

HOW DOES SCHOOL ENTRANCE AGE AFFECT CHILDREN ACADEMICALLY IN
FOURTH GRADE?

by

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A Master's Thesis
Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science in Education
Curriculum and Instruction in Inclusive Education
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December 2012

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CERTIFICATION OF THESIS WORK

We, the undersigned, certify that this thesis entitled HOW DOES SCHOOL ENTRANCE AGE AFFECT CHILDREN ACADEMICALLY IN FOURTH GRADE? by Allison B. Koch, candidate for the Degree of Master of Science in Education, CURRICULUM AND INSTRUCTION IN INCLUSIVE EDUCATION, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this thesis.


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Abstract

A growing number of children are entering kindergarten at or around the age of six rather than the traditional age of five, raising concern about the effect that the age of school entry has on children's academic achievement. A study involving both male and female fourth grade students between the ages of nine and ten years old was conducted in which final math and English language arts grades and local and state level standardized test scores were collected and examined for trends among age-at-entry groups. Older children slightly outperformed younger children in many areas, specifically among females. These findings suggest that later school entry is not a significant concern among this population.

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Introduction

The educational problem I have chosen to investigate is sometimes referred to as the “Kindergarten Entrance Age Effect” (Elder & Lubotsky, 2009, p. 5). This term refers to the effect that the age of school entry has on children’s academic achievement throughout their elementary school career (Elder & Lubotsky, 2009). Over the past 30 years in the United States, a growing number of children have entered kindergarten at or around the age of six rather than the traditional age of five (Elder & Lubotsky, 2009; McEwan & Shapiro, 2008). This is due to the fact that a minimum age for school entry is enforced by requiring that children’s birthdays fall before an enrollment cutoff date, and changes in laws specific to state have resulted in cutoff dates being set earlier in the school year thus increasing kindergarten entrance ages (McEwan & Shapiro, 2008). This is a highly debated issue among educators, policymakers, and parents alike (McEwan & Shapiro, 2008). Some parents feel that their child is not ready for school and voluntarily hold their child out of kindergarten for an additional year (McEwan & Shapiro, 2008; Elder & Lubotsky, 2009). The question remains: at what age should children begin kindergarten?

After reviewing existing literature on this topic, it appears that educators, policymakers, and parents fall into one of two categories: those who are in favor of delayed school entry and those who are opposed to it. Those in favor of delayed school entry feel that older children are more ready for school and will learn quicker than younger children (McEwan & Shapiro, 2008). These individuals believe that enrollment cutoff dates should be set earlier in the school year to prevent students at the age of four, no matter how close to the age of five, from being able to enter kindergarten that year. From this viewpoint, students not yet five years old at the beginning of the school year benefit from waiting until the following fall to enroll in school. This opinion is based on empirical evidence showing that older children score higher on standardized tests and

have a lower risk of grade retention than their younger peers (McEwan & Shapiro, 2008; Elder & Lubotsky, 2009; Furlong & Quirk, 2011).

Those who are opposed to delayed school entry feel that school readiness is not based on age but on pre-kindergarten experiences (Furlong & Quirk, 2011; Elder & Lubotsky, 2009) and delaying school entry simply postpones learning (Elder & Lubotsky, 2009). Research shows that the amount of “human capital” (Elder & Lubotsky, 2009, p.6), or knowledge and skills, children have increases at a higher rate once they begin kindergarten than it would have during the same period of time if they had delayed school entry (Elder & Lubotsky, 2009). Individuals against delayed school entry also posit that holding children out of school longer than necessary results in further disadvantages, specifically: additional childcare costs, fewer years in the workforce, and possible reduced educational attainment (Elder & Lubotsky, 2009). From this viewpoint, enrollment cutoff dates should be set later in the school year to allow children who will be turning five years old within the first few months of school to enter kindergarten that year. If cutoff dates are set earlier in the school year, those children will be forced to wait an additional year causing them to be nearly six years old by the time they begin school. This opinion is based on empirical evidence showing that the possible benefits resulting from delayed school entry, higher standardized test scores and lower risk of grade retention, are only short term (Elder & Lubotsky, 2009; Furlong & Quirk, 2011). This research shows that the achievement gap between older and younger students in the same grade level slowly decreases throughout the early grades and in most cases fades away completely by the end of elementary school (Elder & Lubotsky, 2009; Furlong & Quirk, 2011).

The issue of the “Kindergarten Entrance Age Effect” (Elder & Lubotsky, 2009, p. 5) is important to the field of education because the quality of children’s educations and futures are at

stake. The educational field would benefit from knowing whether or not it is beneficial to hold a child out of school due to an age difference of a few months. If there is no true harm in starting a child's school career as early as possible, it should be done with the child's best interest in mind. The research already conducted in this area is inconclusive in terms of answering the question of when children should begin kindergarten because there is not enough empirical evidence at the current time supporting either argument. More research needs to be done regarding the factors causing early elementary achievement gaps, benefits of delaying kindergarten enrollment versus the costs, and suggestions for improving educational policies and parental decisions (Elder & Lubotsky, 2009). Perhaps in the future a federal mandate could be possible regarding the age of school enrollment rather than leaving it up to individual states or school districts if a stronger research base addressing this problem develops.

This area of inquiry is particularly important to a local elementary school currently debating whether or not to move their kindergarten enrollment cutoff date to the beginning of the school year, September 1st, rather than December 1st as it currently stands. This elementary school has selected this issue as an area of prime interest and is seeking empirical evidence specific to their district on this topic. The evidence gathered through research done on their students' academic records and the recommendations presented based on this research will be considered in the school's impending decision.

The "Kindergarten Entrance Age Effect" (Elder & Lubotsky, 2009, p. 5) is important to me because I would like to contribute to the existing research base of a topic with conflicting views. This area of inquiry is in need of further investigation to produce more conclusive evidence and I would like to help answer this question with my own research. I also take pride in assisting a local elementary school with a concern they have regarding such an important

educational decision that they will soon be making. I have collected and analyzed final grades and standardized test scores from students in grade four at this elementary school, focusing on trends of early and late kindergarten enterers. Through my research, I have been able to make an empirically based recommendation to this district's officials regarding their school's enrollment policy.

I took interest in researching this topic because it would help me gain a better understanding of the early elementary achievement gap and trends that may be present in my future classroom as well as the different factors affecting student success. I also felt that conducting research on this issue would help me make personal decisions as a parent regarding my own future children and allow me to possibly make a difference in my future school's enrollment policy. I have always thought it best for children to wait the extra year to enroll in kindergarten if their birthday falls close to the cutoff date because I felt that being among the youngest students in the class would put them at a disadvantage. Through the research I have reviewed, I am rethinking that notion as a misconception that many people, including myself, have that the older a child is the more ready he or she is for school.

Literature Review

Age of School Entrance Policy

International.

The National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network (2007) states, "exactly when children enroll in kindergarten varies around the world" (p.338). In England, children begin school between the ages of four and five. New Zealand allows children to enter school on their fifth birthday rather than having a specific enrollment cutoff date. Russia, Switzerland, Australia, Japan, and Germany have set their school

entry age at six years old. In Sweden, children begin school at the age of seven (NICHD, 2007). In many developing countries, late school entry is very common. In Mozambique, the average age of school entrance is seven years old (Wils, 2004).

In a study done in 2010, it was found that in Iceland, Japan, Norway, Korea, Poland, and Sweden, nearly all 15-year-olds were in the same grade (Sprietsma, 2010). In Canada, Denmark, Italy, Latvia, and New Zealand, 5-15% of 15-year-olds were in a lower grade than the one their birth date would allow. Of 15-year-olds in Belgium, France, and Portugal, 20-30% were in a too low grade according to school admission cutoff dates (Sprietsma, 2010).

