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Age at Kindergarten Entrance and Its Relationship to Early Academic Achievement

Joanne E. Perry

Philadelphia College of Osteopathic Medicine, joanne.perry@sbschools.org

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Age at Kindergarten Entrance and Its Relationship to Early Academic Achievement

Philadelphia College of Osteopathic Medicine

Joanne E. Perry
PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Emily M. Tomer on the 24th day of May, 2010, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Brad Rosenfield, Psy.D., Chairperson

Virginia Salzer, Ph.D.

Sarah E. Stookey, D.O., Ph.D.

Robert A. DiTomasso, Ph.D., ABPP, Chair, Department of Psychology
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Abstract

This study investigated whether age at kindergarten entrance has any effect on future language arts and literacy, using a sample of 340 students entering kindergarten in one largely white, middle-class, New Jersey, suburban school district. Students were grouped by age into two age categories: young (56-59 months) & on-time (60-72 months). Achievement was studied through archived measures of academic performance using correlations and chi square analyses to determine differences in literacy and language arts functioning related to age at school entrance. Results indicated young students were weaker in literacy and language arts achievement in first and second grade, but this difference was not found by fourth and eighth grade. Young entrants to kindergarten were more likely to be classified eligible for special education than their on-time classmates and were less likely to meet proficiency benchmarks. Early childhood portfolio assessments were weakly correlated with later state-mandated measurements of language arts and literacy performance. Girls and higher income students held an advantage over boys at fourth, but not eighth grade. The only demographic factor related to achievement in eighth grade was ethnic origin. Implications of the results were discussed in terms of appropriate curriculum and instructional practices.
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Live as if you were to die tomorrow. Learn as if you were to live forever.

Mohandas Gandhi
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Chapter 1

Introduction

Kindergarten began in the United States as a play-based early childhood enrichment program. Children were encouraged to learn through interacting with peers in this new and exciting environment where children function without their mothers for the first time (Allen, 1988). Kindergarten teachers were traditionally trained differently than their primary school counterparts and aligned themselves philosophically with the early childhood movement (Smith & Shepard, 1988). Early childhood education, kindergarten services are not guaranteed by state legislation and children are not held to mandatory attendance policies. In fact, eight states Alaska, Colorado, Idaho, New Hampshire, New Jersey, New York, North Dakota, and Pennsylvania, do not require kindergarten (Kauerz, 2005). Although the transition to first grade may be enhanced by the kindergarten experience, guaranteed and required formal education does not begin until first grade.

The entrance age for kindergarten has been increasing since the 1960’s as a result of increasing academic expectations for the student (Gredler, 1992). The trend to increase the age for kindergarten entrance has been encouraged indirectly by the No Child Left Behind (NCLB) Act’s focus on accountability (U. S. Department of Education, 2003). The theory is that older children should be able to achieve the required gains in academic skills delineated in the standards with fewer learning difficulties than younger students (Stipek, 2006). Although formal testing is not mandated by NCLB until grade three (U. S. Department of Education, 2003), teachers in kindergarten through second grade mark educational benchmarks in early literacy and mathematics skills. This standards movement has been driven by George W. Bush administration’s early childhood initiatives (Stipek, 2006; Kauerz, 2005). The federal legislation
called, Good Start Grow Smart, outlines standards for language, literacy and mathematics for children in preschool from the age of three years to five years (Stipek, 2006).

Background

According to information from The Condition of Education 2000 report (U. S. Department of Education, 2001), 98% of American children attend some type of kindergarten program beginning at age five. Each state establishes the kindergarten entrance age and it varies widely from state to state depending on the cut-off date for entrance. The cut-off date is defined as the calendar date by which children must have his or her fifth birthday to enter school in that calendar year. Children range within a one year span from just below five to six years old. The U. S. Department of Education is conducting a longitudinal study on kindergarten students using a nationally representative sample of children who entered kindergarten in the 1998-1999 school year. This study called the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K), provides the most comprehensive information available about the demographic characteristics and functioning of this sample of children. According to these results, the typical student is five and one half years old upon entrance to kindergarten (Zill & West, 2001).

The question of the appropriate age for children to begin school has not been answered to date because of varying educational philosophies about the goals for kindergarten programs. The original intent of a kindergarten as designed by Froebel was to permit the child to develop through play in an enriching environment. It became part of the educational system at the beginning of the 1900’s and flourished in the United States as a means of integrating immigrant children into the language and cultural conventions of the larger society (Baader, 2004). The standards movement has caused the age for entrance into kindergarten to increase over the last
decade because older children are more likely to meet academic benchmarks (Scott-Little & Kagan, 2006). Recently with the passage of the federal No Child Left Behind legislation standards are no longer suggestions, but have become mandates because funding is linked to achievement of benchmarks. In addition, some schools and parents hold children out of kindergarten even when they are age eligible assuming that the older student has advantages both academically and physically compared to their classmates (Datar, 2006; Graue & DiPerna, 2000; Marshall, 2003; Brent, May, & Kundert, 1996; Kundert, May, & Brent, 1995).

Statement of the Problem

Whether giving children an extra year before beginning kindergarten improves academic functioning has not been answered to date. This “gift of time” also called academic redshirting (Graue & DiPerna, 2000), needs further investigation. In fact, the practice may be discriminatory against those students most likely to be held out of kindergarten are African-American or Hispanic boys who are younger than their classmates (Rafoth & Knickelbein, 2008). This may be the case because schools recommend these minority children wait a year before beginning kindergarten because of weaker readiness skills. These readiness skills include focused attention, persistence, and ability to work independently. Another related question is whether those children who are deemed immature by parents or educators and held out of kindergarten are more likely to be classified as special education students. If delayed entrants are in fact showing learning disabilities, waiting a year before starting school leads to withholding necessary interventions (Marshall, 2003). In addition, the deleterious academic consequences of being young for grade also require further study (Yesil-Dagli, 2007).
The information available concerning the effect of age at entrance to kindergarten for later academic functioning is inconclusive at best. It is difficult to make generalizations because of the differences in the characteristics of the children sampled, the definition of age categories, and the measures of achievement used to assess the academic functioning of the students. In addition, age could be mitigated in some schools by differentiated instructional practices that adequately program for students regardless of age (Maxwell & Clifford, 2004). Demographic characteristics of the community are also important. Socioeconomic status (Chatterji, 2006; Yesil-Dagli, 2006; Sirin, 2005; Vanleer & Sidanius, 2001), gender (Kleinfeld, 2009; Chatterji, 2006; Yesil-Dagli, 2006; Chiu & McBride-Chang, 2006), ethnicity (Aldous, 2006, Chatterji, 2006; Yesil-Dagli, 2006; Reardon & Galindo, 2009; Koo, 1998), and preschool experiences available for children lead to varying levels of support for children’s academic skills when entering kindergarten regardless of the students’ age. In order to understand the effect of age, the setting characteristics are important when drawing conclusions.

Purpose of the Study

The context appears to be important to decisions about school readiness, retention, and delayed entry because academic success is determined by the interaction of environmental characteristics and child characteristics (Mantzicopoulos, 2003; Rimm-Kaufman & Pianta, 2000; Carlton & Winsler, 1999; Meisels, 1999). Readiness for kindergarten, then, is a concept that includes not only the child’s skills, but also the demands of the school. Ready schools, defined as those that use differentiated instruction and meet the individual needs of the child are an important part of the equation (Maxwell & Clifford, 2004). Most children arrive at kindergarten ready to learn, “it is a matter of what they learn, how they learn, and in what context they will learn” (Maxwell & Clifford, 2004, p.349). Local expectations vary from one school district to
another as well as between schools in the same district. In light of this variability, it is important to examine the local data to make statements about whether entrance age effects academic achievement in that particular setting.

In New Jersey, one of the six states in the U. S. that do not have a state mandated age of entrance to kindergarten (Kauerz, 2005), there are 611 school districts. Each local school district establishes the entrance age varying from district to district within the state (New Jersey Department of Education). Schools in New Jersey are managed and staffed at the local rather than county or state levels leading to more variations in educational policies and practices within the state. The criterion for school entrance is obtaining the age of five years by a specific date, called the cut-off date, for entrance in kindergarten in September. In one county located in the central part of New Jersey, there are currently five different cut-off dates for twelve school districts. The definition of the younger student in any kindergarten year cohort varies by several months from one school district to another even when they are in close geographical proximity to one another.

One district with a late cut-off date (December 31) accepts students in kindergarten as young as four-years and eight-months old. According the Early Childhood Longitudinal Study-Kindergarten (ECLS-K), students under five in the United States who begin school comprise about nine percent of the students who entered kindergarten (Zill & West, 2001). The local percentage in this one particular school district may be different as a result of the late cut-off date making the normative data different from the national sample studied in the ECLS-K. More boys below five years old may be held out of school leading to a higher proportion of older kindergarten students than the average of four percent reported from the ECLS-K data (Zill & West, 2001). How age relates to achievement may also be related to the practices within the
classrooms in this particular school district. That being said, generalizations about kindergarten entrance age and later academic achievement need to be derived locally, at the school district level. Results of the current analysis will lead to conclusions about children’s academic functioning within this specific setting. The findings will generalize to other school districts with similar demographic characteristics.

The current quantitative research study will address the issue of how age at kindergarten entrance relates to later achievement in language arts and literacy from kindergarten entrance through eighth grade. Archival data from one largely middle-class school district in central New Jersey will be analyzed to determine local results. Research suggests that disadvantages for being younger may occur in early years, but disappear through school. One would assume that this trend might be similar in this sample of young children; however, this early disadvantage is eliminated might differ from one school district to another. Older entrants to kindergarten may fall into two different groups: older students held out or retained because of developmental delays that disappear or those with learning difficulties that are detected later because of the extra year at home or in a community-based preschool program. The delayed group might benefit from the “gift of time” (Graue & DiPerna, 2000) but, those with learning difficulties would be harmed by waiting an extra year for school to begin (Marshall, 2003). Measures used to assess early literacy and language arts skills such as portfolio or curriculum-based assessments may produce different results than standardized state mandated tests. In addition, there may be gender, racial, or cultural factors, such as speaking a language other than English in the home, that negatively impact academic functioning throughout elementary school. The ecological perspective (Rimm-Kaufman & Pianta, 2000) suggests that factors specific to the local setting are critical for understanding the functioning of the kindergarten student. Districts have their
own dynamics in terms of demographic characteristics, teacher training, academic and behavioral expectations, and transition practices that create a unique environment. In New Jersey with 611 distinct local school districts, the environmental factors may be even more pronounced than in states where schools are managed at the county or state level.

Research Questions

The first group of research questions is designed to determine if there are differences in language arts and literacy skills related to starting kindergarten before turning five years old. Are there any differences between students at the youngest age group when entering kindergarten as compared to their on-time or old-for-grade classmates? If there is a difference at kindergarten entrance, do these children catch-up as indicated by the literature? If the youngest group of students eventually match their peers’ achievement, does this occur in elementary grades or at middle school grades?

The second group of questions is designed to determine if age at kindergarten entrance is related to the likelihood of placement in special education. Are the youngest students more likely than their on-time peers to require special services in school? Conversely, are the oldest students who comprise the class because of retention or redshirting (being held out of kindergarten for a year) more likely to need special services than on-time peers?

The third group of questions is designed to determine whether predictions about language and literacy skills from the district-designed literacy portfolio assessment correlate to later performance on state-mandated standardized assessments. Are there any differences related to age of kindergarten entrance and portfolio scores at the end of kindergarten, of first or second
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grade? Do the end-of-second grade scores correlate to the state assessments given in grades four and eight?

