meeting district benchmarks, $X^2(1, N=352)=1.93, p=.165$.

**Table 22**

*Chi-Square Tests-Exceeded Benchmarks*

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymptotic Significance (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.654</td>
<td>1</td>
<td>.198</td>
<td>1.98</td>
</tr>
<tr>
<td>Continuity Correction$^2$</td>
<td>1.381</td>
<td>1</td>
<td>.240</td>
<td>.240</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.660</td>
<td>1</td>
<td>.198</td>
<td>.198</td>
</tr>
<tr>
<td>Fisher's Exact Test Linear-by-Linear Association</td>
<td>1.649</td>
<td>1</td>
<td>.199</td>
<td>.199</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>352</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As demonstrated in Table 22 and Figure 9, a chi-square test for independence indicated no significant association between length of kindergarten day and exceeding district benchmarks, $X^2(1, N=352)=1.65$, $p=.198$.

**Conclusion**

In this chapter, the researcher presented the findings of the study based on the analysis of the data. Information regarding assumption testing was presented first, followed by ANOVA and Chi-Square results. This study provides evidence that the first null hypothesis was rejected. Students who participated in full-day kindergarten did outperform students who participated in half-day kindergarten on attaining grade level literacy benchmarks at the end of kindergarten. However through a longitudinal look over the primary grades, evidence is provided to accept the second null hypothesis. There was no significant difference in the attainment of grade level
literacy benchmarks by students at the end of third grade who participate in full-day and half-day kindergarten.
Chapter 5: Discussion of Research Findings

The purpose of this study was to determine whether full-day kindergarten should be supported with district funding through the examination of the longitudinal impact, if any, the length of the kindergarten school day has on literacy development. Several research studies (Watson & West, 2004; West, Denton, & Reaney, 2001) have indicated greater gains in reading achievement for students attending full-day kindergarten programming. In contrast, several other studies failed to find any significant difference between full-day and half-day programming (Meyer, Wardrop, Hastings, & Linn, 1993; Nunnelly, 1996). With the current emphasis on accountability and the fiscal demands to balance budgets by cutting unnecessary or unsuccessful programs, providing students with the most effective kindergarten programming possible is imperative.

Earlier research pointing toward advantages to full-day kindergarten often focused on achievement at the end of kindergarten or early grades. There appeared to be a void in research examining the longitudinal effect of the kindergarten programming. This study attempted to address this void by investigating the effect of kindergarten programming, specifically the length of the kindergarten school day, on the literacy development at the end of kindergarten as well as through third grade among 3rd, 4th, and 5th grade students in four grade 1-5 elementary schools in Massachusetts. The Developmental Reading Assessment scores of three cohorts of students (N=443) from the beginning of kindergarten and the end of each academic year, kindergarten through grade 3, were compiled. A secondary data analysis was performed utilizing a one-way between-groups ANOVA (after assessing necessary assumptions) to explore the impact of length of day on end of year literacy achievement at the end of kindergarten and a one-way repeated measures ANOVA to compare the scores of the same students at the end of first grade, second
grade, and third grade. Further analysis via a Chi-Square Test of Independence explored the relationship between length of kindergarten day and student attainment of district benchmarks by grade 3. The ensuing chapter discusses the results described in Chapter 4 relative to the research questions, considers possible explanations for the results, assesses the implications of the findings, and offers suggestions for further research.

**Results and Discussion of Research Questions**

The first research question for this study focused on the impact the length of the kindergarten school day had on literacy development at the end of kindergarten. Specifically, the first research question is: At the completion of the kindergarten year, to what extent do full-day kindergarten students outperform their half-day counterparts on the acquisition of grade level literacy benchmarks?

The results of the study show a significant difference between the mean end of kindergarten DRA scores for the two groups. The mean end of kindergarten DRA score (M=5.24) for full-day students was higher than the mean score (M=3.42) for half-day students. The results of the statistical test ANOVA show this difference to be significant \(F(1, 340) =36.41, p=.000, r^2=.097\). The effect size is considered to be small.

The higher performance by the full-day kindergarten students at the end of kindergarten is consistent with findings of Torkelson (2008), Cleminshaw and Guidubaldi (1979), daCosta and Bell (2001), and Walston and West (2004). Although the literacy curriculum utilized in both programs was the same, the extended time allowed for additional exposure to literature and time spent in reading activities had a positive effect on literacy achievement.