State-by-state.

In the United States, the age of school entry also varies. Enrollment cutoff dates are typically set by each individual state (Education Commission of the States, 2011). Traditionally, children in American schools begin kindergarten at the age of five, “placing the United States in the earlier portion of school-entry ages when compared with other countries” (NICHD, 2007, p.339). Alabama, Alaska, Arizona, Arkansas, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming, 33 out of the 50 states, have set their kindergarten enrollment cutoff date in September or earlier. Of these 33, 18 require children to be five years old by September 1st to enter kindergarten that year (Education Commission of the States, 2011). California, Connecticut, Hawaii, Kentucky, Maine, Michigan, Nebraska, and North Carolina, eight out of the 50 states, have set their kindergarten enrollment cutoff date after September. Four of these eight require children to be five years old in October or November. Only three of these eight states require children to be five years old in

December, and one requires children to be five years old by January (Education Commission of the States, 2011).

New Jersey allows individual school districts to set their own cutoff date for kindergarten entry on October 1st or later (New Jersey Department of Education, 2010). Ohio allows districts to choose either August 1st or September 30th as their enrollment cutoff date. New York allows districts to choose a cutoff date between September 1st and December 1st (New York State Education Department, 2011). Vermont allows districts to choose a cutoff date between August 31st and January 1st. Massachusetts and Pennsylvania allow local education agencies the freedom to decide their own kindergarten entry cutoff dates without state guidelines (Education Commission of the States, 2011). New Hampshire's kindergarten entrance policy is not specified in statute (Education Commission of the States, 2011).

Although children in the United States typically begin kindergarten at the age of five, each state has its own policy governing when children must turn five years old to be able to enroll in school that academic year. These regulations vary greatly, from enrollment cutoff dates in July, before the school year has even started, to cutoff dates in December or early January, almost halfway through the school year.

Historical perspective.

Over the past 35 years, there has been a trend in the United States to establish a kindergarten enrollment cutoff date earlier in the school year (Colasanti, 2011). "In 1975, of 30 states that established a cutoff date, nine required students to have turned five by a certain date in September or earlier (30%). By 1990, 42 states established a cutoff date and of those, 28 required that students must turn five by a certain date in September or earlier (67%). By 2005, 45 states established a cutoff date, and 33 of those required that students must turn five by a certain date in

September or earlier (77%). By 2010, 44 states established a cutoff date, and 37 of those required that students must turn five by a certain date in September or earlier (82%)” (Colasanti, 2011, p.1). According to Kristie Kauerz (2005), this upward trend may be explained by the possible misconception that raising the age of students in kindergarten will increase student’s academic achievement. Another factor that may contribute to the rising popularity of setting kindergarten enrollment cutoff dates earlier in the school year or before the school year even starts is the fact that it results in a temporary decrease in the education budget as the number of children who enroll that year is reduced. However, the children who miss these earlier cutoff dates are missing out on a whole year of learning (Kauerz, 2005).

In the United States, most people are accustomed to kindergarten starting at age five and Grade 1 starting at age six, but children did not always start school at age five in this country (Spodek, 1984). In 1647, a law requiring towns to establish schools for young children was passed by the Massachusetts general court. Puritans wanted all people to be able to read the Bible, and felt that they should start as soon as possible. Because of this, children were being taught to read at the age of three or four (Spodek, 1984).

By 1689, there were 23 reading and writing schools in Massachusetts and six in Virginia (Spring, 2005). Being that there was a more diverse population in New York, a variety of educational institutions were provided. However, in New York City, private institutions dominated until the early 19th century (Spring, 2005). For the rich, private institutions and other opportunities for education were available. For the poor, limited opportunities were available (Spring, 2005).

In the early 1700s, there was a clash between German and English settlers; the English settlers feared that the culture and language of the area would become German (Spring, 2005).

Ben Franklin, an opponent of the spreading of German culture, suggested the establishment of English language schools in an attempt to Anglicize the Germans (Spring, 2005). These schools were charity schools, and the first ones were organized in 1755. Not too long after, the German community attacked these schools for presenting a false picture of German culture and the schools faced failure by 1764 (Spring, 2005). Although the Germans had been Anglicized, they preserved their own schools and separate churches throughout the colonial period. This was one of the first attempts to use education as a means of cultural imperialism (Spring, 2005).

In 1754, Moor's Charity School was developed by Eleazar Wheelock to educate young boys in religion, Latin, Greek, and farming and young girls in household tasks (Spring, 2005). This school aimed to prepare Native American children to live similar to New Englanders. The superior factor of this school was the decision to educate women; the first woman enrolled in 1761 (Spring, 2005). However, this school succeeded for only a short time (Spring 2005).

In 1779, Thomas Jefferson pushed for a more general circulation of knowledge (Fraser, 2001). Schools were built to teach reading, writing, common arithmetic, Grecian, Roman, English, and American history. These schools were free of cost for the first three years for both boys and girls. Students could continue beyond this for as long as parents felt necessary or as long as they could afford at private expense (Fraser, 2001). Jefferson's schools were a failure and in 1783 he continued his commitment to the development of a system of public education and the spreading of knowledge. Jefferson felt that during the period of a child's life between eight and fifteen years of age, "the mind, like the body, is not firm enough for laborious operations" (Fraser, 2001, p. 26). In 1786, Benjamin Rush agreed with Jefferson and stated that, "free government can only exist in an equal diffusion of literature. Without learning, men become savages or barbarians, and where learning is confined to a few people, we always find monarchy,

aristocracy, and slavery” (Fraser, 2001, p. 27). Rush also proposed the proper use of tax dollars to support schools (Fraser, 2001).

In the late 1700s New England placed an emphasis on town schools to assure the upholding of religious values and compliance to government (Spring, 2005). The South showed little interest in the advancement of educational institutions with the exception of private schools and tutors for the planter class (Spring, 2005). This conflict continued into the 19th century, and the South fell behind the North in the establishment of government operated educational systems (Spring, 2005).

In the early 19th century, most Massachusetts towns provided schooling for young children and school attendance was high. “In 1826, 5% of children below the age of four, including 20% of three-year-olds, were enrolled in school” (Spodek, 1984, p.6).

At this time, the Infant School that had been started in Britain by Robert Owen in 1816 was introduced to the United States. Owen believed that early education was extremely effective, so these schools accommodated children as young as 18 months (Spodek, 1984). The idea of infant schools became very popular in both Britain and the United States and the schools were being established in England, Ireland, Scotland, and many American cities. Americans believed that infant schools could abolish poverty by teaching and socializing young children from less fortunate families and enabling their mothers to work (Spodek, 1984).

As popular as the infant schools had become, in the following two decades there was a sharp decline in the number of young children enrolled in public schools. This may be explained by the stronger emphasis on the role of the mother in educating her children and increased concern for the wellbeing of young children (Spodek, 1984). Educators began to believe that the best place for children was in the home, provided conditions were good, until the age of five or

six (Szreter, 1964). They felt that any education that took place before formal schooling should occur in the home and strengthen the bond between parents and children. Due to W.E. Forster's Elementary Education Act of 1870, age five became the lower starting age of formal education in Britain. At this time, the idea of kindergarten was introduced to the American educational scene (Szreter, 1964).

In the United States, kindergarten has been implemented mainly as a half-day program for five-year-olds since the 1930s (Kauerz, 2005). Changes in American society and education since 1985 support the transition to full-day kindergarten. Empirical research shows that full-day kindergarten programs have no negative effects on children and children from full-day programs show considerably higher academic gains throughout the kindergarten year than those attending half-day programs (Kauerz, 2005). Many possible benefits have been identified for children enrolled in full-day kindergarten classes. These benefits include the establishment of full-day experiences away from home, becoming accustomed to a regular school schedule that would otherwise begin in first grade, the reduction of disruptions and transitions associated with a half-day, and increased time for instruction and opportunities for learning (Kauerz, 2005).