Finally, the fourth group of questions relates to age at kindergarten entrance and demographic characteristics. Is gender related to differences in language arts and literacy scores for the various age groups? Do students from low socioeconomic status have lower language arts and literacy achievement in this district? Is there any difference in achievement related to race or ethnic background?
Developmental Appropriateness

The National Association for the Education of Young Children (NAEYC) views kindergarten and early elementary school as requiring different types of educational practices than the upper grades of later elementary school (National Association for the Education of Young Children, 1997). Children from birth to age eight are included in NAEYC policy statements encompassing preschool through second grade. According to this position paper, curriculum should address all areas of development, be relevant, engaging and meaningful, build on prior knowledge, cross subjects, be active, culturally relevant, and be attainable to all children. Teachers are warned that curriculum needs to be age and grade specific,

When next-grade expectations or mastery of basic skills are routinely pushed down to the previous grade and whole group and teacher-led instruction is the dominant teaching strategy, children who cannot sit still and attend to teacher lectures or who are bored and unchallenged or frustrated by doing workbook pages for long periods of time are mislabeled as immature, disruptive, or unready for school.

(NAEYC, 1997, p. 13)

The implication of this statement is that children can be either ready or unready to enter kindergarten depending on the demands of the school setting. There is continuing controversy about the readiness of children to enter kindergarten.
The prevailing view is that by a certain age most children will be ready to begin school (Gredler, 1992). According to Meisels (1999), a consensus definition of readiness does not exist because each teacher’s beliefs are shaped by personal philosophy of early childhood development. These philosophies can be divided into four different groups; maturationist, environmentalist, social constructionists, and interactionists. The maturationist group believes that children develop on an individual timetable with the teacher’s role being to nurture the unfolding of the child’s internal clock (Ilg & Ames, 1972). If children are not ready, delaying school entry or retaining students would be considered a good option for children lagging behind their peers. Many teachers hold this view that children will not benefit from kindergarten until they are mature enough to learn (Smith & Shepard, 1988; Carlton & Winsler, 1999). Dire consequences are predicted for those who start school before they are ready including lower school achievement, more learning disabilities, poor emotional adjustment, and weaker leadership skills (Uphoff & Gilmore, 1986). The environmentalist group views readiness as a specific set of skills that the child should demonstrate in pre-academics and behavior before beginning kindergarten. The child is, or is not, ready for school depending on developmental presentation (Kagan, 1990). In the environmentalist view and the maturationist view, if the child does not have the requisite skills, recommendations are made for delayed entry or placement in an alternative program for the slower developing student. The social constructionist group views readiness as a complex interaction between community values and expectations as well as the child’s developmental status (Graue & DiPerna, 2000). Each community must develop its own concept of readiness within general principles outlined by national standards. When the child does not match the local standards, programs would change to facilitate development. The
interactionist group and the social constructivists, believes that the attributes of the child alone
do not define readiness for school. In addition to child variables, the school milieu is important,
leading to a conceptualization of readiness as a “bidirectional concept” (Meisels, 1999, p. 49).
This means that readiness is produced through the interaction of the child and environmental and
cultural experiences of the school. The child and learning environment should be matched and
the child’s skills are measured, compared with their starting point. Rather than a sole focus on
the child’s readiness for school, this view also focuses on the readiness of the school for the child
(Maxwell & Clifford, 2004). Regardless of the philosophical belief system, the question of how
to assess readiness is a problematic issue.

*Screening for Kindergarten Readiness*

Just as the concept of readiness varies with the developmental perspective of the teacher
or school, so does the method of assessing whether a child should begin school. The
maturationist view led to the development of tests such as the Gesell School Readiness Test
(GSRT) as a measure of whether children begin kindergarten, delay entry, or attend a
developmental program. Some studies have shown that the GSRT predicts future academic
performance (Weller, Schnittjer, & Tuten, 1992; Israel, 1990). The use of readiness assessments
to inform school entrance decisions is not shared widely because of methodological problems in
studies used to support them. Not only does the GSRT itself lack validity and reliability, but
whether delayed children eventually catch up is unknown (Porwancher, 1991). The
environmentalist group would use tests of early achievement to assess whether a child possesses
the requisite skills to begin kindergarten. Among the tests traditionally used to assess these skills
are the Iowa Test of Basic Achievement, the Comprehensive Test of Basic Skills, the California
Achievement Test, the Metropolitan Achievement Tests, and the Stanford Early Skills
Achievement Test (Meisels, 1999). According to Meisels (1999), these tests lack validity to predict later academic success in school.

The social constructivists view readiness as highly specific to the local environment. Assessment as a result of this view must be based on the aggregate of all children within the community who are entering kindergarten. Presumably, curricula would then be selected based on the needs of the incoming class of students regardless of their age or developmental status (Berk & Winsler, 1995). The interactionist perspective and the social constructivist view, examines more than the child characteristics to determine readiness for school. Readiness is a consequence of the interaction between the child and educational curricula that shape learning opportunities for young children. Assessment of readiness becomes a process after children are placed in kindergarten rather than viewed as a specific skill set that is required to enter school. Methods including portfolio assessment or curriculum-based measurement help shape the interactions between the teacher and student regardless of where on the developmental continuum the student begins the school year (VanDerHeyden, Witt, Naquin, & Noell, 2001; Carlton & Winsler, 1999). This more naturalistic type of assessment leads to improvement of learning for the specific child by informing instructional design (Maxwell & Clifford, 2004). The interactionist model seems to be gaining favor because it focuses not only on what the child brings to school, but also what the school and community provide for the child in the kindergarten setting (Hojnoski & Missal, 2006). When there is a discrepancy between child characteristics and the program demands, modifications, accommodations, and use of “high-quality, individualized, and developmentally appropriate instruction” (Maxwell & Clifford, 2004, p. 8) seeks to close the gap.
Determination of Kindergarten Entrance

The U. S. Department of Education is conducting a longitudinal study on kindergarten students called Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K). The data derived from this work provides the most comprehensive information available about the demographic characteristics and functioning of this sample of children. According to the nationally representative data derived from the ECLS-K, 69% of public schools and 47% of private schools administer placement of entrance tests to incoming students (Prakash, West, & Denton, 2003). Age for entrance into school has been rising (Kauerz, 2005; Stipek, 2006) due to the academic demands of kindergarten increase as a result of the passage of the No Child Left Behind Act (NCLB) of 2001 (U. S. Department of Education, 2003). Schools are being held to standards of accountability tied to performance goals set for students at earlier and earlier grade levels. Although formal testing is not mandated by NCLB until grade three, teachers in kindergarten through second grade are looking for educational benchmarks in early literacy and mathematics skills in kindergarten and preschool. In New Jersey, for example, the State Department of Education makes available on its website an assessment system for preschool and kindergarten early learning benchmarks (New Jersey State Department of Education). This standards movement may be placing more demands on the readiness of young children to produce skills at younger ages than was common in the past. If policymakers, rather than educators and researchers in early childhood, write state standards they may not be aligned with current knowledge about how children develop and learn (Scott-Little & Kagan, 2006).

According to information from the National Center for Educational Statistics (Department of Education, 2001), 98% of American children attend kindergarten programs beginning at age five. Each state establishes the kindergarten entrance age and age varies widely.
from state to state and district to district. Depending on the cut-off date for entrance, children range within a one year span from just below five to six years old. The question of the appropriate age for children to begin school has not been answered to date. Regardless of the cut-off date used to determine kindergarten admission, there will always be a group of relatively younger and older students in the cohort for any school year (Morrison, Smith, & Dow-Ehrensberger, 1995). According to the results of the NCLS-K, the typical student is five and one half years old upon entrance to kindergarten in the 1998 cohort (Zill & West, 2001).

Children Who Are Old at Entrance

Regardless of their eligibility for kindergarten programs according to state law, some children are recommended to delay entry (Graue & Di Perna, 2000; Smith & Shepard, 1998; Morrison, Griffith, & Alberts, 1997; Brent, May & Kundert, 1996; May, Kundert, & Brent, 1995; Uphoff & Gilmore, 1986). More boys than girls are held out for an extra year (Graue & DiPerna, 2000; Brent et al., 1996; May et al., 1995). In addition, children born closer to the district cut-off date and who would be the youngest in the grade are more likely to wait a year before entering kindergarten (Brent et al., 1996).

Data from the Early Childhood Longitudinal Study (Zill & West, 2001) indicates that four percent of children are six years old or older when beginning kindergarten. Children have traditionally been recommended for delayed school entry because of the maturationist view that additional time would resolve immaturity issues (Kagan, 1990; Uphoff & Gilmore, 1986). Many parents may share the view that immature children should wait a year before beginning kindergarten (Hill, 2001; Marshall, 2003). This view is being questioned (Barbarin et al., 2006;
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Hojnoski & Missall, 2006; Lincove & Painter, 2006), teachers’ beliefs (Smith & Shepard, 1988; Zill, 1999) and some current research appears to support the practice.

The results of one group of studies indicate that older kindergarten students perform at a higher level academically than their younger on-time peers (Fantuzzo et al., 2007; Datar, 2006; Malone, West, Flanagan, & Park, 2006; McCoach, O’Connell, Reis, & Levitt, 2006; Zill & West, 2001; Israel, 1990; Switzer, 1974). The older kindergarten students from the 1998 cohort of the ECLS-K appear to have an advantage in terms of non-cognitive factors related to school success such as self-regulation. They also show better academic skills in reading and mathematics (Zill & West, 2001). A more recent study using this same data set shows that older kindergarten entrants gained more reading skills over the summer break than their younger counterparts (McCoach et al., 2006). Older children who delay school entry based on the results of the Gesell School Readiness Test have shown better academic skills in the early elementary grades (Israel, 1990). A sample of children in Illinois who waited a year based on kindergarten screening results were compared to those who had the same screening result, but started school when age eligible. Those who delayed entry showed higher academic achievement on standardized tests in first through fourth grade. In another study (Switzer, 1974), children who entered school early (57-60 months) were compared to their older classmates on academic achievement measured with the Iowa Test of Basic Skills in third to sixth grade. The older children outperformed the younger group with boys showing the most dramatic effects of age. In an urban Head Start sample of preschool students, older students and girls demonstrated better behavioral control and more academic engagement making them more ready for kindergarten requirements (Fantuzzo et al., 2007). One recent analysis of the ECLS-K data showed mixed academic performance as a result of delayed entry (Malone et al., 2006). At the end of first
grade, the children who started school older than their classmates showed better reading skills, but weaker mathematics performance. In addition, the delayed entrants at the end of kindergarten demonstrated skills typical of first grade readers including understanding sound/letter correspondence, reading sight words, and deriving meaning or words from context clues. Another study using the same data set, but a slightly different methodology, reports that the advantage of delaying school entry leads to significant gains in math and reading scores in kindergarten, first, and second grades (Datar, 2006).

Other studies have not found any advantage of delayed entry into school. This has led to the conclusion that delayed entry does not produce demonstrable achievement advantage for most children (Brent et al., 1996; Kundert et al., 1995). No age effect was demonstrated for memory skills or early reading skills measured in kindergarten and first grade (Morrison et al., 1995). Older and younger students perform similarly on a picture recall task. In addition, there are no differences in phonemic awareness or reading scores on the Wide Range Achievement Test in first grade. Although Uphoff and Gilmore (1986) caution parents and educators to hold younger students out of kindergarten because “Children who are developmentally unprepared to cope with school face disadvantages that may become lifelong” (p.11), few studies evaluate the consequences of delayed entry beyond elementary school. One of the studies to examine long-range outcomes found no long-term advantage educationally or economically of delaying school entry (Lincove & Painter, 2006). Using data derived from the National Educational Longitudinal Study of 1988, students who delayed school entry did not differ from age eligible classmates on achievement, drop-out rate, out-of-wedlock pregnancies or college attendance. The only consistent advantage for the older kindergartener is that they were less likely to repeat a grade in school.
Conversely, there may be negative consequences of delaying entry because of developmental problems that have not been detected in early childhood. Statistics from the 1998 cohort of students indicate that the six-year-olds were twice as likely as their younger peers to have coordination problems and more likely than any other group to have speech articulation difficulties (Zill & West, 2001). In addition, these older children were more likely to be in special education in later grades (Malone et al., 2006; Graue & DiPerna, 2000; May et al., 1995). Another study reports that being old-for-grade regardless of whether students delay entry or are retained leads to increased rates of behavior problems during adolescence (Byrd, Weitzman, & Auinger, 1997). Older students held out of kindergarten may be different than older students that are retained in kindergarten although both groups are older students in the cohort year (Graue & DiPerna, 2000). One study reports that the IQ scores of the retained students are lower than those of the delayed entrants of the same age (Kundert et al., 1995).