However, a claim of a positive relationship between the length of the kindergarten day and literacy achievement and a justification for allocating major district monies to fund full-day
programming requires a closer look at the longitudinal effects. Another component of the study focused on the impact of the length of the kindergarten school day on literacy development as students progressed through the primary grades. Specifically, the second research question is: As students progress through each of the primary grades, to what extent do those who attended full-day kindergarten outperform their half-day counterparts on the acquisition of grade level literacy benchmarks? This data was analyzed by cohort, grade 3 students, grade 4 students, and grade 5 students and in the aggregate.

The results of this component of the study showed some inconsistencies across student groups. The mean DRA scores for the full-day students in the grade 3 cohort (Gr. 1 M = 20.74; Gr. 2 M = 31.57; Gr. 3 M = 37.74) were consistently higher at each grade level than their half-day peers (Gr. 1 M = 18.89; Gr. 2 M = 29.69; Gr. 3 M = 37.60). Similarly the full-day 5th grade students (Gr. 1 M = 20.43; Gr. 2 M = 31.30; Gr. 3 M = 37.93) outperformed their half-day counterparts (Gr. 1 M = 19.26; Gr. 2 M = 31.00; Gr. 3 M = 37.68). This was not true for the 4th grade cohort. For these students the mean score of half-day students at the end of second (M=32.11) and third grade (M=36.95) was higher than the full-day students (Gr. 2 M=30.90; Gr. 3 M=36.65).

To determine if any significant differences between the means of the two groups in each cohort, Wilks’ Lambda was calculated. Only in the third grade cohort scores was a significant effect of the length of day (Wilks’ Lambda = .946, F (2, 126) = 3.630, p = .029) found. This was not true for the fourth grade cohort (Wilks’ Lambda = .976, F (2,112) = 1.358, p = .261) or fifth grade cohort (Wilks’ Lambda=.993, F (2, 95) =.353, p=.261). Although we found a statistically significant difference for Day in the third grade cohort, the effect for this group (Sig. = .091) was not significant.
The results of the aggregate followed a similar pattern to the third and fifth grade cohorts. Although the mean scores at each grade level were higher for the full-day students (Gr. 1 M = 20.47; Gr. 2 M = 31.39; Gr. 3 M = 37.48) than the half-day students (Gr. 1 M = 19.11; Gr. 2 M = 30.78; Gr. 3 M = 37.42), a significant effect of the length of day was not found (Wilks’ Lambda = 2.5792, F (2,339) = .2576, p = .078).

The results of this present study are consistent with prior research (Stewart, 2006; Votruba-Drazel and Li-Grining, 2008) suggesting that any advantages of full-day versus half-day kindergarten fade out by the end of third grade.

**Discussion of the Study Findings in Relationship to the Theoretical Frameworks**

Two theoretical strands informed this quantitative: early literacy theories, specifically reading readiness theory and emergent literacy theory, and developmental theories.

**Developmental theory.** The developmental theories of Piaget and Vygotsky, discussed in Chapter 2, provide important insight into the learning processes of children. Piaget proposed that children progress through distinct developmental stages, each characterized by its own specific kinds and ways of organizing its knowledge. Although these stages are sequential, children may pass through at varying ages and at times move back and forth between the stages. The students entering kindergarten in the Dedham Public Schools present at various developmental stages and having a wide variety of language and literacy experiences. This is apparent through the range of DRA scores achieved by students at the beginning of the year (O-16). This variance continues through the primary grades. The classroom teachers are cognizant of these differences and therefore plan their instruction and literacy activities to accommodate students at various stages. Students are exposed to a wide variety of print and literacy activities that are differentiated to match the child's developmental level and strategies.
Piaget viewed children as constructors of their own structure of knowledge through their day-to-day physical and mental interactions with objects and people in their environment. Through adaptation a child first attempts to assimilate information into his existing schema. When he is unsuccessful or partially successful, a mental disequilibrium occurs causing the child to accommodate the new information. As the information is accommodated, a new schema is created allowing the information to be assimilated and equilibrium to be restored (Dimitriadis & Kamberelis, 2006; Miller, 2002; Mooney, 2000). Piaget stressed that instruction would only be beneficial if the child was cognitively ready to assimilate or accommodate the information at his present cognitive level thereby necessitating the ideas or materials not be radically different from the child’s current level of understanding (Miller, 2002).