Demographic Influences on Age of Entry

Role of gender.

In addition to the debate of whether or not school entrance age affects students' academic achievement, there is also the question of whether or not gender, race, and socioeconomic status play a role. A study was conducted in a large public school in the Bronx in which literacy assessment scores were analyzed at the kindergarten, grade one, and grade two levels (Warder, 1999). This assessment measured knowledge of the alphabet, sight word vocabulary, phonemic awareness, reading, and writing mechanics. The scores of children from six classes in each of the

three grade levels were compared (Warder, 1999). Results from the study showed that female students were at grade level more often than male students in almost all grades and months of birth. Males in early childhood tend to fall slightly behind their female peers, and males born at the end of the year were the farthest behind (Warder, 1999).

Another study was done in Chile in 2008 and found similar results. This study addressed the academic effects of delayed school entry by gender, focusing on retention rate and test scores (McEwan & Shapiro, 2008). First grade data including birth dates, exact enrollment ages, instances of retention, and test scores from 1997-2004 was collected and studied, then compared to fourth grade data. The results of the study found that delaying enrollment among males results in greater decreases in retention and significant increases in test scores. A one-year increase in enrollment age improves males' test scores by about one third more than females (McEwan & Shapiro, 2008).

However, a study conducted in 2004 suggests otherwise (Grissom, 2004). In this study, the scores of a series of standardized achievement tests from grade two through grade eleven were studied to investigate whether age effects remain over time. Results from this study showed that any effects present were consistent in both males and females and no gender differences exist.

Role of race and ethnicity.

A study was done in 2010, which addressed trends in education by race and ethnic group (Aud, Fox, & KewalRamani). The study first examined proficiency in letter, number, and shape recognition among four-year-old children. These children were assessed in 2005-2006 on their ability to identify a letter by either its name or the sound it makes, and their ability to identify single-digit numbers and basic geometric shapes (Aud, Fox, & KewalRamani, 2010).

As shown in Table 1, 33 percent of the four-year-olds tested were proficient in letter recognition. Hispanic and American Indian/Alaska Native children had lower rates of proficiency, while Asian children had a higher rate of proficiency than other groups. White children and children of two or more races had higher rates of proficiency than Black, Hispanic, and American Indian/Alaska Native children (Aud, Fox, & KewalRamani, 2010).

Approximately 65 percent of the four-year-olds tested were proficient in recognizing numbers and shapes. American Indian/Alaska Native children had a lower rate of number and shape proficiency than Hispanic children, Black children, children of two or more races, White children, and Asian children. Asian four-year-olds had higher rates of proficiency than any other racial/ethnic group. No measurable differences in the proficiency rates were found between Hispanic and Black children (Aud, Fox, & KewalRamani, 2010).

Table 1

Percentage of 4-Year-Old Children in 2005-2006 who were Proficient in Letter, Number, and Shape Recognition by Race/Ethnicity

Race/Ethnicity	Proficient in Letter Recognition	Proficient in Numbers and Shape Recognition
Total	32.7	65.4
White	36.8	73.1
Black	28.3	54.7
Hispanic	23.0	51.4
Asian	49.4	81.2
Native Hawaiian/Pacific Islander	N/A	N/A
American Indian/Alaskan Native	18.8	39.9
Two or More Races	35.4	65.4

Note. Reporting standards were not met for Native Hawaiian/Pacific Islander children.

Aud, Fox, and KewalRamani (2010) next researched reading achievement among fourth grade students in 2007. Reading achievement was measured by the National Assessment of Educational Progress (NAEP) results. The National Assessment of Educational Progress results are stated as average scores and the percentage of students performing at or above three achievement levels: Basic, Proficient, and Advanced (Aud, Fox, & KewalRamani, 2010). These achievement levels are performance standards presenting what students should know and be able to do at their grade level. Basic signifies limited mastery of knowledge and skills that are essential for proficient work at a given grade level. Below Basic, therefore, signifies less than this level of achievement. Proficient represents expected academic performance. Students reaching this level have demonstrated competency over subject matter that is challenging for their grade level. Advanced indicates above average, superior performance (Aud, Fox, & KewalRamani, 2010).

As shown in Table 2, about 33 percent of fourth graders scored at or above the Proficient level. Higher percentages of Asian/Pacific Islander and White students scored at or above this level than Black, Hispanic, and American Indian/Alaska Native students. Over one-half of Black fourth graders and about one half of Hispanic and American Indian/Alaska Native fourth graders scored below the Basic achievement level (Aud, Fox, & KewalRamani, 2010).

Table 2

Percentage of Students in Fourth Grade in 2007 at National Assessment of Educational Progress (NAEP) Reading Achievement Levels by Race/Ethnicity

Race/Ethnicity	Below Basic	At Basic	At or Above Proficient	At Advanced
Total	33	34	33	8
White	22	35	43	11
Black	54	32	14	2
Hispanic	50	32	17	3
Asian/Pacific Islander	23	32	46	15
American Indian/Alaskan Native	51	30	18	4

Lastly, Aud, Fox, and KewalRamani (2010) investigated mathematics achievement among fourth grade students in 2009. Mathematics achievement was also measured by the NAEP results. The NAEP mathematics assessment determines students' abilities in five content areas: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions (Aud, Fox, & KewalRamani, 2010).

As shown in Table 3, about 39 percent of fourth graders scored at or above the Proficient level. Asians/Pacific Islanders had the highest percentage of fourth graders scoring at or above Proficient, followed by White students. Both of these groups had higher percentages of students scoring at this level than did Hispanics and American Indian/Alaska Natives students. Blacks had the lowest percentage of fourth grade students scoring at or above the Proficient level of all groups (Aud, Fox, & KewalRamani, 2010).

Table 3

Percentage of Students in Fourth Grade in 2009 at National Assessment of Educational Progress (NAEP) Mathematics Achievement Levels by Race/Ethnicity

Race/Ethnicity	Below Basic	At Basic	At or Above Proficient	At Advanced
Total	18	43	39	6
White	9	40	51	8
Black	36	48	16	1
Hispanic	29	49	22	1
Asian/Pacific Islander	8	31	60	17
American Indian/Alaskan Native	34	45	21	2

Role of socioeconomic status.

In terms of socioeconomic status, the findings appear to be consistent. In a report originally from 2007, it is suggested that delaying school entry may be detrimental for children from low-income families (Colasanti, 2011). This is suspected to be the case because of the fact that these children are already entering school with less developed cognitive skills. Evidence from research shows that time spent out of school contributes more to the social class achievement gap than time spent in school (Colasanti, 2011). In addition, children from higher-income families are more likely to attend quality preschool programs, which have been found to be a factor in children's developing language skills and other cognitive abilities. The skills and knowledge gained by children through quality preschool programs is a strong predictor of their future academic achievement once they begin school (Colassanti, 2011).

Todd Elder and Darren Lubotsky (2009) agree that age related differences in early academic achievement are due largely in part to the accrual of skills prior to kindergarten entry. Contrary to popular belief, older and younger children appear to learn at the same rate once they

begin formal schooling. If children who are older learn at a quicker rate, achievement gaps would widen from one year to the next but instead they begin to fade away, consistent with the idea that these gaps exist because of experiences prior to kindergarten (Elder & Lubotsky, 2009). Effects related to entrance age are greater and more constant among children from high socioeconomic status families, consistent with the higher level of investments more fortunate parents are likely to make in their children prior to kindergarten entry (Elder & Lubotsky, 2009). Because of this finding, delaying school entry among children from lower-income families, who do not have as many educational opportunities outside of the school system, is disadvantageous (Elder & Lubotsky, 2009).