According to data from the ECLS-K, the retained students, unlike the delayed entrants, did not show any academic gains compared to their age eligible peers. In fact, the retained students showed lower reading and mathematics skills than their on-time peers (Malone et al., 2006). Although some view delayed entry as a passive retention, the children who are retained in kindergarten are clearly different from the delayed entry group on a number of factors. Both groups were more likely to be boys who had not attended preschool, the delayed entry group was largely white and had parents with college educations. These parents choose to keep their children out of kindergarten however the group of parents who receive school recommendations to wait a year for developmental reasons tends to be Hispanic or African–American (Rafoth & Knickelbein, 2008). The practice of delaying school entry in order to give children an advantage compared to their younger classmates has been termed redshirting because of its similarity to the
delaying entrance into varsity sports to allow students to gain a physical advantage. In a review of the redshirting literature, Marshall (2003) concludes that parents usually delay kindergarten entrance because of social immaturity of their children, yet holding them out has not shown to give them any social advantages. The academic advantages are limited at best and at worse children are not receiving instruction for an extra year when they are more likely to have learning problems. Further children, especially boys who are closer to the cut-off date, are more likely to be retained in kindergarten in spite of the evidence that retention does not produce gains in later achievement (Lincove & Painter, 2006).

The children retained in kindergarten are more likely to be from poor backgrounds, have parents with less than a high school education, and to be diagnosed with disabilities later in school (Malone et al., 2006). Long-term effects of retention include an increased likelihood of dropping out of school (Crone & Whitehurst, 1999; Entwisle & Alexander, 1999). One study, using a sample of children from California, demonstrates several other demographic factors associated with retention in kindergarten including low family income, females as the head of the household, being an ethnic minority, and speaking a language at home other than English (Zepeda, 1993). Using a sample of children who attended Head Start preschool programs, one study indicates that the retained students are different from promoted peers regardless of their age (Mantzicopoulos, 2003). Students who are retained in kindergarten show lower academic skills and social adjustment weaknesses relative to their promoted peers. All the students from the Head Start sample are from low income backgrounds, but Mantzicopoulos (2003) failed to support ethnicity, non-English speaking homes, or female head of household as significant demographic indicators for the retained children.
Another variation of retention that causes kindergarten students to be older than their grade peers is the developmental kindergarten or transition class (Gredler, 1992). Children enter one of these programs when enrolling in kindergarten because of immaturity issues. Sometimes at the end of a regular kindergarten experience because they are deemed unready for first grade, they may enter a transitional program that is essentially a repetition of kindergarten (Gredler, 1992; Meisels, 1992). Carlton and Winsler (1999) conclude that the practice does not have any positive effect on achievement.

Various groups of professionals have denounced the idea of delayed school entry for a variety of reasons. The National Association for the Education of Young Children affirmed the conclusions of the National Association of Early Childhood Specialists in State Departments of Education (2001) in recommending that children begin school when they are age-eligible for kindergarten. The National Association of School Psychologists (2003) in a position paper on retention stated,

> While delayed entry and readiness classes may not hurt children in the short run, there is no evidence of a positive effect on either long-term school achievement or adjustment. Furthermore, by adolescence, these early retention practices are predictive of numerous health and emotional risk factors, and associated deleterious outcomes. (¶ 6)

Economically disadvantaged children are the students most likely to suffer from delayed school entry because good quality preschool experiences are less likely to be available for them before they begin kindergarten (Stipek, 2006).
Children Who Are Young at Entrance

When children are too young for school according to the local cut-off date, tests are sometimes used to determine if these children may enter kindergarten. In the ECLS-K data, thirteen percent of schools used testing for this purpose (Prakash et al., 2003). Children may enter school early because they are thought to be gifted and talented and therefore seem ready for the educational challenges of a more academically-oriented program. Gagne’ and Gagnier (2004) examined the social and emotional impacts for these early entrants into school in Canada. Teachers feared that younger children who were gifted would not benefit from academic acceleration due to negative social or emotional consequences. The researchers gathered teacher ratings on a Likert-type 5-point scale on three adjustment dimensions and one achievement dimension. The adjustment dimensions include conduct (frustration tolerance, behavior and obedience), social integration (sociable, curious, calm), and maturity toward school task (attention, concentration, persistence). There were no social or emotional differences between the accelerated and regularly admitted students. When reviewing the data for the on-time school entrants, the youngest group of regularly admitted students had more social and emotional difficulties than the three older groups.

The younger group of kindergarteners in the United States comprises about nine percent of students in the ECLS-K (Prakash et al., 2003). Later cut-off dates are the usual reason for children to enter kindergarten before turning five years old. These younger students lag behind the older students academically and self-regulation skills (Zill & West, 2001). The self-regulation skills include child characteristics that are similar to the dimensions studied by Gagne’ and Gagnier (2004) in Canada. The characteristics include interest in learning, attention,
persistence, and work completion. Kindergarten places new demands on children to follow a formal routine dictated by an adult, the teacher, unlike previous childcare settings.

The new demands include being compared to their classmates on their understanding of concepts for early literacy and understanding of numbers. Comparing the achievement of younger and older first grade students using a pre-test, post-test design, the amount of academic gains over the course of the school year is similar for both groups (Morrison et al., 1997). The younger group, however, is slightly below their older grade peers on overall achievement both in mathematics and reading. Younger students at the end of first grade were reading at a 2.0 grade level on the Wide Range Achievement Test (WRAT) while the older students were reading at a 2.3 grade level. The younger students were at the 2.1 grade level in mathematics while the older students were at the 2.4 grade level on the WRAT. The authors concluded that there are no significant differences between the groups related to age. This conclusion may not be valid considering the ability grouping within the typical second grade classroom. The younger children might be placed in a lower group within their classroom based on a three month difference. Young kindergarten students from a large, urban, low income sample showed lower academic and behavioral competencies than their older classmates with the same background factors (Fantuzzo et al., 2005). Both mathematics and reading performance in kindergarten was weaker for the younger students.

Other studies have failed to find this connection between age and academic functioning in kindergarten and first grade (Lincove & Painter, 2006; Morrison, et al., 1995; Morrison et al., 1997; Flynn, Rahbar, & Bernstein, 1996). As indicated earlier, age at entrance to kindergarten does not show any long-term consequences (Lincove & Painter, 2006). Younger students show no differences in early performance on memory task using pictures or early reading tasks.
(Morrison et al., 1995) and they gained skills at the same rate as their older peers (Morrison et al., 1997). Reading disabilities are not linked to age at school entrance according to one study (Flynn et al., 1996).

Some studies have found the academic advantages in kindergarten for older students disappear as students move into higher grades in elementary school (Yesil-Dagli, 2007; Kurdek & Sinclair, 2001; Crone & Whitehurst, 1999). Although older kindergarten students showed better emergent literacy skills, this did not translate into higher reading skills in first or second grade (Crone & Whitehurst, 1999). One recent dissertation conducted in 2007 used the ECLS-K data to evaluate the effect of age at school entrance to academic functioning (Yesil-Dagli, 2007). The early entrants, younger, medial, older on-time, and delayed entry kindergarten students were compared on academic performance in kindergarten, first and third grade. Delayed entrants, the oldest kindergarten students, showed academic advantages in kindergarten and first grade, but these disappeared by third grade. Kurdek and Sinclair (2001) report that younger students showed lower achievement in kindergarten, but that disadvantage disappeared by fourth grade. Examining census data from Texas and California, Dobkin and Ferreira (2009), found advantages for adults who entered school at younger ages. One long-term advantage was completion of high school at higher rates than older peers. There were no differences in employment, wages, or home ownership for the students who entered school in the youngest group.

Demographic Characteristics of the Sample

Early academic achievement, particularly reading, has been shown to be related to student characteristics. Among these significant characteristics are the socioeconomic status of
the family, their race and ethnicity and the child’s gender. Female students have been shown to be better readers in elementary school (Kleinfeld, 2009; Morgan, Farkas, & Hibel, 2008; Chatterji, 2006; Chiu & McBride-Chang, 2006; Yesil-Dagli, 2006; Sax, 2001). Those students of higher socioeconomic status have been shown to have higher language arts and literacy skills than students from low socioeconomic groups (Morgan, et al., 2008; Chatterji, 2006; Yesil-Dagli, 2006; Sirin, 2005; Vanleer & Sindannius, 2001). Young Asian students have been shown to enter school with better reading skills than other ethnic groups and be higher achievers in language arts and literacy throughout school (Morgan et al., 2008; Aldous, 2006; Koo, 1998). Hispanic and Black students show weaker language arts and literacy achievement than their White classmates of Non-Hispanic origin (Reardon & Galindo, 2009; Morgan et al., 2008; Chatterji, 2006; Yesil-Dagli, 2006).

Summary of Literature

Readiness for kindergarten needs to be put into a context that combines the child’s characteristics with that of the educational setting following a more interactionist philosophy (Rimm-Kaufman & Pianta, 2000; Carlton & Winsler, 1999; Meisels, 1999). Rather than assessing the readiness of the child, this perspective includes the readiness of the school to provide differentiated instruction based on the learning and behavioral characteristics of each individual student (Maxwell & Clifford, 2004).

Delaying kindergarten entry may lead to early achievement gains for these older students (Fantuzzo et al., 2007; Datar, 2006; Malone et al., 2006; McCoach et. al., 2006; Zill & West, 2001; Israel, 1990; Switzer, 1974). This advantage may last past kindergarten and into higher grades of elementary school (Yesil-Dagli, 2007; Kurdek & Sinclair, 2001; Crone & Whitehurst,
There are few studies that examine the effects of age at school entrance to kindergarten on long-term functioning. The delayed entry kindergarteners are more likely than on-time entrants to have developmental problems, social emotional difficulties, and later learning disabilities (Malone et al., 2006; Graue & DiPerna, 2000; May et al., 1995). These divergent conclusions about educational functioning may indicate that there are two different types of delayed entrants. One group of delayed entrants may have maturational lags that improve as a result of waiting a year to enter kindergarten while the other group may be demonstrating special educational needs that are interpreted by parents or school personnel as maturational delays. “These problems are not maturation related and later are diagnosed as special needs” (Graue & DiPerna, 2000, p. 527). Children who are older in kindergarten because of retention appear to be different from those who delay entry because they are more likely to have learning and/or social emotional problems and an increased risk of dropping out of school (Crone & Whitehurst, 1999; Entwisle & Alexander, 1999; Marshall, 2003; Bryd et al., 2003).