In the kindergarten and primary grades, a significant portion of the school day is spent exposing children to a variety of language and literature through shared reading, read alouds, partner reading, and in guided reading groups. The teachers explain, model, and use guided practice to help their students construct knowledge. Students are involved in word play through phonemic awareness activities and phonics. Students are provided a multitude of opportunities to practice their reading independently, allowing them the time to read and work through a text to decode it. Through these exposures to literacy activities children are actively involved in exploring and making meaning of the oral and written word.

Vygotsky posited that a child’s development of higher cognitive processes such as language development, abstract thinking and memory are dependent upon the social environment and the child's interaction with teachers and peers (Dimitriadis & Kamberelis, 2006). Like Piaget, Vygotsky recognized that learning should be matched with the child's developmental
level. In contrast, he suggested that a better indication of the mental development could be viewed through what children could do with the assistance of others (Vygotsky, 1978).

Acknowledging the zone of proximal development, Vygotsky (1978) stressed that children were able to exceed the limits of their own capabilities through imitation in activity with peers or under the guidance of adults. Through scaffolding, teachers or other children could provide supporting information to enable a child to acquire a new skill or concept (Mooney, 2000).

Within the kindergarten and primary classrooms children are provided with book bags or bins of reading materials that are right at their independent level or slightly higher. They are given the opportunity to read alone but more often to read with partners or in small groups to help each other to decode unfamiliar text or just share what they are reading.

As mentioned in Chapter 2, Vygotsky recognized the importance of observation by teachers in determining and planning curriculum. Through these observation teachers should be able to determine what is within the zone of proximal development for students and plan instruction that extends their knowledge by putting them in learning situations where their competence is stretched (Mooney, 2000). As previously mentioned, the teachers explain, model, and use guided practice to help their students construct knowledge.

Within the primary classrooms teachers carefully watch the student's interactions with the printed word, providing modeling and "just right" material on which the student can practice and explore the reading process. In her interactions in guided reading groups, the teacher exposes students to literature which is slightly higher than "just right", while providing support as needed. Children 'partner read' with more knowledgeable peers who also provide assistance as the children make meaning of the text.
Early literacy theory. As mentioned in Chapter 2, the developmental theories of Piaget and Vygotsky provide a structure for the early literacy theories of reading readiness and emergent literacy as they relate to reading instruction in the kindergarten and primary grades. Reading readiness theory, heavily influenced by developmental theorists such as Gesell, suggested that children would only be able to learn to read once they had developed the necessary mental processes through maturation (Teale & Sulzby, 1986). Proficiency in oral language preceded learning to read and write. Prior to reaching the developmental stage enabling learning to read, children could be taught a series of readiness skills which served as building blocks for eventual reading (Teale, 1995).

Emergent literacy theory assumes the concurrent and interdependent development of reading, writing and oral language within a social, rich print environment rather than formal instruction of pre-reading (Whitehurst & Lonigan, 1998). Children are predisposed to become literate in a print-rich environment (Teale and Sulzby, 1991) in which they are actively involved in the construction of literacy through their interaction with the environment, adults, and other peers (Schweiker & Schweiker, 1993).

Through the daily interactions in the classroom, the students in this study were provided opportunities to explore, test out, and create meaning from the written language. This is part of an interrelated curriculum in which the students read, write about that which they have read or their own stories, and share stories and their own writings with peers and their teachers. The teachers involved in this study used DRA scores along with their observations of the students' literacy learning to inform instructional practices and choice of leveled materials. As students became more comfortable and successful with a given level of literature, they were exposed to
more difficult material with which to make meaning. Through this process year after year, the data showed a steady progression in literacy achievement.

**Discussion of the Study Findings in Relationship to the Literature**

This investigation of the impact full-day kindergarten programming has on literacy can be aligned to a review of the literature presented in Chapter 2.