Research suggests that demographic factors such as gender, race, ethnicity, and socioeconomic status can affect children's academic achievement. These demographic influences coupled with age of school entry could potentially strengthen or weaken children's achievement in school.

Typical Academic Achievement

Primary grades.

Typical academic achievement of primary and intermediate level children is described by Chip Wood (1997). In the area of reading, children at the age of six, or typical first graders, should be able to read simple chapter books and complete short, expressive reading comprehension assignments. In the area of writing, six-year-old children should be beginning to write complete sentences. It is common for children of this age to exclude vowels when spelling words. The size of their handwritten letters is quite large and their spacing is erratic. Upper and lower case letters are used sporadically (Wood, 1997). Mental math and basic problem solving strategies begin to surface at the age of six. Children at this age begin basic computation using

money and engage in simple measurement tasks. Practice with computation in the form of simple worksheets is appropriate (Wood, 1997).

In the area of reading, children at the age of seven, or typical second graders, begin to read individually, though not yet silently. Children at this age should be able to complete more extended reading comprehension tasks, which involve more written responses (Wood, 1997). In the area of writing, seven-year-old children should be able to write stories that contain a beginning, middle, and end. More accurate spelling emerges and the size of handwritten letters is rather small. Children at this age should begin writing about nonfiction topics (Wood, 1997). In math, children at the age of seven should be more proficient in computation using money and telling time. Children should be more skillful in measuring, weighing, and comparing objects. Seven-year-old children should begin working with simple equations, fractions, geometry, and the concept of symmetry. Children should be comfortable with simple multiplication computation and become introduced to the concept of division using concrete manipulatives. Practice with computation and skills in the form of math games are appropriate (Wood, 1997).

Intermediate grades.

Eight-year-old children, or typical third graders, in the area of reading should be able to read silently and independently and complete individual assignments, such as book reports, based on what they have read (Wood, 1997). In the area of writing, children at the age of eight should be writing longer stories with increased descriptive language, but it is common to provide more detail than is desirable. Eight-year-old children have begun using the process of drafting and revising to reach a final product. Correct spelling, use of compound words, capitalization, and punctuation improve in children of this age. These children know how to use a dictionary and list items in alphabetical order (Wood, 1997). Children at the age of eight use all four

operations in problem solving and are accustomed to the concept of borrowing and carrying. Working with fractions and geometry continues, and children's skills in measuring and weighing are strengthened (Wood, 1997).

Nine-year-old children, or typical fourth graders, in the area of reading should be able to engage in simple research assignments (Wood, 1997). In the area of writing, children at this age should demonstrate character development, plot, cohesiveness, and believability in their written work (Wood, 1997). Spelling shows even fewer mistakes, basic capitalization and punctuation are usually mastered at this point, and handwriting is much neater. In math, children at the age of nine should be proficient in division and comfortable with word problems. It is at this age that decimals are introduced (Wood, 1997).

Standpoint

In favor of delayed school entry.

There are opposing viewpoints on appropriate cutoff dates for kindergarten enrollment, an ultimate conflict of what age a child should begin formal schooling. Some research has been done in favor of delaying kindergarten entry and other research has been done in opposition to delaying entry. Kristin Warder (1999), who conducted the study in a large public school in the Bronx, collected and analyzed the test results of a group of students in kindergarten, first grade, and then second grade on a literacy assessment which included the alphabet, sight word recognition, phonemic awareness, reading, and writing mechanics. The scores of children from six classes in each of the three grade levels were studied and the results were grouped by birth date and gender.

As shown in Table 4, Warder (1999) found that within kindergarten, student achievement was lower for younger children. In level one, achievement was lower for younger children in

alphabet, sight word knowledge, and reading, but not consistently in phonemic awareness and writing (Warder, 1999). In the final study, level two, Warder (1999) discovered that achievement was lower for younger children on all areas of the test, with the biggest gap between students born in the first and final thirds of the year.

Table 4

Percentage of Students in Kindergarten, First Grade, and Second Grade who Scored at or Above Grade Level on Areas of a Literacy Assessment

Level	Birth Date	Alphabet and Sight Word Knowledge	Phonemic Awareness	Reading	Writing
Kindergarten	January – April	64	N/A	27	4
	May – August	50	N/A	20	5
	September – December	51	N/A	11	2
One	January – April	53	63	53	50
	May – August	36	82	50	52
	September – December	42	75	51	49
Two	January – April	63	51	66	43
	May – August	62	46	58	27
	September – December	61	45	50	20

Note. Phonemic awareness is not tested in kindergarten until May, and this study was done in October (Warder, 1999).

The results from Warder's (1999) study show the achievement gap between oldest and youngest students increasing from kindergarten to second grade. Considering these results, Warder (1999) asserted that moving the cutoff date for kindergarten enrollment from December 1st to September 1st, delaying entry for those born in the final third of the year, would lessen the incidence of failure among these youngest students. She acknowledges that moving the cutoff

date forward can only shrink the achievement gap rather than eliminate it because there will always be a youngest group.

Another researcher, Ashlesha Datar (2006), found results similar to Warder's (1999). Datar (2006) studied a nationally representative group of kindergarteners and measured their academic achievement through reading and math scores. Datar (2006) found that students entering kindergarten a year later scored an average of 5.4 points higher in math compared to their younger peers. She also found that these students gained an average of .52 points more in math during the first two years of school. Students entering kindergarten a year later also scored an average of 4.6 points higher in reading compared to their younger peers, and these students also gained an average of .89 points during their first two years of schooling (Datar, 2006). Datar (2006) concludes that there is a clear advantage in delaying kindergarten entry because on average, older students scored higher than their younger classmates in both reading and math.

Opposed to delayed school entry.

A limitation to these studies that favor delayed kindergarten entry is that data is only collected and analyzed for the first few years of schooling. An important aspect of this issue is the possibility of long-term effects. James Grissom (2004) looked into this possibility when he studied the standardized achievement test scores of a group of students at second grade, sixth grade, and tenth grade, focusing on the relationship between age and achievement over time.

The results of the second grade study showed a positive relationship between age and achievement for age normal peers: as age normal peers get older, their test scores get higher on average (Grissom, 2004). For students who have been retained, there was instead a negative relationship: as they get older, their test scores decline (Grissom, 2004). Grissom (2004)

concluded at this point that being older is better to a certain extent, but beyond that, i.e. grade retention, the effects of being older become negative.

The results of the sixth grade study were consistent with the results of the second grade study. For age normal peers, the relationship between age and achievement was positive. As age normal peers get older, their test scores get higher on average (Grissom, 2004). For students who have been retained, there was a negative relationship. As retention students get older, their test scores decline (Grissom, 2004).

The results of the tenth grade study showed that there was no longer a positive relationship between age and achievement for age normal peers. The oldest age normal students no longer have the highest test scores and the variance is small (Grissom, 2004). The academic advantage from being older disappears by grade 10. However, for retained students, the negative relationship remains constant (Grissom, 2004). Grissom (2004) concludes that the notion to delay school entry or retain students to improve their academic achievement is not supported by the data he has collected and analyzed. The difference in scores is not profound and decreases as grade level increases until it ultimately disappears in high school (Grissom, 2004).

Jane Arnold and Gary Painter (2006) conducted a long-term study focusing on grade retention, high school dropouts, and college attendance using three groups of students: those who started kindergarten at age five, five and a half, and six. The results showed that the youngest students, those who started kindergarten at age five, have a higher probability of repeating kindergarten than those who started at age five and a half or six but have lower dropout rates and are more likely to attend college (Arnold & Painter, 2006). The oldest students, those who delayed entry and began kindergarten at age six, have dropout rates three times higher than the

other age groups and have lower college attendance rates. Arnold and Painter (2006) concluded that there are no significant long-term effects to delaying kindergarten entry.