Students entering school before turning five years old were more likely to demonstrate weaknesses in non-academic skills including curiosity, attention, frustration tolerance/persistence, and work completion (Gagne’ & Garnier, 2004; Prakash et al., 2003; Zill & West, 2001). This leads to more issues with behavior management and social skills in kindergarten for these younger students. Behavioral characteristics interfere with their ability to learn as rapidly as their classmates. There may be a tendency for students with attention deficit disorder and/or weak self-regulatory skills typical of some members of the younger kindergarten group leading to referrals for special education evaluation (Wallingford & Prout, 2000). In addition, some studies have found that students beginning school before the age of five years may have disadvantages compared with their older classmates in language arts and literacy.
development (Kurdek & Sinclair, 2001; Fantuzzo, et al., 2005; Yesil & Dangli, 2007). There may also be a tendency for younger students to be classified as learning disabled because of reading difficulties (Elder & Lubotsky, 2009; Weiss, 2008; Malone, et al., 2006). Differentiated instruction, the ready environment, may eliminate some of these deficits by the end of elementary school or middle school when younger students have been found to close the gap between their achievement in reading and writing and the achievement of their classmates (Carlton & Winsler, 1999; Meisels, 1999; Rimm-Kaufman & Pianta, 2000; Maxwell & Clifford, 2004).

The information available concerning the effect of age at entrance to kindergarten for later academic functioning is inconclusive at best. It is difficult to make generalizations because of the differences in the characteristics of the children sampled, the definition of age categories, and the measures of achievement used to assess the academic functioning of the students. It appears that older students have an advantage early, but by third or fourth grade the difference between older and younger students is negligible (Yesil-Dagli, 2007; Kurdek & Sinclair, 2001; Crone & Whitehurst, 1999).

Flynn and Rahbar (1993) have questioned the educational relevance of differences in achievement found in studies linking age and academic functioning. They conclude that “The average differences of four percentile points in the middle of the distribution do not support the common recommendation that boys delay kindergarten entrance…” (Flynn & Rahbar, 1993, p. 306). In a review of early literature on school entrance age and achievement, Gredler (1992) argues that statistically significant results are often not socially significant. A number of methodological and conceptual problems can be found in the literature as a whole. Yesil-Dagli (2006) found difference in the age categories from one study to another led to the same age
student labeled as young in or study and on-time in another. These differences are related to the differences in kindergarten entrance dates. In addition, differences in achievement are measured with different types of instruments that may or may not be comparable.

Directions for Research

Regardless of how kindergarten readiness is defined, schools throughout the United States establish a kindergarten entrance date. Students will generally fall within a one year span from that date unless they delay entry to kindergarten by choice or are retained in kindergarten. Does the age of children entering kindergarten have an effect, either positive or negative on their literacy and language arts achievement? It is hypothesized that students at the ends of the age continuum will demonstrate the most dramatic age effects.

The literature suggests that old for grade and younger kindergarten students have more learning difficulties. If these students have more difficulty learning to read and write, do these learning issues lead to more students at the age extremes being classified as eligible for special education?

One of the issues in comparing different studies is the difficulty of comparing different measures of achievement. When several different types of measures are used to assess literacy and language arts achievement, are they related in any way to one another?

This review of the literature leads to the conclusion that demographic factors have significant relationships to academic success. How are age and demographic factors including gender, race and ethnicity, and socioeconomic status related to literacy and language arts achievement?
Chapter 2

Method

Rationale

The appropriate age to begin formal education has been debated since the inception of the kindergarten in American education (Allen, 1988). Current thinking on the matter defines school readiness as an interaction between child factors including age of school entry and environmental factors including the demands of the program and the flexibility of the instruction provided by kindergarten teachers (Maxwell & Clifford, 2004). Factors specific to the local environment are critical in examining academic functioning in kindergarten because of demographic characteristics, teacher training, academic and behavior expectations, and transition practices from preschool programs to kindergarten.

Participants

The participants in this study were 340 students in one largely middle-class suburban New Jersey school district who entered kindergarten in the school year beginning in September 1998 and ending in June of 1999. According to census statistics, the community was affluent with only 2.1% of families and 3.1% of individuals living below the poverty level. The suburb was mostly white (70.5%), followed by Asian (18%), Black (7.9%), Latino (5.1%), other (1.4%), and two or more races (2.0%) (U. S. Census Bureau, 2000). The sample was similar to the larger community because 3.8% were considered low income as measured by eligibility for free or reduced school lunches. The students were mostly white (72.9%), followed by Asian (15.0%),
and lastly, Non-White 12.1%. The Non-White group was comprised of Hispanic, Black and students labeled Mixed race. The participants were nearly equally divided by gender, with 49.7% female and 50.3% male. Students receiving special education services comprised 9.7% of the sample. No students received English as a second language services.

Students from the kindergarten class of 1998 were included in the study if they had scores for all of the data points; kindergarten, first, second, fourth and eighth grade. This requirement reduced the number of participants from the 444 who entered kindergarten by January of 1999 to 340 participants. The demographic characteristics of the 444 students who enrolled in 1998 were not specified however, it is likely that this population was similar to the sample group of enrolled kindergarten students.

*Independent Measure: Age*

Age when children entered kindergarten was the independent measure in this study. Because of the characteristics of the population all the proposed age categories could not be used for statistical analysis. To determine whether age of entrance into kindergarten was related to language arts and literacy achievement the original design of the study called for four age groups. Of these four age groups, the literature review led to the hypothesis that the age of entry into kindergarten might have a significant effect on the oldest and youngest students. Because there were only two students from the entire 444 students enrolled in kindergarten in the 1998-1999 school year who were old-for-grade, defined as 72 months and older, this group was eliminated from the study. An additional 102 students did not have data for all five assessments and were eliminated from the data analysis. Thus, the final sample was comprised of 340 of the 444 registered kindergarten students.
All of the questions posed in study were intended to compare the youngest students to the rest of the students who were designated as on-time students because they entered kindergarten within the typical age range for the United States (Zill and West, 2001). The young group of students entered school before turning five years old and were between 56 and 59 months old; the middle students who were between 60 and 67 months and the old group of students who were from 68 to 71 months were combined into one group of on-time students. Of the 340 participants who entered the kindergarten class of 1998, there were 93 young students (56-59 months at entry) and 247 on-time students (60-72 months at entry). As noted two students who were considered old-for-grade were eliminated from the data analysis.

**Dependent Measures**

Over these first nine years of school, this school district used several different kinds of measures that assess language arts and literacy competence. In kindergarten, first grade, and second grade students were assessed twice a year on a variety of tasks assembled by the school district into a language arts and literacy portfolio that yielded a numerical rating from one to six. Beginning in third grade the school district used state-mandated standardized tests to assess student language arts and literacy proficiency. At fourth grade and eighth grade, these assessments yielded scores from 100 to 300. Proficient functioning on these tests was set at a score of 200 or better. Table 1 presents a summary of the assessments available for the 1998-1999 kindergarten co-hort.

The school district routinely collected data on all of its students in order to complete reports that are required by various governmental agencies. The student’s name, grade, and date of birth were part of the data set. In addition, demographic characteristics for each student were
collected by the school district. These included gender, ethnicity, race, lower socioeconomic status or not, and whether the student was an English language learner or a special education student. Once the data were obtained, names were eliminated prior to data analysis in order to protect the identity of the participants.

*The literacy portfolio.*

Information within the portfolio includes student performance measures that are recorded by their teacher and written answers about reading practices in the home from parents. Students are assessed for concepts about print, phonemic awareness, letter knowledge, word analysis, spelling ability, ability to read high frequency sight words, oral reading, story re-telling, writing samples, as well as reading comprehension. The specific content of the portfolio has changed over the years since its development in 1989 to reflect current knowledge about language arts and literacy development in the early grades. For an outline of similar skills, the School-Home Links Reading Kit (See Appendixes A & B) is available from the U. S. Department of Education (1999).

Benchmarks are established by the school district and range from zero to 6.0 (see Appendix C). Proficient functioning at the end of kindergarten is 2.0, at the end of first grade 4.0 and at the end of second grade 6.0. A scoring rubric is used by the teachers to determine the student’s score on the pre-selected materials chosen by district personnel. Reading materials are leveled using the Fountas & Pinnell system (Pinnell, 1990). In order for a student to earn a proficiency score of 2.0, evidence of emergent literacy is demonstrated by understanding basic concepts about print and picture reading to tell a story. Writing samples contain written evidence of a story using letters. A proficiency score of 4.0, the beginning reader, is shown when the
student reads high frequency sight words and three books from level 3 selections. In addition, the student shows spelling is emerging, and writing samples show evidence of capitalization and punctuation as well as production of meaningful text. To earn a proficiency score of 6.0, an independent reader, the student must successfully read two level 7 books, summarize a story showing understanding, and produce a writing sample with a story that stays on topic, conveys a logical sequence of events, and adds some details. The written product should have complete sentences and demonstrate correct use of capitals, punctuation, and spelling of high frequency words. The student who receives a 6.0 is an independent reader who uses a variety of strategies when confronted with unfamiliar text and writes using many grammatical conventions. Teacher training is provided to increase the reliability of the ratings and several teachers in each elementary school serve as support staff. The scoring system was developed by the district teachers in conjunction with Educational Testing Service in 1991. Reliability data collected when the instrument was developed however, this data was not available at this time.

New Jersey State Standardized Assessments.

Starting in third grade, students’ achievement data are collected using state-mandated standardized assessments. The fourth grade assessment administered to the 1998 kindergarten class was the New Jersey Assessment of Skills and Knowledge (NJ-ASK, New Jersey Department of Education, 2007). Performance on this assessment indicates how well students are meeting the New Jersey Core Curriculum Content Standards. The language arts and literacy assessments in this test includes two reading sections, working with text and analyzing text. In the written language area, the two sections require writing about pictures and writing about poems. Students read passages then answer multiple choice questions, open-ended questions,
Table 1

Assessments of Literacy and Language Arts Proficiency

<table>
<thead>
<tr>
<th>GRADE</th>
<th>ASSESSMENT</th>
<th>RANGE</th>
<th>BENCHMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>Literacy Portfolio</td>
<td>1 to 6</td>
<td>2</td>
</tr>
<tr>
<td>First</td>
<td>Literacy Portfolio</td>
<td>1 to 6</td>
<td>4</td>
</tr>
<tr>
<td>Second</td>
<td>Literacy Portfolio</td>
<td>1 to 6</td>
<td>6</td>
</tr>
<tr>
<td>Fourth</td>
<td>New Jersey- Assessment of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skills &amp; Knowledge</td>
<td>100 to 300</td>
<td>200</td>
</tr>
<tr>
<td>Eighth</td>
<td>Grade Eight</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proficiency Assessment</td>
<td>100 to 300</td>
<td>200</td>
</tr>
</tbody>
</table>
and complete writing tasks. Each student is then rated as partially proficient (100-199), proficient (200-249) or advanced proficient (250-300) as established by the state standard.

Reliability of the test has been established using Cronbach’s coefficient alpha as a measure of internal consistency with a score of .85 for the total language arts literacy score (New Jersey Department of Education, 2003, p.39). Inter-rater reliability using a rubric for scoring open-ended and writing samples was demonstrated to be excellent. Two raters agreed within one point for 96.8% of the samples (New Jersey Department of Education, 2003, p.44). Both the technical manual and the interpretive manual are available from the New Jersey Department of Education at http://www.njpep.org/assessment/TestSpecs/LangArts/AssessOverview.html#CONTENT

Content validity of the NJ-ASK was established in a variety of ways including matching item content to Core Curriculum Content Standards, submitting materials to an external review committee, and comparing it to other states’ and countries’ standards. Construct validity is established using Pearson product moment correlations which are reported to be within acceptable levels. Criterion validity is established using correlations to other state administered tests.

The eighth grade assessment for the 1998 kindergarten class is the Grade Eight Proficiency Assessment (GEPA, New Jersey Department of Education, 2004). The GEPA is similar to the NJ-ASK in the manner which it uses to assess language arts and literacy skills. Reading passages assess the student’s ability to interpret text and analyze/critique text. Written language assesses the ability to speculate about a picture and persuade a reader on a specific topic. The GEPA has a combination of multiple choice and open-ended questions as well as
writing tasks similar to the NJ-ASK. The scoring is reported in the same categories partially proficient (100-199), proficient (200-249), and advanced proficient (250-300).

