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Relationships between Kindergarten Entrance Age and Attendance Rates in Kindergarten through Second Grade

Julie A. McDonald
Western Michigan University, jmcd630@gmail.com

RELATIONSHIPS BETWEEN KINDERGARTEN ENTRANCE AGE AND ATTENDANCE RATES IN KINDERGARTEN THROUGH SECOND GRADE

by

Julie A. McDonald

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Doctoral Committee:

Dr. Patricia Reeves, Ed.D., Chair
Dr. Louann Bierlein Palmer, Ed.D.
Dr. Lindsay Noakes, Ph.D.

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Western Michigan University, 2020

Education research over the last 50 years has found a significant relationship between academic achievement and kindergarten entrance age, with kindergarten students who enter school at the earliest ages tending to have lower academic achievement than their counterparts. Other studies have found that student achievement depends on factors such as class attendance rates and socioeconomic factors. Indeed, one issue consistently identified in education research as having a strong correlation to student achievement is student attendance, which makes intuitive sense because students must be present and engaged in school to learn. National research confirms that not only do attendance rates negatively impact student learning in the affected school year, but that students who are chronically absent as early as kindergarten have lower achievement in later grades as well.

Since there can be a wide age span for students entering kindergarten, there is reason to also examine the relationship between kindergarten age and attendance from the first year of K-12 education. To date, however, little research was found regarding the relationship between kindergarten attendance rates as defined by the Every Student Succeeds Act (ESSA) and kindergarten entrance age. This may be due in part to the variations in the age of compulsory school attendance, which spans four years across the 50 states and the District of Columbia (National Center for Educational Statistics (NCES), 2018).

The present quantitative study employed a quantitative, ex post facto design approach using existing student attendance database information from a mid-sized, Midwestern, urban school district to determine if there was a relationship between the two variables of children's age at kindergarten entrance and their attendance rate in each of grades Kindergarten through second grade. There were a total of 1,301 students covered within the data examined. Multiple linear regression and logistic regression analyses using Intellectus Statistics software determined that, when controlling for socioeconomic status, there was no relationship between the students' kindergarten entrance age and their K-2 attendance rates. There was, however, a relationship between socioeconomic status and attendance rates in kindergarten and first grade, irrespective of age of kindergarten entrance. There was, however, a relationship between socioeconomic status and attendance rates in kindergarten and first grade, irrespective of age of kindergarten entrance. This finding has important implications for local districts in that it is important to study their attendance rates, which consistent with the national and state-level studies, indicate that attendance rates are concerning as early as kindergarten.

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CHAPTER I

INTRODUCTION

For over 50 years, one of the most researched topics in education has focused on how to close the student achievement gap, which is defined as, "the observed, persistent disparity in measures of educational performance among subgroups of U.S. students, especially groups defined by socioeconomic status (SES), race/ethnicity and gender" (Berliner, 2009, p. 325). Researchers have focused their attention on studies that could provide insight into the interaction of educational issues that contribute to the achievement gap and how to best address these issues (Dickenson, 2016; Jackson, 2016; Jeynes, 2014; Jeynes, 2015). However, after over five decades of research, there is still a lack of consensus regarding which strategies should be used to close the gap and raise student achievement (Jeynes, 2015).

One issue consistently identified in education research as having a strong correlation to student achievement is student attendance (Reeves, 2008), which makes intuitive sense because, as Chang and Romero (2008) note, students must be present and engaged in school in order to learn. National research confirms that not only do attendance rates negatively impact student learning in the affected school year, students who are chronically absent as early as kindergarten have lower achievement in later grades as well (Chang & Romero, 2008; Gottfried, 2011; Musser, 2011). This link to achievement and regular school attendance makes it imperative right from the start because, during the early elementary years, children gain social and academic skills that are critical for academic success in later grades (Gottfried, 2011; Sprick, 2017). Conversely, young students who do not attend school regularly do not attain these essential skills. By third grade, they become disengaged, fall behind academically, fail courses, and require extra help to catch up

(Chang & Romero, 2008; Sparks, 2010). In addition, attendance rates in the early grades can have a far-reaching impact on students' later success in school. Chang and Romero (2008) found that high school dropouts tend to have a history of negative behaviors, including a high level of absences throughout their elementary years. Indeed, the impact of attendance rates shows a link between absenteeism as early as kindergarten and certain student success variables at later grades, such as high school completion (Allensworth & Easton, 2005). For instance, students who eventually drop out of high school had significantly more absences in first grade than their peers who graduated from high school. In eighth and ninth grades, the link between absences and high school graduation becomes even more pronounced, with regular attendance being a key factor for student success.