There is a strong existing research base surrounding the controversial issue of when children should begin kindergarten or formal schooling. Enrollment policies are constantly changing throughout the years, and are moving toward increasing the age at which children enter school (Colasanti, 2011). Regardless of the particular enrollment cutoff date of a school, some parents, up to a tenth in the United States, voluntarily choose to delay their children's school entry (McEwan & Shapiro, 2008). Research has shown mixed results regarding the relationship between delayed school entry and academic achievement, but it is strongly suggested that any benefits that may result from delaying enrollment are only short-term and likely not worth long-term costs (Grissom, 2004).

Methodology

This empirical study was requested by the elementary school principal of a small, suburban school district in Western New York. This research involves collecting, analyzing, and interpreting data of final grades in two core subject areas (mathematics and English language arts) and standardized test scores, at both the local and state levels in mathematics and English language arts, of students in grade four at one elementary school. The specific objective of this study is to investigate possible trends in the academic achievement of children who began kindergarten at the age of four or six compared to children who began at the traditional age of five. The overall goal of this study is to provide an evidence-based recommendation to the school district in which this principal works to either move the district's kindergarten enrollment cutoff date to September 1st or keep it as is at December 1st. This goal will be achieved by seeking an

answer to the research question, “how does school entrance age affect children academically in fourth grade?”

Participants

For the purpose of this study, de-identified academic retrospective data will be collected on the 96 male and female students between the ages of nine and ten years old enrolled in grade four at one elementary school. The identity of the participants will not be known, so the ethnic background of these individuals may be any of the following that make up the school’s population: Caucasian, Hispanic, African American, Asian or Other Pacific Islander, or multiracial. Of the elementary school’s pre-kindergarten through Grade 5 population, 90% are Caucasian, 6% Hispanic, 2% African American, 1% Asian or Pacific Islander, and 1% multiracial. Only 2% of the elementary school’s students are limited English proficient. In the elementary school, 27% of students are eligible for free lunch and 7% for reduced price lunch.

Setting

Data will be collected from the elementary school in a small, suburban school district in Western New York. The district is made up of one elementary school, one middle school, and one high school. Of the total of 1,500 students enrolled in the district’s three schools, 90% are Caucasian, 6% Hispanic, 2% African American, 2% Asian or Pacific Islander, and 1% multiracial. Only 1% of the district’s students are limited English proficient. Throughout the district, 21% of students are eligible for free lunch and 8% for reduced price lunch.

Design

I collected, analyzed, and interpreted data of final grades in the core subject areas of mathematics and English language arts and scores on local and state level standardized tests of students in grade four at one elementary school. The local standardized tests used in this study

were the norm referenced AIMSweb Math Computation assessment and AIMSweb Reading – Curriculum Based Measurement assessment. The state level standardized tests used in this study were the New York State 4th Grade Mathematics Test and the New York State 4th Grade English Language Arts Test.

The AIMSweb Math Computation assessment is a scope and sequence of mathematics material students are expected to know in fourth grade. Scores are based on the number of correct responses in eight minutes of testing. Scoring is given by points and is categorized into achievement levels including “well above average,” or greater or equal to the 90th percentile; “above average,” or greater or equal to the 75th percentile; “average,” or greater or equal to the 25th percentile; “below average,” or greater or equal to the 10th percentile; and “well below average,” or greater or equal to zero. The target score is 55 points, or 55 correct responses, and is within the realm of “below average” scores.

The AIMSweb Reading – Curriculum Based Measurement assessment measures fluency and accuracy of reading. Scores are based on the number of words students read correctly in one minute of testing. Scoring is given by points and is categorized into the same achievement levels as the AIMSweb Math Computation assessment. The target score is 136 points, or 136 correctly read words, and is within the realm of “average” scores.

The New York State 4th Grade Mathematics Test is based on the New York State Common Core Learning Standards in mathematics for fourth grade. It covers mathematics material students are expected to know in fourth grade. It is a timed test that is given over a three-day period. The one multiple choice component has 30 questions with 40 minutes allowed for administration. The two performance assessment components are 50 minutes each. Scoring is determined to be one of four levels overall; a score of one signifies that the student is not

meeting the State Learning Standards, a score of two signifies that the student is partially meeting the State Learning Standards, a score of three signifies that the student is meeting State Learning Standards, and level four signifies that the student is exceeding State Learning Standards.

The New York State 4th Grade English Language Arts Test is based on the New York State Common Core Learning Standards in English language arts for fourth grade. It covers English language arts material students are expected to know in fourth grade. It is a timed test that is given over a three-day period. The one multiple choice component has 28 questions with 45 minutes allowed for administration. The two performance assessment components are 60 minutes each. Scoring is determined to be one of four levels overall, the same levels as the New York State 4th Grade Math Test. It contains multiple choice questions based on brief reading passages and performance assessment items.

Upon data collection, the students were divided up into seven age groups using quarters of the year. The seven age groups were as follows: those born in April – June 2001, making them between the ages of six years and three months and six years and five months upon entrance into Kindergarten; July – September 2001, making them between the ages of six years and two months and six years; October – December 2001, making them between the ages of five years and eleven months and five years and nine months; January – March 2002, making them between the ages of five years and eight months and five years and six months; April – June 2002, making them between the ages of five years and five months and five years and three months; July – September 2002, making them between the ages of five years and two months and five years; and October – December 2002, making them between the ages of four years and eleven months and four years and nine months. Using the data organized by age group, the final

grades and test scores of all the individuals in each age group were averaged to come up with one score to represent each age group in each area. Possible trends in academic achievement were then investigated between age-at-entry groups and between males and females. This approach allowed for identification of any effects of age of school entry on academic achievement.

Data Collection

The data of participants' final grades in the two core subject areas and standardized test scores were collected directly from the school district. All participant names and other personal information were de-identified by the district prior to collection. Students and corresponding data were identified by number only.

Data Analysis

To discover possible trends in academic achievement between the age-at-entry groups and between males and females, the final grades in the two core subject areas and standardized test scores of each student in each age-at-entry group were compared to those in the same group and those in the other age-at-entry groups.

Findings

Overview

The results of this study on how school entrance age affects academic achievement in fourth grade both confirm and refute certain findings within the literature review. Warder (1999) concluded that achievement was lower for younger children in both math and English language arts (ELA). Although this study provided no significant conclusion about achievement in ELA by age, the findings did confirm Warder's (1999) conclusion in math. The findings from this study show that older children have slightly higher averages in math than younger children.

Datar (2006) concluded that older students score higher than younger students on assessments in both math and reading. The findings from this study refute Datar's (2006) conclusion in both subjects. Results from this study show that children in the middle age group answered slightly more questions and read slightly more words on the AIMSweb math and reading assessments than their older and younger peers.

Grissom (2004) found that the older the child, the higher the test score in both math and ELA. The findings from this study refute that conclusion in math; there were no significant findings regarding achievement on the state math test by age. However, this study does confirm Grissom's (2004) conclusion in ELA. The findings from this study show that the youngest children score slightly lower on the state ELA test than their older peers.

McEwan and Shapiro (2008) concluded that delaying enrollment among males results in increased test scores in both math and ELA. The results from this study refute McEwan and Shapiro's (2008) findings in both subjects. The findings from this study show that younger males answered slightly more questions than their older peers on the AIMSweb math assessment and younger males score slightly higher on the state ELA test than older males. This study also suggests that males in one of the middle age groups read slightly more words than their older and younger peers on the AIMSweb reading assessment. No significant findings were documented regarding scores on the state math test among males by age.