Both technical and interpretive manuals are available from the New Jersey Department of Education at http://www.state.nj.us/education/njpep/assessment/TestSpecs/LangArts/TOC.html. Reliability for scoring is reported to be from .88 to .90 (New Jersey Department of Education, 2007). Cronbach’s coefficient alpha, a measure of internal consistency, is reportedly .87 for the total language arts literacy score.

Content validity of the GEPA is established through rigorous comparison of test items to the Core Curriculum Content Standards to other state and national standards. Construct validity is established using factor analysis and other statistical methods. One of the purposes of the GEPA is to predict performance on the High School Proficiency Assessment. GEPA results are correlated with High School Proficiency Assessment results at a reported coefficient of .72 to establish predictive validity (New Jersey Department of Education, 2007).

Hypotheses and Research Questions

The first hypothesis was that students who enter school as kindergarten students before turning five years old have a disadvantage educationally. One way to examine this hypothesis was to perform a chi square goodness of fit to examine whether the proportion of students meeting or exceeding benchmarks was different for young and on-time students at each of the data points kindergarten, first, second, fourth and eighth grade. Data were then examined to determine if and when the young students met their on-time peers’ literacy and language arts achievement. Another way to examine this first hypothesis was to determine if disproportionate numbers of the younger students were placed in special education indicating some learning
differences. Comparison of special education status for the on-time students and the younger students were made using chi square goodness of fit.

The second hypothesis was that the district-designed portfolio assessment would predict literacy and language arts proficiency equally well for young and on-time students. If the district designed portfolio assessment predicts literacy and language arts proficiency with a score of 6.0 at the end of second grade, this score should be correlated with the New Jersey- Assessment of Skills and Knowledge (NJ-ASK) proficiency in fourth grade defined as a score of 200 or above. In addition, the end of second grade score denoting literacy and language arts proficiency will be correlated with eighth grade performance on the Grade Eight Proficiency Assessment (GEPA). Again, a score of 200 or above denotes proficiency on the GEPA.

An additional set of questions addressed whether there was any effect on proficiency for either group of students based on demographic characteristics of gender, ethnicity or income. These demographic characteristics were examined using the chi square goodness of fit to determine whether the younger students make up a disproportionate number of students in any of these groups.
Results

The purpose of the study was to determine whether the age of entrance into kindergarten had an effect, either positive or negative, on literacy and language arts achievement from kindergarten to eighth grade. The 340 participating students who entered kindergarten in 1998 were taken from one mostly white, middle class, suburban school district. There were 248 white students, 51 Asian students and 41 Non-White students. The Non-White group consisted of children from Hispanic homes, black children, and one mixed-race child. Only 13 of the participating students received free or reduced school lunches, the measure of low income status. The participants were equally divided by gender with 169 female and 171 male. Thirty-three of the students were in special education programs of some type.

Age and the Language Arts Literacy Portfolio

In order to determine whether the younger students were at a disadvantage educationally, a chi square goodness of fit test was performed for each of the five measures used in this study. At kindergarten, first grade, and second grade the district designed literacy portfolio was the measure of proficiency in language arts and literacy. As shown in Table 2, age of school entry and language arts and literacy proficiency as measured by the portfolio was not significant at the end of kindergarten, but was significant at the end of first and second grade. Students who met the benchmark at the end of kindergarten with a score of 2.0 or higher were considered proficient. Age was not related to meeting the kindergarten benchmark, \( x^2(1, n = 340) = .425, p > .05 \). The young students were as likely to meet the benchmark as their on-time peers. There was a relationship between meeting the first grade benchmark (4.0) and age, \( x^2(1, n = 340) = \)
The on-time students were more likely to meet the first grade benchmark over their peers who started school before turning five years old. Approximately 93% of the on-time students were proficient, about 84% of their younger peers met the proficiency benchmark. In second grade this same relationship was found between age and proficiency on the language arts and literacy portfolio, \( x^2(1, n = 340) = 5.426, p < .05 \). On-time students (66%) met the end of second grade benchmark of 6.0 more than their younger grade peers (53%).

*Age and State-Mandated Standardized Tests*

As stated previously, the measures of language arts and literacy were measured by state-mandated standardized test results for fourth and eighth grade. As shown in Table 2, there was no significant difference related to age at school entry and achievement in language arts and literacy as measured by the two state-mandated standardized tests. In fourth grade with the New Jersey- Assessment of Skills and Knowledge (NJ-ASK), no significant differences were found in meeting the benchmark for proficiency in language arts and literacy, \( x^2(1, n = 340) = 1.722, p > .05 \). The benchmark was met by 90% of the younger students, 94% of the on-time students met the benchmark. Likewise, in eighth grade using the Grade Eight Proficiency Assessment (GEPA), there was no significant difference in meeting the language arts and literacy benchmark by age of school entry, \( x^2(1, n = 340) = .000, p > .05 \). In both groups of students, young and on-time, 93.5% of students met the benchmark.
Table 2

*Pearson Chi Square for Age and Literacy and Language Arts Proficiency*

<table>
<thead>
<tr>
<th>GRADE</th>
<th>MEASURE</th>
<th>% PROFICIENT</th>
<th>CHI SQ. VALUE</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>Portfolio</td>
<td>0.42</td>
<td>1</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>Portfolio</td>
<td>6.78</td>
<td>1</td>
<td>0.01**</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>93</td>
<td></td>
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<td></td>
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<tr>
<td>Second</td>
<td>Portfolio</td>
<td>5.43</td>
<td>1</td>
<td>0.02*</td>
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<tr>
<td>Young</td>
<td></td>
<td>53</td>
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<td></td>
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<tr>
<td>On-time</td>
<td></td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>NJ-ASK</td>
<td>1.72</td>
<td>1</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eighth</td>
<td>GEPA</td>
<td>0.00</td>
<td>1</td>
<td>0.99</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>94</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01
Age and Special Education Status

Another way to determine if younger students were at a disadvantage educationally was to perform a chi square goodness of fit to compare the proportions of young students who were in special education programs. Students who entered school before the age of five years were more likely to be classified as eligible for special education and related services $\chi^2(1, n = 340) = 6.027, p < .05$, than those who entered school after their fifth birthday. The young students entered special education programs at a higher rate than their on-time peers. Sixteen percent of young school entrants were in special education with only 7% of on-time students requiring these additional services.

Relationship between the Portfolio and Standardized Tests

The second hypothesis was that student performance on the district-designed language arts and literacy portfolio was related to later performance on state-mandated standardized assessments. Performance on the language arts and literacy portfolio was related to performance on the NJ-ASK in fourth grade and the GEPA in eighth grade. Using a Pearson correlation, portfolio scores at the end of second grade were correlated with fourth grade NJ-ASK scores, $r = .49, n = 93, p < .01$ for young students and also for their on-time classmates, $r = .55, n = 247, p < .01$. The relationships were weak with only 24% of the variation in scores for the young entrants and 30% for their on-time peers was accounted for with the commonality between the measures. Similarly, the data revealed that scores on the second grade portfolio were related to scores on the GEPA in eighth grade, $r = .46, n = 93, p < .01$ for young entrants to kindergarten and also for their on-time peers, $r = .43, n = 247, p < .01$. This connection was weak, with only 22% of the variation in scores accounting for the young entrants and 18% for the on-time peers.
Another way to examine this hypothesis was to determine if reaching the language arts and literacy benchmark in second grade was an indication that students would also meet their benchmarks at fourth and eighth grade. As shown in Table 3, these results were mixed with second grade proficiency being related only for the on-time students at fourth grade and for both age groups at eighth grade. The second grade score was not indicative of fourth grade proficiency for young students, $\chi^2(1, n = 93) = 3.710, p > .05$, but it was indicative of meeting the fourth grade benchmark for their on-time classmates, $\chi^2(1, n = 247) = 18.063, p < .01$.

Second grade portfolio performance was significantly related to eighth grade performance on the GEPA for both age groups. Language arts and literacy performance on the portfolio was related to their GEPA score for the younger students, $\chi^2(1, n = 93) = 7.143, p < .01$. The on-time students also demonstrated the relationship between their second grade portfolio score and GEPA proficiency in eighth grade, $\chi^2(1, n = 247) = 9.472, p < .01$.

**Effects of Demographic Characteristics and Age of School Entry on Language Arts and Literacy Proficiency**

The demographic characteristics of interest were defined by factors that are found to impact language arts and literacy achievement in the literature for each age group at kindergarten, first grade, second grade, fourth grade and eighth grade. These include benefits for female over male students (Kleinfeld, 2009; Chatterji, 2006; Chiu & McBride-Chang, 2006), middle class over poorer students (Chatterji, 2006; Sirin, 2005; Vanleer & Sidannius, 2001) and Asian students over other ethnic groups academically (Aldous, 2006; Koo, 1998). Hispanic and Black students show weaker achievement than White students of Non-Hispanic origin (Reardon & Galindo, 2009; Chatterji, 2006).
Table 3

Relationship between Proficiency on the Portfolio and Proficiency on the State-Mandated Tests

<table>
<thead>
<tr>
<th>GRADE</th>
<th>MEASURE</th>
<th>CHI SQ.</th>
<th>df</th>
<th>SIG.</th>
<th>PEARSON’S R</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second to</td>
<td>Portfolio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>NJ-ASK</td>
<td>5.41</td>
<td>1</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>3.71</td>
<td>1</td>
<td>0.054</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>18.06</td>
<td>1</td>
<td>0.00**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second to</td>
<td>Portfolio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eighth</td>
<td>GEPA</td>
<td>4.97</td>
<td>1</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>7.14</td>
<td>1</td>
<td>0.01**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-time</td>
<td></td>
<td>9.47</td>
<td>1</td>
<td>0.00**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** p < .01; *** p < .001
**Gender.** As shown in Table 4, gender was related to language arts and literacy achievement at first grade for on-time students, $\chi^2(1, n = 247) = 6.82, p < .01$, and at fourth grade for the on-time students, $\chi^2(1, n = 247) = 6.83, p < .01$. In both grades there was a significant difference for gender, with more girls proficient than boys. In first grade for the on-time group of students, a higher percentage of girls (approximately 98%) were proficient on the NJ-ASK than boys (approximately 89%). In fourth grade for the on-time group of students, a higher percentage of girls (approximately 98%) were proficient on the NJ-ASK than boys (approximately 91%). This difference was not found by the time students reached eighth grade. In eighth grade, the on-time students showed no difference in reaching proficiency by gender, $\chi^2(1, n = 340) = .023, p > .05$. About 93% of girls were proficient in eighth grade while approximately 94% of boys were proficient.