**Empirical studies of full-day kindergarten students' early literacy development at the end of kindergarten.** Many of the studies reviewed in Chapter 2 focused on the impact of full-day kindergarten on literacy development at the end of kindergarten. Studies by Torkelson (2008) and daCosta and Bell (2001) pointed to higher mean scores for full-day students on the Marie Clay *Observation Survey* (1993). Similarly, research by Walston and West (2004), showed greater gains in reading achievement of full-day students. Cleminshaw and Guidubaldi (1979) determined that factor of time accounted for significant differences not only in the total scores, but also in student performance on five of the six *Metropolitan* subtests. Similar results were apparent in this research study. In this study, statistical significance was found favoring students who participated in full-day kindergarten over students who participated in half-day kindergarten.

**Empirical studies of full-day kindergarten students' early literacy development—through grade.** This researcher found there to be far fewer studies examining the long term effects of kindergarten programming on literacy development. In those studies found, Plucker et al (2004) reported full-day students as outperforming the half-day students through third grade while, Alber-Kelsay (1998) and Stewart (2006) found no statistical differences. Votruba-Drazel and Li-Grining (2008) reported that any advantage of full-day versus half-day kindergarten faded out by the spring of third grade. The results of this study mirror this inconsistency. Although the
mean DRA scores for students in the grade 3 and grade 5 cohorts and the aggregate who attended full-day kindergarten were consistently higher than for those attending half-day kindergarten, this was not true for the grade 4 cohort in which the mean DRA score for the half-day students rose above the full-day students in grades 2 and 3. However, by grade three the difference in mean scores was minimal across all cohorts and in the aggregate.

**Implications for Practice**

The primary goal of this research was to inform practices, budgetary and programming, in the Dedham Public Schools by examining the impact of full-day versus half-day kindergarten programming on the development of literacy skills over time. The findings of this study are relevant to the central administration and school committee of the district in which this study was conducted - as budgets are established and funding priorities are determined by these parties. As cited in Chapter 2, existing research exploring the impact of programming on literacy skill development at the end of kindergarten favors full-day kindergarten (e.g. Baskett, Bryant, White & Rhoads, 2005; Clemshaw & Guidibaldi, 1979; daCosta & Bell, 2001; Rivera, 1985; Torkelson, 2008; Walston & West, 2004). The results of this study are in agreement with these in finding a statistically significant difference for those attending full-day kindergarten programming. However, as results in other research show (e.g. Alber-Kelsay, 1998; Votruba-Drazel and Li-Grining, 2008), the lack of statistical significance in the findings for the second research question of this study suggest that an argument cannot be made that enrollment in full-day kindergarten will lead to improved literacy achievement over time.

Although the results of this study suggest that gains in literacy achievement cannot be attributed to enrollment in a full day kindergarten program, district administrators, teachers and communities should remember that there are variables that could be used to measure the
importance of a full-day kindergarten program. This research did not take into account any of the other academic areas such as math, writing, social studies or science. The kindergarten year is also an important one for young children to begin to develop the social skills involved in working and playing with other students, resolving conflicts and becoming independent in their learning.

District administrators should also explore the pedagogy and teaching in the primary grade classrooms that is providing the necessary support for students to close the gap. Although ELL students and special education students were excluded from this study, there are many regular education supports available in the district, above the Level 1 Response to Intervention support provided by the classroom teachers, which may have contributed to students being able to reach district benchmarks.

Implications for Research

The literature review utilized in this research provided an overview of the history of kindergarten from its roots in Germany through its migration to the United States and its shift from private or church-based programs to public school programs. Additionally, it reviewed an extensive number of earlier research studies to determine the relationship between full-day kindergarten programs and the longitudinal impact on literacy achievement. This research has attempted to address concerns cited in earlier studies; that the impact of a longer kindergarten day on literacy achievement has been examined primarily only at the end of kindergarten rather than on the long term effects as children progress through the grades and add to the body of knowledge. However, there remains a dearth of research on the longitudinal effect of the length of day in kindergarten programming. Future research should include additional sites and
continue with a focus on the longer lasting effects of the kindergarten programming, i.e. into the upper elementary levels and through high school.

Given that the findings of several research studies regarding the impact of full-day and half-day kindergarten have provided mixed results ((Meyer, Wardrop, Hastings, & Linn, 1993; Nunnelly, 1996; Watson & West, 2004; West, Denton & Reaney, 2001), coupled with the results of this study that find that there is not a significant difference in literacy achievement attained by students in either kindergarten program through the primary grades, future research should also focus on other factors such as how instructional time is spent.