Grissom (2004) states that any academic effects present in math or ELA were consistent in both males and females, and no gender differences exist. This study refutes Grissom's (2004) conclusion. The findings from this study show that in many cases, younger males score higher than older males in math and ELA and older females outperform younger females in the same subjects.

Evaluation Measure**Final grades.**

Slightly significant findings were apparent in the study of final grades in math and no significant findings were apparent in the study of final grades in ELA. These findings can be seen in Table 5. In math, the biggest gap was five points. This was between those born in July – September 2002 (an average of 81) and those born in April – June 2001 (an average of 86). However, there were only three children being taken into account who were born in April – June 2001 as opposed to eighteen in July – September 2002. The next highest average was 85, from those born in both October – December 2001 and January – March 2002. These age groups had a slightly higher average than the three younger age groups by one point, four points, and two points. There are no significant differences in the average grades, but it does appear that older children have slightly higher averages than younger children in this study.

In ELA, the biggest gap was five points. This was between those born in both January – March 2002 and October – December 2002 (an average of 84) and those born in April – June 2001 (an average of 89). However, there were only three children being taken into account who were born in April – June 2001 as opposed to nineteen who were born in January – March 2002 and nine who were born in October – December 2002. The next highest average was 87, from those born in April – June 2002. This age group had a slightly higher average than the two younger age groups by two and three points as well as the next two older age groups by three points and one point. Because there is no steady, solid pattern to the data and no significant differences in the average grades, the results of this study are inconclusive.

Table 5

Final Math and ELA Grades Among Fourth Grade Students at Different Ages

Age Group	Number of Students	Final Math Grade	Final ELA Grade
April – June 2001	3	86	89
October – December 2001	11	85	86
January – March 2002	19	85	84
April – June 2002	34	84	87
July – September 2002	18	81	85
October – December 2002	9	83	84

AIMSweb assessments.

Slightly significant findings were apparent in the study of AIMSweb math and reading assessment scores. These findings can be seen in Table 6. On the AIMSweb math assessment, the biggest gap was fifteen correct answers. This was between those born in April – June 2001 (an average of 50 correct responses) and those born in January – March 2002 (an average of 65 correct responses). However, there were only three children being taken into account who were born in April – June 2001 as opposed to nineteen in January – March 2002. The next lowest average of correct answers was 60, from those born in October – December 2001. Those born in January – March 2002 had a slightly higher average of correct answers than the three younger age groups by one answer, two answers, and one answer as well as the next older age group by five answers. There are slightly significant differences in the average number of questions answered correctly; it appears that one of the middle age groups, those born in January – March 2002, answered slightly more questions correctly than their older and younger peers.

On the AIMSweb reading assessment, the biggest gap was fifty correctly read words. This was between those born in April – June 2001 (an average of 107 correctly read words) and those born in April – June 2002 (an average of 157 correctly read words). However, there were only three children being taken into account who were born in April – June 2001 as opposed to 34 in April – June 2002. The next lowest average of words read correctly was 121, from those born in October – December 2002. Those born in April – June 2002 had a slightly higher average of correctly read words than the two younger age groups by eleven words and 36 words as well as the three older age groups by eleven, twelve, and fifty words. There are slightly significant differences in the average number of words read correctly; it appears that one of the middle age groups, those born in April – June 2002, read slightly more words correctly than their older and younger peers.

Table 6

AIMSweb Math and Reading Assessment Scores Among Fourth Grade Students at Different Ages

Age Group	Number of Students	AIMSweb Math Score	AIMSweb Reading Score
April – June 2001	3	50	107
October – December 2001	11	60	145
January – March 2002	19	65	146
April – June 2002	34	61	157
July – September 2002	18	63	146
October – December 2002	9	61	121

State tests.

No significant findings were apparent in the study of state math test scores and slightly significant findings were apparent in state ELA test scores. These findings can be seen in Table

7. On the state math test, all age groups averaged a score of three. There are no differences in scores by age group, and therefore no conclusions can be made about the effects of age on state math test score. The limit of only four levels of scoring does not allow for uncovering subtle variations in score by age group.

On the state ELA test, the oldest age group and the youngest age group, those born in April – June 2001 and October – December 2002, averaged a score of two. All other age groups in between averaged a score of three. Because there were only three children being taken into account who were born in April – June 2001, there is not a reliable basis to form a solid conclusion about the oldest children. However, it does appear that younger children score slightly lower on the state ELA test than their older peers.

Table 7

Math and ELA State Test Scores Among Fourth Grade Students at Different Ages

Age Group	Number of Students	Math State Test Score	ELA State Test Score
April – June 2001	3	3	2
October – December 2001	11	3	3
January – March 2002	19	3	3
April – June 2002	34	3	3
July – September 2002	18	3	3
October – December 2002	9	3	2

Gender

Males.

Slightly significant findings were apparent in the study of final grades in math, but no significant findings were apparent in the study of final grades in ELA for males. These findings can be seen in Table 8. In math, the biggest gap among males was seven points. This was

between those born in October – December 2001 (an average of 80) and those born in October – December 2002 (an average of 87). Those born in October – December 2002 had a slightly higher average than the five older age groups by five points, three points, four points, seven points, and one point. There are slightly significant differences in the average grades, but there is no steady, solid pattern in the data. However, it appears that the oldest and youngest males have slightly higher averages than males in the middle age groups in this study.

In ELA, the biggest gap among males was eight points. This was between those born in January – March 2002 (an average of 81) and those born in April – June 2001 (an average of 89). However, there were only three males being taken into account who were born in April – June 2001 as opposed to ten in January – March 2002. The next highest average was 87, from those born in April – June 2002, creating a six-point difference. Those born in April – June 2001 had a slightly higher average than the five younger age groups by seven, eight, two, three, and three points. There are slightly significant differences in the average grades; it appears that the second and third oldest age groups have slightly lower averages than the other age groups. However, because no steady, solid pattern exists in the data, no conclusion can be made about age and achievement based on these findings.

Table 8

Final Math and ELA Grades Among Fourth Grade Males at Different Ages

Age Group	Number of Males	Final Math Grade	Final ELA Grade
Apr – Jun 2001	3	86	89
Oct – Dec 2001	6	80	82
Jan – Mar 2002	10	83	81
Apr – Jun 2002	18	84	87
Jul – Sept 2002	11	82	86
Oct – Dec 2002	6	87	86

Slightly significant findings were apparent in the study of AIMSweb math and reading scores among males. These findings can be seen in Table 9. On the AIMSweb math assessment, the biggest gap among males was eighteen correct answers. This was between those born in April – June 2001 (an average of 50 correct responses) and those born in October – December 2002 (an average of 68 correct responses). However, there were only three males being taken into account who were born in April – June 2001 as opposed to six in October – December 2002. The next lowest average of correct answers was 56, from those born in October – December 2001, creating a difference of twelve correct answers. Those born in October – December had a slightly higher average of correct answers than the five older age groups by six, nine, seven, twelve, and eighteen correct answers. There are slightly significant differences in the average number of questions answered correctly, but no steady, solid pattern exists in the data. However, it does appear that the youngest males answered slightly more questions correctly than their older peers.

On the AIMSweb reading assessment, the biggest gap among males was 42 correctly read words. This was between those born in April – June 2001 (an average of 107 correctly read words) and those born in April – June 2002 (an average of 149 correctly read words). However, there were only three males being taken into account who were born in April – June 2001 as opposed to eighteen in April – June 2002. The next lowest average of words read correctly was 124, from those born in October – December 2001, creating a difference of 25 correctly read words. Those born in April – June 2002 had a slightly higher average of correctly read words than the two younger age groups by seven and fourteen words and the three older age groups by nineteen, 25, and 42 words. There are slightly significant differences in the average number of words read correctly, but no steady, solid pattern exists in the data. However, it appears that one

of the middle age groups of males, those born in April – June 2002, read slightly more words correctly than their older and younger peers.