**Socioeconomic status.** This study defined low socioeconomic status as families who received free or reduced lunch in school. It should be noted that there were only 13 total students in the low income group. As shown in Table 5, at the end of first, second, and in fourth grade, students from the on-time group showed differences in language arts and literacy proficiency by income. At the end of second grade, there was a difference in achievement related to income level, $\chi^2(1, n = 340) = 11.995, p < .01$. Low income students were less likely to reach proficiency in language arts and literacy as measured by the portfolio at the end of second grade. Approximately 18% of the low income group was proficient compared to 69% of the more affluent group. In fourth grade also there was a difference in language arts and literacy achievement related to income for the on-time group, $\chi^2(1, n = 340) = 34.085, p < .001$, but not for the young entrants, $\chi^2(1, n = 340) = 1.673, p > .05.$
Table 4

*Gender, Age and Literacy and Language Arts Proficiency*

<table>
<thead>
<tr>
<th>GRADE</th>
<th>BOYS PROF.</th>
<th>GIRLS PROF.</th>
<th>CHI SQ. VALUE</th>
<th>df</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>98%</td>
<td>96%</td>
<td>0.21</td>
<td>1</td>
<td>0.65</td>
</tr>
<tr>
<td>On-time</td>
<td>98%</td>
<td>98%</td>
<td>0.14</td>
<td>1</td>
<td>0.71</td>
</tr>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>77%</td>
<td>90%</td>
<td>3.00</td>
<td>1</td>
<td>0.08</td>
</tr>
<tr>
<td>On-time</td>
<td>89%</td>
<td>98%</td>
<td>6.82</td>
<td>1</td>
<td>0.009**</td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>47%</td>
<td>58%</td>
<td>1.22</td>
<td>1</td>
<td>0.27</td>
</tr>
<tr>
<td>On-time</td>
<td>61%</td>
<td>72%</td>
<td>3.55</td>
<td>1</td>
<td>0.06</td>
</tr>
<tr>
<td>Fourth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>86%</td>
<td>94%</td>
<td>1.67</td>
<td>1</td>
<td>0.20</td>
</tr>
<tr>
<td>On-time</td>
<td>91%</td>
<td>98%</td>
<td>6.83</td>
<td>1</td>
<td>0.009**</td>
</tr>
<tr>
<td>Eighth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>88%</td>
<td>98%</td>
<td>3.55</td>
<td>1</td>
<td>0.06</td>
</tr>
<tr>
<td>On-time</td>
<td>94%</td>
<td>93%</td>
<td>0.02</td>
<td>1</td>
<td>0.88</td>
</tr>
</tbody>
</table>

**p < .01**
Table 5

*Income, Age and Literacy and Language Arts Proficiency*

<table>
<thead>
<tr>
<th>GRADE</th>
<th>LOW INCOME % PROFICIENT</th>
<th>MID/HIGH INCOME % PROFICIENT</th>
<th>CHI SQ.</th>
<th>DF</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Kindergarten</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>100</td>
<td>98</td>
<td>0.07</td>
<td>1</td>
<td>0.79</td>
</tr>
<tr>
<td>On-time</td>
<td>91</td>
<td>98</td>
<td>2.90</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>100</td>
<td>84</td>
<td>0.39</td>
<td>1</td>
<td>0.53</td>
</tr>
<tr>
<td>On-time</td>
<td>64</td>
<td>95</td>
<td>15.61</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>50</td>
<td>53</td>
<td>0.01</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>On-time</td>
<td>18</td>
<td>67</td>
<td>11.99</td>
<td>1</td>
<td>0.001**</td>
</tr>
<tr>
<td>Fourth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>100</td>
<td>90</td>
<td>0.22</td>
<td>1</td>
<td>0.64</td>
</tr>
<tr>
<td>On-time</td>
<td>55</td>
<td>96</td>
<td>34.09</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>Eighth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>100</td>
<td>93</td>
<td>0.14</td>
<td>1</td>
<td>0.71</td>
</tr>
<tr>
<td>On-time</td>
<td>82</td>
<td>94</td>
<td>2.60</td>
<td>1</td>
<td>0.11</td>
</tr>
</tbody>
</table>

**p < .01; ***p < .001
Approximately 55% of the low income on-time group was proficient while 96% of the more affluent group reached proficient level. As with gender, these differences were not found at eighth grade. In eighth grade, there was no significant difference in achieving language arts and literacy proficiency on the GEPA related to income level for the young group, \( \chi^2(1, n = 340) = .141, p > .05 \), or the on-time group, \( \chi^2(1, n = 340) = .141, p > .05 \). About 91% of the low income group achieved proficiency in language arts and literacy while 94% of the more affluent group was proficient.

*Ethnic origin.* As shown in Table 6, ethnic origin was significant at the end of second grade for the young group, in fourth grade for the on-time group, and in eighth grade for the on-time group. At the end of second grade ethnic background was related to achieving language arts and literacy proficiency for the young students only, \( \chi^2(2, n = 340) = 9.019, p < .05 \). Only 20% of the young, non-White group achieved proficiency compared to about 50% of the White group and 70% of the Asian group were proficient on the portfolio. In fourth grade, the difference between various ethnic groups was significant for the on-time students, \( \chi^2(2, n = 340) = 8.132, p < .05 \). Approximately, 84% of the non-White group achieved proficiency compared to 95% of the White group, and 100% if the Asian group reached proficient levels of language arts and literacy achievement as measured by the NJ-ASK. Likewise in eighth grade there was a significant difference related to ethnic group for the on-time students, \( \chi^2(2, n = 340) = 10.658, p < .01 \). Approximately 81% of the non-White group achieved proficiency on the GEPA with 95% of the White group and 100% of the Asian group reaching established benchmarks for language arts and literacy performance.
Table 6

*Ethnicity, Age and Literacy and Language Arts Proficiency*

<table>
<thead>
<tr>
<th>GRADE</th>
<th>ASIAN</th>
<th>WHITE</th>
<th>NON-WHITE</th>
<th>CHI SQ.</th>
<th>df</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>100</td>
<td>95</td>
<td>100</td>
<td>2.05</td>
<td>2</td>
<td>0.36</td>
</tr>
<tr>
<td>On-time</td>
<td>96</td>
<td>99</td>
<td>94</td>
<td>4.55</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>93</td>
<td>79</td>
<td>90</td>
<td>2.96</td>
<td>2</td>
<td>0.23</td>
</tr>
<tr>
<td>On-time</td>
<td>96</td>
<td>94</td>
<td>84</td>
<td>4.81</td>
<td>2</td>
<td>0.09</td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>71</td>
<td>50</td>
<td>20</td>
<td>7.84</td>
<td>2</td>
<td>0.02*</td>
</tr>
<tr>
<td>On-time</td>
<td>80</td>
<td>67</td>
<td>52</td>
<td>4.85</td>
<td>2</td>
<td>0.09</td>
</tr>
<tr>
<td>Fourth</td>
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<td></td>
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<td></td>
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<tr>
<td>Young</td>
<td>96</td>
<td>88</td>
<td>90</td>
<td>1.61</td>
<td>2</td>
<td>0.45</td>
</tr>
<tr>
<td>On-time</td>
<td>100</td>
<td>95</td>
<td>84</td>
<td>8.13</td>
<td>2</td>
<td>0.02*</td>
</tr>
<tr>
<td>Eighth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>96</td>
<td>93</td>
<td>90</td>
<td>0.59</td>
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<td>0.74</td>
</tr>
<tr>
<td>On-time</td>
<td>100</td>
<td>95</td>
<td>81</td>
<td>10.66</td>
<td>2</td>
<td>0.005**</td>
</tr>
</tbody>
</table>

* * p < .05; ** p < .01
Special education status. As shown in Table 7, the students who were eligible for special education were less likely to achieve language arts and literacy proficiency than their regular education classmates. In kindergarten, $\chi^2(1, n = 247) = 8.08, p < .01$, and fourth grade, $\chi^2(1, n = 247) = 17.75, p < .001$ the on-time students were more likely to be proficient in language arts and literacy if they were in regular education. Ninety-nine percent of kindergarten students who started school on-time were proficient if they were in regular education, but only 89% of their special education classmates were proficient. In fourth grade the on-time students who were in regular education were proficient 96% of the time, but their special education peers met the proficiency benchmark only 72% of the time. As shown in Table 7, for first, second, and eighth grade, regardless of age of school entry, regular education students were more likely to reach the proficiency benchmarks. For young school entrants in first grade, 94% of regular education students met the benchmark compared to only 33% of their special education peers were able to meet that criterion. For on-time first grade students, 96% of regular education students met the benchmark with 61% of the special education students meeting that level of proficiency. At the end of second grade, the students who entered kindergarten before age five, only one (6.7%) of 15 special education students was proficient, $\chi^2(1, n = 340) = 15.196, p < .001$. For the on-time students, approximately 22% (four of eighteen) were proficient, $\chi^2(1, n = 340) = 16.980, p < .001$. In eighth grade educational status and language arts and literacy proficiency on the GEPA were related for both age groups of students. For the on-time group, there was a stronger relationship between educational status and proficient functioning on the GEPA, $\chi^2(1, n = 247) = 33.665, p < .001$. Approximately 96% of regular education students were proficient on the GEPA with only 61% of the special education students meeting proficiency benchmarks. With the young group also demonstrated a significant difference by
Table 7

Special Education Status, Age and Literacy and Language Arts Proficiency

<table>
<thead>
<tr>
<th>GRADE</th>
<th>% SPECIAL</th>
<th>% REGULAR</th>
<th>CHI SQ.</th>
<th>df</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>93</td>
<td>97</td>
<td>0.68</td>
<td>1</td>
<td>0.41</td>
</tr>
<tr>
<td>On-time</td>
<td>89</td>
<td>99</td>
<td>8.08</td>
<td>1</td>
<td>0.004**</td>
</tr>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>33</td>
<td>94</td>
<td>33.77</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>On-time</td>
<td>61</td>
<td>96</td>
<td>31.03</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>7</td>
<td>62</td>
<td>15.20</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>On-time</td>
<td>22</td>
<td>70</td>
<td>16.98</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>Fourth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>80</td>
<td>92</td>
<td>2.18</td>
<td>1</td>
<td>0.14</td>
</tr>
<tr>
<td>On-time</td>
<td>72</td>
<td>96</td>
<td>17.75</td>
<td>1</td>
<td>0.00***</td>
</tr>
<tr>
<td>Eighth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>80</td>
<td>96</td>
<td>5.44</td>
<td>1</td>
<td>0.02*</td>
</tr>
<tr>
<td>On-time</td>
<td>61</td>
<td>96</td>
<td>33.67</td>
<td>1</td>
<td>0.00***</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001
educational status, $\chi^2(1, n = 93) = 5.44$, $p < .05$. Approximately 96% of the regular education students met the proficiency benchmark, but only about 80% of the special education students were proficient.
Discussion

The purpose of the study was to determine whether the age of entrance into kindergarten had an effect, either positive or negative, on literacy and language arts achievement from kindergarten to eighth grade. Because of the characteristics of the study participants, the primary comparisons made are between children who entered school before turning five years old and their on-time classmates who were at least five years old when beginning kindergarten. The Early Childhood Longitudinal Study- Kindergarten (ECLS-K) examined the same kindergarten cohort from the school year 1998-1999 using a nationally representative sample of students (Zill & West, 2001). Only 9% of this group of kindergarten students entered school before turning five years old. In the current study, however, 27% of the students were not yet five years old on September 1, 1998 as they entered kindergarten. Because the school district in this study used a kindergarten entrance date of December 31, 1998, more students began school before turning five years old than the nationally representative sample (Prakash et al., 2003). There are 93 young students of the total 340 study participants who were not yet five when entering kindergarten in this school district.

Results from the ECLS-K indicate that older students have an advantage over younger students in the same class in reading, mathematics, general knowledge, and motor skills (Prakash, et al., 2001). In this study, adequate performance or achievement in reading and writing is defined as reaching proficient levels on the measurements used to assess language arts and literacy at kindergarten, first, second, fourth, and eighth grade. Portfolio assessment was used in kindergarten, first and second grade. State-mandated standardized assessments were
used in fourth grade (NJ-ASK) and eighth grade (GEPA) to measure achievement. As shown in Table 2, age of school entrance was related to literacy and language arts functioning in first and second grade, but not kindergarten, fourth or eighth grade.

*Age and the Language Arts Literacy Portfolio*

Information within the portfolio includes student performance measures that are recorded by the teacher and written answers about reading practices in the home provided by parents. Students are assessed for concepts about print, phonemic awareness, letter knowledge, word analysis, spelling ability, ability to read high frequency sight words, oral reading, story re-telling, writing samples, as well as reading comprehension. A scoring rubric is used by the teachers to determine the student’s score on the pre-selected materials chosen by the district reading specialist. The teachers are well-trained in the implementation of the scoring system with periodic reliability checks by more senior staff members. Appendix C provides a description of the scoring system. The specific contents of the portfolio are not available because of proprietary control of the materials by the school district. For an outline of similar skills, the School-Home Links Reading Kit (See Appendix A & B) is available from the U. S. Department of Education (1999).