The kindergarten experience, however, entails much more than just literacy instruction. Stubits (2005) examined student performance on math assessments. Using parent questionnaires, student attendance and discipline or social issues were also studied. Similarly McClinton & Topping (2001) examined teachers’ perceptions of students’ adjustment to first grade. Although the focus of this study was limited to literacy achievement, future research should use a broader brush to examine academic achievement in other areas as well as perhaps social adjustment and skills.

In determining the methodology for this study, the researcher excluded English language learners and special education students. Torkelson (2008) studied the literacy behaviors of "at risk" students, while Jose L. da Costa and Susan Bell (2001) focused on low socioeconomic students. Plucker & Zapf (2005) found that full-day kindergarten was shown to help reduce the achievement gap for minority and low socioeconomic status students. Further research might consider focusing on the impact of kindergarten programming with these "at risk" populations.

**Limitations of the Study**
The researcher recognizes that several limitations may have impacted the results of this study. The generalizability of a study of this nature is affected by any number of factors, including - primarily - that this research was specifically considered and designed to address a problem of practice particular to the researcher's own school and school district.

In the same vein, another limitation is the sampling method. As noted, the site for this study was determined due to researcher access and the problem of practice for the district. This study utilized a convenience sample drawn from the accessible population of students and, therefore, its subjects were not randomized for placement in full-day or half-day programs. This limiting factor will affect the generalizability of study findings to other populations, however, it is reasonable to assume that the findings would be generalizable to the remaining accessible population.

The researcher’s inability to control for factors other than kindergarten program type is another limitation. This study utilized archival data consisting solely of benchmark assessments scores to which the researcher was provided access. Information about preexisting differences among the participants, such as time exposed to literacy development prior to beginning kindergarten, student attendance and the respective educational levels of the parents of the students was unavailable.

Despite these noted and anticipated limitations, this research and these research findings should prove useful and valuable to both the researcher and to the administration of her public school authority.

**Conclusion**

Developing strong reading skills directly affects how students perform in school, and also how well they progress throughout life (U.S. Department of Education, 2005). In the 2003 report...
of the National Center for Education Statistics (NCES) only an estimated 13% of adults in the United States read at a proficient level. The concerns raised by the U. S. Department of Education (1983) in *A Nation at Risk* have not been resolved over three decades.

The purpose of this study was to gain a deeper understanding of the impact kindergarten programming, specifically the length of school day, has on longitudinal literacy achievement. As a longtime, active participant in the budgetary process in her school district, the researcher has been aware of the multifaceted demands on district funding, which are frequently accompanied by a simultaneous call for increased student achievement in early literacy. This study attempted to provide the district with statistical data upon which to make determinations for budget priorities.

This study found that students participating in full-day kindergarten do outperform students who participate in half-day kindergarten on attaining grade level literacy benchmarks at the end of kindergarten. However, there is no significant difference in the attainment of grade level literacy benchmarks by students at the end of third grade who participate in full-day and half-day kindergarten.

The findings of this thesis, then, serve as solid, research-based evidence to support an argument against the investment of significant funding for full-day kindergarten programs solely for such programming’s purported efficacy as a driver of increased student literacy achievement.

Those who might be tempted to draw far-reaching conclusions about the value and wisdom of full-day kindergarten programming from these findings are cautioned about their finite and specific context. There is a wide array of aspects of child development, social and emotional growth, cognitive development and various learning opportunities which is unconsidered and, therefore, unanswered by this study.
References


Stewart, S. (2006, November) Minority student’s achievement: Full-day and half-day kindergarteners’ basic early literacy skills. Available from ProQuest Dissertations and Theses database. (Order No. 3246685).


US Census Bureau (2014) Table 4. *Nursery school and kindergarten school enrollment of people 3 to 6 years old, by control of school, attendance status, age, mother’s labor force status and education, family income, race, and Hispanic origin.* Retrieved January 1, 2016 from http://www.census.gov/hhes/school/data/cps/2014/tables.html


APPENDIX

Sample Pages of Student Text- *Developmental Reading Assessment*

```
"Snail, can you sing?"
"No."
```

Level A

```
Mandy and her brother and sister got new shoes. Her brother got a pair of shoes for his soccer game. The shoes came in a red box with white stripes on it.
Mandy's brother took the shoe box home. He put a caterpillar in it. The caterpillar liked his new home.
```

Level 10

Sample Teacher Observation Guide- *Developmental Reading Assessment*
Can You Sing?