Table 9

AIMSweb Math and Reading Scores Among Fourth Grade Males at Different Ages

Age Group	Number of Males	AIMSweb Math Score	AIMSweb Reading Score
Apr – Jun 2001	3	50	107
Oct – Dec 2001	6	56	124
Jan – Mar 2002	10	61	130
Apr – Jun 2002	18	59	149
Jul – Sept 2002	11	62	142
Oct – Dec 2002	6	68	135

No significant findings were apparent in the study of state math test scores and slightly significant findings were apparent in state ELA test scores among males. These findings can be seen in Table 10. On the state math test among males, all age groups averaged a score of three. There are no differences in scores by age group, and therefore no conclusions can be made about the effects of age on state math test score for males.

On the state ELA test among males, the three oldest age groups, those born in April – June 2001, October – December 2001, and January – March 2002, averaged a score of two. The three youngest age groups, those born in April – June 2002, July – September 2002, and October – December 2002, averaged a score of three. Because there were only three males being taken into account who were born in April – June 2001, there is not a reliable basis to form a solid conclusion about the youngest males. However, even without considering the oldest age group with only three participants, the pattern still remains that younger males score slightly higher on the state ELA test than older males.

Table 10

Math and ELA State Test Scores Among Fourth Grade Males at Different Ages

Age Group	Number of Males	Math State Test Score	ELA State Test Score
Apr – Jun 2001	3	3	2
Oct – Dec 2001	6	3	2
Jan – Mar 2002	10	3	2
Apr – Jun 2002	18	3	3
Jul – Sept 2002	11	3	3
Oct – Dec 2002	6	3	3

Females.

Slightly significant findings were apparent in the study of final grades in math and ELA for females. These findings can be seen in Table 11. In math, the biggest gap among females was fourteen points. This was between those born in October – December 2002 (an average of 76) and those born in October – December 2001 (an average of 90). However, there were only three females being taken into account who were born in October – December 2002 as opposed to five in October – December 2001. The next lowest average was 79, from those born in July – September 2002, creating an eleven point difference. Those born in October – December 2001 had a slightly higher average than the four younger age groups by three, seven, eleven, and fourteen points. There are slightly significant differences in the average grades and even without considering the youngest age group with only three participants, the pattern still remains that older females have slightly higher averages than younger females in math.

In ELA, the biggest gap among females is ten points. This was between those born in October – December 2002 (an average of 80) and those born in October – December 2001 (an average of 90). However, there were only three females being taken into account who were born in October – December 2002 as opposed to five in October – December 2001. The next lowest average was 84, from those born in July – September 2002, creating a six point difference. There

are slightly significant differences in the average grades and even without considering the youngest age group with only three participants, the pattern still remains that older females have slightly higher averages than younger females in ELA.

Table 11

Final Math and ELA Grades Among Fourth Grade Females at Different Ages

Age Group	Number of Females	Final Math Grade	Final ELA Grade
Oct – Dec 2001	5	90	90
Jan – Mar 2002	9	87	88
Apr – Jun 2002	16	83	86
Jul – Sept 2002	7	79	84
Oct – Dec 2002	3	76	80

Slightly significant findings were apparent in the study of AIMSweb math and reading scores among females. These findings can be seen in Table 12. On the AIMSweb math assessment, the biggest gap among females was 22 correct answers. This was between those born in October – December 2002 (an average of 47 correct responses) and those born in January – March 2002 (an average of 69 correct responses). However, there were only three females being taken into account who were born in October – December 2002 as opposed to ten in January – March 2002. The next lowest average of correct answers was 63, from those born in July – September 2002, creating a difference of six correct answers. Those born in January – March 2002 answered a slightly higher number of questions correctly than the next three younger age groups by four, six, and 22 correct answers and the next oldest age group by four correct answers. There are slightly significant differences in the average number of questions answered correctly, but no steady, solid pattern exists in the data. However, it appears that one of the middle age groups of females, those born in January – March 2002, answered slightly more questions correctly than their older and younger peers.

On the AIMSweb reading assessment, the biggest gap among females was 78 correctly read words. This was between those born in October – December 2002 (an average of 93 correctly read words) and those born in October – December 2001 (an average of 171 correctly read words). However, there were only three females being taken into account who were born in October – December 2002 as opposed to six in October – December 2001. The next lowest average of words read correctly was 153, from those born in July – September 2002, creating an eighteen word difference. Those born in October – December 2001 had a slightly higher average of words read correctly than the four younger age groups by seven, five, eighteen, and 78 words. There are slightly significant differences in the average number of words read correctly and even without considering the youngest age group with only three participants, the pattern still remains that older females read slightly more words correctly than younger females.

Table 12

AIMSweb Math and Reading Assessment Scores Among Fourth Grade Females at Different Ages

Age Group	Number of Females	AIMSweb Math Score	AIMSweb Reading Score
Oct – Dec 2001	5	65	171
Jan – Mar 2002	9	69	164
Apr – Jun 2002	16	65	166
Jul – Sept 2002	7	63	153
Oct – Dec 2002	3	47	93

Slightly significant findings were apparent in the study of state math test scores and no significant findings were apparent in state ELA test scores among females. These findings can be seen in Table 13. On the state math test among females, the oldest age group, those born in October – December 2001, averaged a score of four. The youngest age group, those born in October – December 2002, averaged a score of two. All other age groups in between averaged a score of three. Because there were only three females being taken into account who were born in

October – December 2002, there is not a reliable basis to form a solid conclusion about the youngest females. However, it does appear that older females score slightly higher on the state ELA test than younger females.

On the state ELA test among females, the four oldest age groups, those born in October – December 2001, January – March 2002, April – June 2002, and July – September 2002, averaged a score of three. The youngest age group, those born in October – December 2002, averaged a score of two. However, because there were only three females taken into account who were born in October – December 2002, there is not a reliable basis to form a solid conclusion about the youngest females. Because all other age groups averaged a score of three, no conclusions can be made about the effects of age on state ELA test score for females.

Table 13

Math and ELA State Test Scores Among Fourth Grade Females at Different Ages

Age Group	Number of Females	Math State Test Score	ELA State Test Score
Oct – Dec 2001	5	4	3
Jan – Mar 2002	9	3	3
Apr – Jun 2002	16	3	3
Jul – Sept 2002	7	3	3
Oct – Dec 2002	3	2	2

Discussion

Overview

The findings from this study are limited in reliability because the sample sizes in some of the age groups were very low. Some of the sample sizes, as low as three children, are not sufficient to develop a reliable conclusion for even a single school district. However, from the findings that were present, I was not surprised by the fact that older children had slightly higher averages in math and scored slightly higher on the state ELA test than younger children. It makes

sense that the older the child is, the more exposure they have had to background information and academic material, provided the child has gone to a quality preschool before entering kindergarten. Thus it is not surprising that older children would have higher scores on these standardized tests. This is one of the reasons I chose to conduct this study. I, like many parents who chose to “redshirt” their children, or hold them out of kindergarten for an additional year, believed that being older would benefit children academically as they would have more background knowledge and a longer period of exposure to subjects like math and reading.

I was also not surprised by the fact that children in the middle age group answered slightly more questions on the AIMSweb math assessment and read slightly more words on the AIMSweb reading assessment than their older and younger peers. I was not surprised by this finding because of what I discovered in the literature about this topic. Many studies show that children who start kindergarten either early or late achieve less academically than those who start kindergarten at the traditional age of five.