As shown in Table 2, age of school entrance was related to achievement in first and second grade, but not kindergarten. There are several possible explanations for these results including measurement factors, curriculum content, or the demographic characteristics of this particular school district. The kindergarten benchmark might be set too low to detect differences in achievement because only eight of 340 students failed to achieve the required score of 2.0 at the end of kindergarten. It is possible that some of the skills set at the first grade level are in fact
learned earlier by students. That means that the ceiling of items at kindergarten does not detect true differences in literacy and language arts functioning during the first year of school when early reading instruction for reading problems may be most effective at reducing learning disabilities. Weiss (2008) analyzed the ECLS-K data as it related to age of school entry, learning behaviors, reading instruction and learning disabilities. She recommends explicit supplemental reading interventions begin in kindergarten in an effort to reduce later reading disabilities. Another possible explanation is that the language arts and literacy curriculum in kindergarten teaches the required elements thoroughly and almost all of the students learn them (Maxwell & Clifford, 2004). In addition, the school district is largely Caucasian and middle class and these demographic characteristics are shown to increase academic functioning (Reardon & Galindo, 2009; Chatterji, 2006; Sirin, 2005; Van Laar & Sidanius, 2001). One recent analysis of the ECLS-K data leads to the conclusion that children from more affluent families enter school with more skills (Elder & Lubotsky, 2009). This may be true for the current study as well the students arrive in kindergarten with a high level of literacy skills.

If the interpretation that the curriculum addresses all the elements in the kindergarten portfolio is valid, then curriculum issues could be a weakness in first and second grades where levels of proficiency decrease for both young and on-time students. A higher percentage of young students are below the grade benchmark than on-time classmates. At the end of first grade, 84% of the young students met or exceeded that benchmark of a 4.0 on the portfolio while 93% of the on-time students scored a 4.0 or above. For second grade students, the benchmark increases to 6.0 with 53% of young students meeting this criterion and 66% of on-time students scoring 6.0 on the portfolio items. Using data from the ECLS-K, Datar (2006) found that students who were younger lagged behind their classmates in initial reading score measured in
kindergarten and in the gain in reading made during first grade. Results suggest that the poor, the disabled, and boys may benefit from being older at kindergarten entrance. In contrast to that study, young students from low socioeconomic background showed the same growth as their older classmates (McCoach, O’Connell, Reis, & Levitt, 2006). It appears that the lack of enriching experiences during the summer recess accounts for differences seen between poor and more affluent students as they move through school.

One of the other interpretations offered might explain the increase in the number of students failing to meet the first and second grade benchmarks. The task of assessing written language is more problematic than assessing reading skills (McMaster & Petursdottir, 2009; Gansle, VanDerHeyden, Noell, Resetar, & Williams, 2006; Jewell & Malecki, 2005). Measurement issues with content and scoring for the writing portion of the portfolio might explain higher percentages of children who failed to meet the benchmarks for first and second grade if curriculum and instruction continue to be appropriate. The literacy and language arts scores are combined in the benchmark and the relative contributions of reading and writing cannot be derived from the number. Content validity of the materials required to assess early writing skills had not been established in 1999-2000 school year when these students were in first grade or 2000-2001 school year when these students were in second grade. Research about how students learn to write has been growing since that time and could be used to inform changes in the content of the portfolio. Although training occurs annually on scoring the portfolio, if the content is not a valid measure of both literacy and language arts, the score is meaningless in assessment of student functioning. Further analysis of these issues by the school district is warranted in order to establish reliable and valid tasks at each grade level. The school district reviews curriculum and instructional practices regularly and might use the portfolio to
inform changes and additions in areas that are not adequately addressed in first and second grade classrooms. There appears to be a significant amount of time and effort into scoring without assessing whether the teachers actually use the information gained from the assessment to inform teaching practices.

Because the school district in this study uses the interactionist perspective of early childhood education, both the characteristics of the child and the type of classroom instruction are taken into account when programming for students. The portfolio is designed to assess the relative proficiency of students as they develop literacy and language arts skills. When students have not met their benchmarks, instructional support is provided outside of the classroom in addition to the classroom reading and writing practices. Portfolio assessment has been shown to be effective for measuring student development of academic skills (Carlton & Winsler, 1999; VanDerHeyden et al., 2001).

**Age and State-Mandated Standardized Tests**

Age may be related to reading and writing achievement in first and second grade, but not in later grades. As shown in Table 2, there was no relationship between age at entrance to kindergarten and language arts and literacy achievement as measured by state-mandated standardized tests at fourth and eighth grade. This result contradicts several interpretations of the ECLS-K data that found younger students show a disadvantage in fifth grade (Fleischman, 2007).

One explanation for the difference in fourth and eighth grade might be that the state-mandated assessments may be measuring different aspects of reading and writing than the portfolio tasks. These tests may measure fluency of these skills because of the time limits
imposed on administration, while the portfolio may be measuring acquisition of literacy and language arts. An alternative explanation is that differentiated instructional practices and appropriate curriculum materials lead to all children, regardless of the age at which they began school, achieving proficiency by fourth grade. Any effects of being younger are mitigated by good teaching provided in third grade and until the tests are administered in the spring of the fourth grade year. The literature supports this explanation that any age effects diminish over time in school (Dobkin & Ferreira, 2009; Yesil-Dagli, 2007; Lincove & Painter, 2006; Kilpatrick, 2002; Kurdek & Sinclair, 2001; Graue & DiPerna, 2000; Crone & Whitehurst, 1999).

Age and Special Education Status

The young students in the current study entered special education programs at a higher rate than their on-time peers. Sixteen percent of young school entrants were in special education while only 7% of on-time students received these additional services. According to some studies, the younger students tend to lag behind their older classmates academically (Dobkin & Ferreira, 2009; Yesil-Dagli, 2007; Fantuzzo et al., 2005; Kurdek & Sinclair, 2001) and behaviorally (Gagne' & Gagnier, 2004; Zill & West, 2001). Several studies reviewed by Weiss (2008), report a link between being the youngest group of students entering school and learning disabilities. Interestingly though, Weiss (2008) in her analysis of the Early Childhood Longitudinal Study-Kindergarten (ECLS-K) cohort did not find a relationship between being young in grade and the diagnosis of learning disabilities. This study did indicate a relationship between being the youngest group of students in the grade and being more socially immature and having weaker academic behaviors such as the ability to work independently. These differences between the younger and on-time students were found using teacher ratings. Teacher perception of their students’ social and learning behaviors has been found to be related to higher rates of
later learning disability diagnosis (Weiss, 2008). Students who were rated by their teachers as having weaker social and learning behaviors in kindergarten had higher rates of learning disability diagnosis in third and fifth grade.

Another recent analysis of the same data (Elder & Lubotsky, 2009) reports that younger school entrants are more likely to be diagnosed as having a learning disability or attention deficit disorder than their older classmates. These different conclusions appear to be related to the statistical procedures used to analyze the data as well as different ways of grouping participants by age. The young students are more likely to demonstrate the learning and social immaturity noted by Weiss (2008) as related to learning disability diagnosis. Being younger may lead to a perception by teachers that these children are not progressing as much as their older classmates when some literature indicates academic and behavioral growth trajectories are similar for younger and on-time students (Morrison et al., 1997; Flynn et al., 1996). A more recent examination of the ECLS-K data indicates that students with reading problems lag behind their peers and the amount of difference grows over time for those most at risk for reading failure (Morgan, Farkas, & Hibel, 2008). The students who were most at risk for reading problems were black, male students from low socioeconomic backgrounds. The school district in the current study appears to be providing additional services to struggling readers in early elementary school. These additional services are helping low performing readers close the gap and met benchmarks similar to their classmates by the time they reach eighth grade.

Relationship between the Portfolio and Standardized Tests

There is a relationship between scores on the district designed portfolio and later achievement as measured by state standardized assessments in fourth and eighth grades. As
reported, student performance on the literacy and language arts portfolio at the end of second grade was correlated with performance on the NJ-ASK in fourth grade and the GEPA in eighth grade. The strength of this relationship was weaker than reports by district personnel. One explanation of this weak correlation could be that the portfolio and the later assessments are measuring different things. The portfolio is measuring the acquisition of reading and writing, the later assessments in fourth and eighth grade appear to be measuring the fluency with which this knowledge is applied to the test items. Time limits ensure that students must possess the skills needed to read and write as well as apply them with efficiency (New Jersey Department of Education, 2005; 2007). Unlike the state assessments, the portfolio has no time limits so the efficiency of skill application is not assessed in kindergarten, first or second grade when students are acquiring reading and writing skills.

Another way to examine the hypothesis that the portfolio and state assessments was related to one another was to determine if reaching the literacy and language arts benchmark in second grade was an indication that students would also meet their benchmarks at fourth and eighth grade. As shown in Table 3, these results were mixed. Second grade proficiency is related only for the on-time students at fourth grade. Both age groups show a relationship at eighth grade. Almost half or 44 of 93 young second grade students did not meet the 6.0 benchmark. By fourth grade, many of these students appear to have improved enough to have met that benchmark with only 9 of 93, or less than 10% of the young students not making the required score of 200 that demonstrates literacy and language arts proficiency. The most likely explanation is that additional educational resources were given to the low performing students in third and the beginning of fourth grade and their skills improved enough to demonstrate fourth grade proficiency.
Effects of Demographic Characteristics and Age of School Entry on Language Arts and Literacy Proficiency

The demographic characteristics of interest were defined by factors that are found to impact language arts and literacy achievement in the literature for each age group at kindergarten, first grade, second grade, fourth grade and eighth grade. These include benefits for female over male students (Kleinfeld, 2009; Morgan, Farkas, & Hibel, 2008; Yesil-Dagli, 2006; Chatterji, 2006; Chiu & McBride-Chang, 2006, Sax, 2001), middle class over poorer students (Morgan et al., 2008; Chatterji, 2006; Yesil-Dagli, 2006; Sirin, 2005; Vanleer & Sidannius, 2001) and Asian students over other ethnic groups academically (Morgan et al., 2008; Aldous, 2006; Koo,1998). Hispanic and Black students show weaker achievement than White students of Non-Hispanic origin (Morgan et al., 2008; Yesil-Dagli, 2006; Reardon & Galindo, 2009; Chatterji, 2006). Demographic factors may in fact have a greater impact on literacy and language arts skills as students get older (Yesil-Dagli, 2006).

Gender. As shown in Table 4, gender was related to language arts and literacy achievement at first grade for on-time students and at fourth grade for the on-time students. In both grades a significant difference for gender was shown, with more girls proficient than boys. This finding is similar to other research findings indicating female students have an advantage over male students in reading and writing in elementary school (Kleinfeld, 2009; Chatterji, 2006; Chiu & McBride-Chang, 2006; Sax, 2001; Switzer, 1973). Younger boys have a disadvantage over girls in the ECLS-K in first grade (Datar, 2006; Chatterji, 2006). This disadvantage for boys was still found using the ECLS-K in fifth grade (Morgan et al., 2008). One study using students from Tennessee found this advantage disappears by eighth grade (Kilpatrick, 2002). The current study did not find any effect for gender at the eighth grade assessment. Long-term
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effects of being young lead to an increased likelihood for boys to be retained and indirectly this may lead to higher drop-out rates (Lincove & Painter, 2006). Because this study did not examine retention, this could not be assessed from the district data.