1. READING ENGAGEMENT

T: Who reads with you or to you at home?

T: Tell me about one of your favorite books.

2. ORAL READING

INTRODUCTION AND PREVIEW

T: This book is called Can You Sing? Let's read it together and find out who can sing. I'll read some of the story to you. As I read, I will point to each word with my finger. Watch and listen. Point to each word as you read pages 2–5.

T: Turn to page 6. Say: Now, I'll point to and read what the bird says. You point to and read what the other animals say.

Continue to read what the bird says, and have the student point to and read what the other animals say. Note the student's ability to hold/control the book and turn the pages.

RECORD OF ORAL READING

Record the student's oral reading behaviors on the Record of Oral Reading below.

Page 7
“No.”

Page 9
“No.”

Page 11
“No, no.”

Page 13
“No.” “No.” “No.”

Page 15
“Yes! Yes! Yes!”
3. TEACHER ANALYSIS

ORAL READING, PERCENT OF ACCURACY
Count the number of miscues that are not self-corrected. Circle the percent of accuracy based on the number of miscues.

Word Count: 10

<table>
<thead>
<tr>
<th></th>
<th>EM</th>
<th>DEV</th>
<th>IND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Miscues</td>
<td>3 or more</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Percent of Accuracy</td>
<td>70 or less</td>
<td>80</td>
<td>90</td>
</tr>
</tbody>
</table>

• If the student’s number of miscues is 1 or less, continue the assessment with a Level 1 text.
• If the student’s number of miscues is 2 or more, STOP!
  1. Circle the descriptor in each row of the DRA2 Continuum that best describes the student’s reading behaviors and responses.
  • Add the circled numbers to obtain a total score for each section.
  • Record the total scores at the top of page 1.
  2. Use the student’s profile of reading behaviors to identify instructional needs.
  3. Administer DRA Word Analysis, beginning with Task 1, at another time.

<table>
<thead>
<tr>
<th>DRA2 CONTINUUM</th>
<th>LEVEL A</th>
<th>EMERGENT READERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EMERGING</td>
<td>DEVELOPING</td>
</tr>
<tr>
<td>Reading Engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literacy Support</td>
<td>1 No response or is uncertain</td>
<td>2 Names at least one person who reads with him/her at home</td>
</tr>
<tr>
<td>Favorite Book</td>
<td>1 No response or is uncertain</td>
<td>2 Tells something about a favorite book</td>
</tr>
<tr>
<td>Book-Handling Skills</td>
<td>1 Relies on others to hold and turn pages of a book</td>
<td>2 Holes and/or turns pages of a book when prompted</td>
</tr>
<tr>
<td>Score</td>
<td>3 4</td>
<td>5 6 7</td>
</tr>
<tr>
<td>Oral Reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring/Self-Corrections</td>
<td>1 Detects no miscues</td>
<td>2 Self-corrects at least 1 miscue and neglects to self-correct other miscues</td>
</tr>
<tr>
<td>Use of Cues</td>
<td>1 Often neglects cues (e.g., picture, sentence pattern, visual information)</td>
<td>2 Uses cues (e.g., picture, sentence pattern, visual information) at times</td>
</tr>
<tr>
<td>Accuracy Rate</td>
<td>1 70% or less</td>
<td>2 80%</td>
</tr>
<tr>
<td>Score</td>
<td>3 4</td>
<td>5 6 7</td>
</tr>
<tr>
<td>Printed Language Concepts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directionality</td>
<td>1 No little control of directionality</td>
<td>2 Inconsistent control of directionality</td>
</tr>
<tr>
<td>One-to-One Correspondence</td>
<td>1 Slides finger, no one-to-one match</td>
<td>2 Points to words, inconsistent one-to-one match</td>
</tr>
<tr>
<td>Score</td>
<td>2 3</td>
<td>4 5</td>
</tr>
</tbody>
</table>