I did not expect the findings regarding differences in gender. The data examined in this study showed that in most cases, older females outperformed younger females and younger males outperformed older males. I did not anticipate finding any gender differences. Another thing I did not expect was the 4th grade class size being so small and the number of early kindergarten enterers so low and late enterers so high.

Challenges

A challenge I came across during the study was obtaining the data from the school district in a timely manner. Because details of the study and its methodology changed so many times, communication with the school district and its board became obstructed and unclear. It was difficult attempting to keep all individuals involved in the planning and process of approval

of this study on the same page. It was another challenge once receiving the data to organize it in a cohesive manner so that it could be recorded easily and effectively into a readable chart. There were many different scores to find and record for each individual child and it was overwhelming at first, but once everything was in order the data became easier to record and analyze.

It was also difficult to try to establish conclusions based on data from only 96 participants. It seemed like plenty of data initially, but once I divided the participants into specific age groups, I realized that some groups had many more students than others. I also realized that the oldest and youngest groups had the fewest students. I only discovered clear patterns in the data in a couple cases and I was unsure when to consider findings or gaps in grades and scores significant.

If I were to conduct this study again, I would investigate the number of early and late kindergarten enterers in a specific grade level before I selected that group as participants. A larger sample of children who entered school both earlier and later than the traditional age of five would have yielded more reliable results in response to the research question. I would also make sure that my overall sample size allowed for similar numbers of participants in each age group. Some age groups had significantly less participants than others, making it difficult to generate a conclusion about one age group over another. Another thing I would change about this study is the way I compared scores on the New York State math and English language arts tests. If I were to do it again I would look at and compare raw scores to obtain more specific data.

If I had a longer period of time to conduct the study, it would have been interesting to include all grade levels in the elementary school or beyond to determine whether any effects of school entrance age diminish over time, as much of the literature suggests. I would also be

intrigued to look at potential differences in the effects of school entrance age among the special education population and by race/ethnicity and socioeconomic status.

Implications for Practice

Based on this study and its results, I am unsure about making a recommendation to the school district involved regarding keeping their Kindergarten enrollment cutoff date at December 1st or changing it to September 1st. I do not believe there is enough evidence, especially regarding the youngest children, to make a reasonable recommendation. However, if I were to make one based on what I did find I would suggest changing the cutoff date to September 1st. The overall findings showed that older children outperformed younger children in some areas and children in the middle age groups outperformed those older and younger in other areas, so there is no basis to suggest keeping the cutoff date at December 1st, thus allowing younger children to enroll, present in this study.

As apparent in the age data from this study, late entry seems to be more prevalent in this district than early entry. Although some literature discourages “redshirting” due to the fact that learning is being postponed, there is no reason to discourage late entry from the results of this study. However, to make the most of the time spent away from traditional schooling, a child who is going to enter late should be enrolled in a quality preschool or a part of some other educational environment where they can learn and grow in preparation for kindergarten and their entire school career.

Implications for Further Research

For further research on this topic, a much larger sample size should be incorporated into a study. It would be a better idea in future studies to gather data from multiple school districts in multiple areas. A larger sample size along with multiple districts and areas included would be

possible with more than one researcher and would yield the most reliable results. It is important to provide diversity within the sample population and involve enough participants so that as equal distribution among age groups as possible can occur. I would recommend a sample of participants including those of various racial/ethnic groups, socioeconomic status, and special education status. I would also recommend studying more than one grade level to investigate the possibility of age effects appearing, increasing, or diminishing over time.

Limitations

This study had a few limitations that affect the reliability of the results as a whole and their application to the field of education. One limitation of this study is the small sample size, 96 participants. There were significantly less students in some age groups than in others, causing the reliability of the results to be questionable. Another limitation is that the participants were of one grade level, fourth grade, and attended a single elementary school. The fact that only one school district in one particular area was considered for this study is also a limitation.

The “Kindergarten Entrance Age Effect” (Elder & Lubotsky, 2009, p. 5) is a true concern in education today. The quality of children’s education and the degree of academic success is at stake if policymakers and parents are not made aware of the effects associated with delayed school entry. More research needs to be done in this area as many studies conducted thus far, including this one, have proven inconclusive. The overall goal of this individual study was to provide an answer to the research question, “how does school entrance age affect children academically in fourth grade?” and help inform this particular school district’s policy regarding school entrance age. Unfortunately, no reliable conclusion regarding the effects of school entrance age was able to be made using the data collected in this study. However, based on the

trends that were observed, it is recommended that the school district change their enrollment cutoff date to September 1st.

References

- Arnold, J. & Painter, G. (2006). Does the age that children start kindergarten matter? Evidence of long-term educational and social outcomes. *Educational Evaluation & Policy Analysis*, 28(2) 153-179.
- Aud, S., Fox, M., & KewalRamani, A. (2010). Status and trends in the education of racial and ethnic groups. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Colasanti, M. (Ed.). (2011). Kindergarten entrance ages: A 35 year trend analysis. Retrieved from <http://www.ecs.org/clearinghouse/93/61/9361.pdf>.
- Datar, A. (2006). Does delaying kindergarten entrance give children a head start? *Economics of Education Review*, 25(1), 43-62. doi:10.1016/j.econedurev.2004.10.004
- Education Commission of the States. (2011). Access to kindergarten: Age issues in state statutes. Retrieved from <http://mb2.ecs.org/reports/report.aspx?id=32>.
- Elder, T.E. & Lubotsky, D.H. (2009). Kindergarten entrance age and children's achievement: Impacts of state policies, family background, and peers. *Journal of Human Resources*, 44(3), 641-683.
- Fraser, J.W. (2001). *The school in the United States: A documentary history*. New York, NY: McGraw-Hill.
- Furlong, M. & Quirk, M. (2011). The relative effects of chronological age on Hispanic students' school readiness and grade 2 academic achievement. *Contemporary School Psychology*, 15, 81-92. doi:10.1080/15377903.2010.540518
- Grissom, J. (2004). Age and achievement. *Education Policy Analysis Archives*, 12(49).

- Kauerz, K. (2005). Full-day kindergarten: A study of state policies in the United States. Retrieved from <http://www.ecs.org/clearinghouse/62/41/6241.pdf>.
- McEwan, P.J. & Shapiro, J.S. (2008). The benefits of delayed primary school enrollment: Discontinuity estimates using exact birth dates. *Journal of Human Resources*, 43(1), 1-29.
- National Institute of Child Health and Human Development Early Child Care Research Network. (2007). Age of entry into kindergarten and children's academic achievement and socioemotional development. *Early Education and Development*, 18(2), 337-368.
- New Jersey Department of Education. (2010). Frequently asked questions. Retrieved from <http://www.state.nj.us/education/genfo/faq/faq.htm>.
- New York State Education Department. (2011). Retrieved from <http://www.nysed.gov>.
- Spodek, B. (1984). *The past as prologue: Exploring the historic roots of present day concerns in early childhood education*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA. (April 23-27, 1984).
- Sprietsma, M. (2010). Effect of relative age in the first grade of primary school on long-term scholastic results: International comparative evidence using PISA 2003. *Education Economics*, 18(1), 1-32. doi:10.1080/09645290802201961
- Spring, J. (2005). *The American school: 1642-2004* (6th ed.). New York, NY: McGraw-Hill.
- Szreter, R. (1964). The origins of full-time compulsory education at five. *British Journal of Educational Studies*, 13(1), 16-28.
- Warder, K. (1999). Born in december: Ready for school? Research Report.
- Wils, A. (2004). Late entrants leave school earlier: Evidence from Mozambique. *International Review of Education*, 50(1), 17-37. doi:10.1023/B:REVI.0000018201.53675.4b

Wood, C. (1997). *Yardsticks: Children in the classroom ages 4-14. A resource for parents and teachers*. Turners Falls, MA: Northeast Foundation for Children, Inc.