Socioeconomic status. As shown in Table 5, at the end of first, second, and in fourth grade, students from the on-time group showed differences in language arts and literacy proficiency by income. As demonstrated in the literature, students from middle class families are more likely to demonstrate better academic functioning in school (Chatterji, 2006; Yesil-Dagli, 2006; Sirin, 2005; Vanleer & Sidanius, 2001; Weller et al., 1992). Students from the ECLS-K regardless of age of school entry had a disadvantage in reading if they were from poor backgrounds (Morgan et al., 2008; Datar, 2006, Chatterji, 2006). In eighth grade, there was no significant difference in achieving literacy and language arts proficiency on the GEPA related to income for either age group. It appears that the negative impact of income in this school district is mitigated by appropriate educational practices as children move through middle school.

Ethnic origin. As shown in Table 6, ethnic origin was significant at the end of second grade for the young group, in fourth grade for the on-time group, and in eighth grade for the on-time group. At the end of second grade ethnic background was related to achieving language arts and literacy proficiency for the young students with only 20% of the young, non-White group achieve proficiency, while about 50% of the White group and 70% of the Asian group were proficient on the portfolio. In fourth grade, the difference between various ethnic groups was significant for the on-time students. About 84% of the non-White group, 95% of the White group, and 100% of the Asian group reached proficient levels of literacy and language arts achievement as measured by the NJ-ASK. Likewise in eighth grade there was a significant difference related to ethnic group for the on-time students. About 81% of the non-White group,
95% of the White group, and 100% of the Asian group reach established benchmarks for language arts and literacy performance.

These results are similar to several studies showing Asian students performing better than other ethnic groups academically (Aldous, 2006; Koo, 1998). Hispanic and Black students show weaker achievement than White students of Non-Hispanic origin (Reardon & Galindo, 2009; Chatterji, 2006). The most replicated finding related to ethnic origin is that Black students perform at lower levels than White students regardless of age of school entry (Chatterji, 2006; Luster & McAddo, 1996; Weller, et al., 1992). The current study did not have a sufficient number of Black students to separate their performance from other non-White participants.

Special education status. As shown in Table 7, the students who were eligible for special education were less likely to achieve language arts and literacy proficiency than their regular education classmates except for young students at kindergarten and fourth grade. In kindergarten there were two regular education students who did not score at least 2.0 compared to only one special education student in the young group did not score 2.0 in kindergarten. A high percentage of young students in both regular (97%) and special (93%) education reached the benchmark. Although there was a larger difference in the performance of the fourth grade young group with 92% of regular education and 80% of special education students meeting the 200 points required for proficiency, it did not reach statistical significance. At fourth grade, the same type of relationship as seen in kindergarten was found with six of regular education students not meeting proficiency compared to three of the students receiving special education.

Students who are demonstrating lower achievement in literacy and language arts are more likely to be classified as having a specific learning disability and hence being represented in this
study as special education students. Being young at kindergarten entry has been connected to higher rates of learning disability diagnosis (Elder & Lubotsky, 2009; Maddux, Green & Horner, 1986). For the cohort group in this study, New Jersey permitted special education students to be waived from taking the NJ-ASK in their fourth grade year. This may have produced higher rates of proficiency for the district during this year for both age groups of students. In order to investigate this question, the original data was examined to determine the number of students eliminated from the study because of missing scores for fourth grade. If there were a large number of students eliminated, this may have skewed the results. From the original 444 students, only four special education students were eliminated from the 36 students who were classified at that time. Of the remaining 32 students who took the NJ-ASK in fourth grade, 26 passed with a score of 200 or better showing 81% proficiency rate. This rate of proficiency was similar to the study participants who demonstrate 80% proficiency. It does not appear that the results of the study were negatively impacted by eliminating the four special education students who did not take the NJ-ASK in fourth grade.

Conclusion

Age at kindergarten entrance has measurable effects on literacy and language arts achievement in the early grades but, these differences disappear by eighth grade. This finding agrees with a body of literature that shows achievement differences related to age at school entry fade over time (Yesil-Dagli, 2007; Kurdek & Sinclair, 2001; Crone & Whitehurst, 1999). It appears the educational interventions level the playing field as students move into later elementary school and middle school.
In the few studies that have examined long-term consequences of age of school entry, the findings indicate no dire consequences for young entrants to school. Lincove and Painter (2006) concluded that students who enter school will have one more year in the workforce so that they may earn more money than delayed entrants to school. High school achievement, graduation rates, and college attendance were not different for young and older school entrants (Lincove & Painter, 2006). Dobkin and Ferreira (2009) examining data from California and Texas, found no differences between early school entrants and on-time classmates for wages earned, employment or home ownership. They concluded labor market outcomes were not affected by age at which students entered kindergarten programs.

Whether being labeled as a special education student has any negative consequence is not known from the data analyzed in this study. As noted, young school entrants were more likely to be eligible for special education than their on-time classmates. Ingesson (2007) indicates that in the early grades students who receive special education have lower self-esteem, but this effect diminishes over time. As the student moves through school into adulthood, he or she selects courses and jobs that use strengths and minimizes the impact of weaknesses. Because students with disabilities have higher drop-out rates than regular education students, researchers have examined methods to prevent this and enhance post-high school outcomes for students (Test, Fowler, White, Richter, & Walker, 2009). In a recent review of 11 studies examining post-secondary outcomes of students with disabilities, Test and colleagues have shown that strategies including mentoring, improving academic engagement, and cognitive-behavioral interventions are beneficial for learning disabled students. In addition, vocational education programs including career awareness and exploration, work/study type programs, and involving students in the IEP transition process improve graduation rates and post-secondary employment.
Limitations

Although valuable conclusions may be reached for this particular school district from this research, it may not be useful for many other school settings. The sample in this study is largely white, affluent, and suburban so generalizing the results to other types of communities is of questionable value. The data are collected on only one year of kindergarten entrants, those who began school in 1998. There could be factors about this particular class year that are different from other cohort years. These students are now approaching high school graduation and the characteristics of the community may have changed since these data were collected in 1998-1999.

The results may contribute to the existing literature about the relationship between age of school entrance and achievement, but it cannot be replicated using the same measures of achievement. Because of copyright laws and proprietary control, the specific items used to assess literacy and language arts cannot be reproduced and used in another study. Although the same types of skills could be assessed using similar materials an exact replication could not be conducted in other school districts. The study could be approximated using the descriptions that are provided of the assessment methods.

Because of the research design used in this study, causation cannot be determined by any of the significant results. A statistically significant result could be caused by a related third factor that may not be part of this design. One factor that is posited in the literature is that age of school entry may be an inexact marker for neurobiological factors including attention and independent work habits that are related to achievement (Claessens, Duncan, & Engel, 2009; Elder & Lubotsky, 2009). In addition, this study did not have any information regarding whether...
students attended a preschool program prior to entering kindergarten. Some studies have found that students who attend preschool prior to kindergarten are more likely to have an advantage in early literacy over other students from low income backgrounds (Elder & Lubotsky, 2009; Magnuson, Ruhm, & Waldfogel, 2007; Fantuzzo, et al., 2005).

The demographic characteristics of the district used in this study have changed since this class of students began kindergarten and the results could be very different if current students were used in the same type of analyses. The district has significantly more students of Asian descent and has grown in size with more economic variation since these students entered kindergarten in the 1998-1999 school year.

Future Directions

The results of this study demonstrate that there is a relationship between age at kindergarten entry in the early grades in this district. It would be interesting to examine the causation of this, including if students attended a preschool program. This factor has been found to relate to later academic achievement (Elder & Lubotsky, 2009; Magnuson, Ruhm, & Waldfogel, 2007; Fantuzzo, et al., 2005). Some measurement of home literacy practices could enhance identification of at risk readers. Students from families who read at home have been linked to early advantages in reading at school entrance (Kainz & Vernon-Feagans, 2007; Morgan, Farkas, & Hibel, 2008, Evans, Shaw & Bell, 2000). In addition, a prospective study would help to answer the question of causation.

Curriculum and instructional practices are hypothesized to minimize age effects. An examination of curriculum and diagnostic teaching practices linked to the portfolio content may also be a factor in how students learn the skills that lead to their portfolio score. Many schools
use testing to inform instruction as reported in the kindergarten data of the ELCS-K (Prakash et al., 2003). Although the school district studied uses the portfolio to identify at risk students and provide additional instructional support, this is accomplished in a model where students are pulled out of their regular education classes. If regular education teachers received additional training about teaching reading and writing as well as using the portfolio content to provide diagnostic instruction, the gains for the students may be improved over current levels.

There is some evidence that early mathematics skills are predictive of later achievement and these may be easier to measure than literacy and language arts skills (Duncan, et al., 2007). This would not lead to changes in curriculum and instructional practices for teaching reading and writing, but may help to identify students in need of remedial services earlier in their school career.

In the school district used in this study the age of school entry has been changed so that a smaller proportion of students begin school before turning five years old. It would be interesting to examine whether this earlier cut-off date has led to more students meeting literacy and language arts benchmarks and fewer students being classified as eligible for special education. Although the rationale for this change is related to the standards movement in the United States, relatively young students in the class cohort may still suffer from teacher perceptions that they are less capable than their classmates. Teacher training could be used to allay the fear that the younger children learn skills as well as their grade peers and eventually reach similar levels of achievement.
References


Magnuson, K. A., Ruhm, C., & Waldfogel, J. The persistence of preschool effects: Do

achievement of children who repeated kindergarten or who began school a year late
(Department of Education, National Center for Education Statistics No. NCES 2006-064).

Mantizicopoulos, P. (2003). Flunking kindergarten after head start: An inquiry into the
contribution of contextual and individual variables. *Journal of Educational Psychology, 95*(2), 268-278.

kindergarten entry. *Young Children*, 84-93.


Appendix A

School-Home Links Reading Kit: Reading and Literacy Skills

1. Knows the Parts of Books and Their Functions
2. Begins to Track Print
3. Recognizes and Names Uppercase and Lowercase Letters
4. Understands That Words Consist of a Sequence of Sounds
5. Learns One-to-One Letter/Sound Correspondence
6. Recognizes Some Words by Sight
7. Connects Information and Events in Text to Real Life
8. Listens to/Retells Stories or Parts of Stories
9. Listens Attentively to Books Read
10. Identifies Words that Are Similar or Different
11. Identifies Words that Share the Same Sound
12. Merges Sound Segments into Words
13. Rhymes
14. Uses Sounds and Letters to Spell
15. Writes to Express Own Meaning
16. Builds a Vocabulary of Words
17. Writes Own Name
18. Writes Most Letters and Some Words
19. Knows that Words Join Together to Make Sentences
20. Follows Directions
Appendix B

School-Home Links Reading Kit: Books Links

1. Connects Information and Events in Texts to Life and Life to Text
2. Retells Stories or Parts of Stories
3. Listens Attentively to Books Read
4. Correctly Answers Questions about Stories
5. Makes Predictions about Stories
Primary Reading/Writing Scale: Scoring System

- Early Emergent Skills Proficiency Score = 1
- Advanced Emergent Skills Proficiency Score = 2
- Early Beginning Skills Proficiency Score = 3
- Advanced Beginning Skills Proficiency Score = 4
- Early Independent Skills Proficiency Score = 5
- Advanced Independent Skills Proficiency Score = 6
Appendix D

Definitions

**Literacy:** the set of skills necessary to be able to read; reading

**Language Arts:** written language including spelling and composition; writing

**Age at Kindergarten Entry:** age on September 1 of 1998, the year beginning kindergarten

**Cut-off Date:** the last birth date in the calendar year in which a student begins kindergarten,

12-31-98 in this study

**Proficient:** competency as measured by an established benchmark

**Not Proficient:** failing to meet the benchmark established to demonstrate competency

**Low socioeconomic status:** student receives free or reduced lunch in school

**Young students:** students who entered school before turning five years old,

56-59 months old on 9-01-98

**On-time students:** students who were five years old when beginning kindergarten,

60-72 months old on 9-01-98