In order to tackle the attendance issue, the Every Student Succeeds Act (ESSA) (2015) changed the attendance metric of the 2002 iteration of the Elementary and Secondary Education Act (ESEA), commonly known as No Child Left Behind (NCLB). NCLB required schools to track and report only the metric of truancy (the number of days missing school without permission or unexcused absences). The new metric of ESSA requires that schools and districts examine data about chronically absent students, which is defined as those students who miss more than 10% of the school year regardless of whether the absence is an excused or unexcused absence (Sprick, 2017). The NCLB metric of Average Daily Attendance (ADA) (the average percentage of attendance across the entire student body) could easily hide an attendance problem in a particular grade level or for an individual student. For example, a school could have an ADA of over 95%, which is considered good, but a given grade level could be below 90% (Polikoff, 2017). Likewise, an individual student could have zero unexcused absences and would not be considered truant, but could have excused absences that equal over 10% of the school year. Under

NCLB, this would not be considered an attendance issue while ESSA metrics would flag that student chronically absent since 10% of the school year was missed even though the absences were excused. Interestingly, only 18 states and the District of Columbia require kindergarten attendance (NCES, 2018), yet calculations of the ADA, as well as the new ESSA metric, include kindergarten attendance. This is possible because all attendance metrics focus only on those students actually enrolled in school. Unfortunately, since Michigan is a state with a compulsory education age of 6, schools have no leverage to hold parents accountable for attendance if students enroll at ages 4 and 5.

While research shows negative attendance patterns attribute to the achievement gap throughout the K-12 years (Hanushek, Peterson, Talpey, & Woessmann, 2019), my proposed study was particularly interested in the link between age at kindergarten entrance and attendance rates in kindergarten through second grade. Since there can be a wide age span for students entering kindergarten, there is a reason to examine the relationship between kindergarten entrance age and attendance in the early years of K-12 education. To date, however, little research was found regarding the relationship between kindergarten entrance age attendance rates as defined by the ESSA in grades K-2. This may be due in part to the variations in the age of compulsory school attendance, which spans four years across the 50 states and the District of Columbia (National Center Education Statistics (NCES), 2018). Only eight states and the District of Columbia have a compulsory age requirement of five years old, which is considered on-time entry to kindergarten. The remainder of the states have compulsory age requirements in the range of age six to eight (Education Commission of the States (ECS), 2018). These variations in compulsory education requirements could account for the lack of attention in the research to the question of attendance rates of kindergarten students.

For those states with compulsory education starting ages of six to eight years, including Michigan, kindergarten attendance is not mandated because the compulsory requirement for formal education begins after the on-time, traditional age of 5, for starting kindergarten (ECS, 2018). To complicate matters, since there is no agreement from state-to-state on what the best age is to begin school, parents may choose to delay entry to kindergarten for a full year until their child is six years old (Great Schools, 2015). As a result, based on current kindergarten entrance policies and compulsory education laws, kindergarten classrooms in most states with a compulsory start age of age six or later, including Michigan, have a combination of four-, five-, and six-year-old students. Beginning in 2014, to reduce the age gap, Michigan moved the kindergarten entrance cutoff date for reaching the age of five from December 1 to September 1. Even with this change, students four years of age can still begin school, with a waiver signed by their parents, if their birthdays fall between September 1 and December 1. These early starters are defined as early entry kindergarteners. The shift in the cutoff date is an effort to skew the age range of kindergartners more towards five- and six-year-olds since the four-year-old students are required to have a waiver to enroll. This change occurred after the state had expanded funding for and promoted early childhood education with the emphasis on four-year-old, pre-school programs (Great Schools, 2015).

Parents and educators hold strong beliefs regarding academic practices that lack sufficient literature to substantiate the arguments for and against kindergarten entrance ages. The majority believe that a positive relationship exists between student's age at entry to school and academic success (Navarro, García-Rubio, & Olivares, 2015). Stories are also circulating in newspaper articles and from some parents who herald their children's success in both academics and school sports being related to the delaying their child's entry by two years. Experts,

however, have not agreed on the extent to which school attendance and academic success can be influenced by kindergarten entry age (Akareem & Hossain, 2016).

Agreement on the extent to which kindergarten entrance age impacts attendance could be lacking because little research exists giving detailed explanations on why high attendance rates are being experienced by some kindergarten children (States, Detrich, & Keyworth, 2017). Historical data has not established a rational, clear age for school entry and findings on the impact of age and attendance rates are mixed (Akareem & Hossain, 2016). Therefore, my study focused on trying to determine any relationship between age starting in kindergarten and school attendance in grades K-2 given the fact that the different states of the U.S. continue to differ on the appropriate age for a student to enter kindergarten.

Statement of the Problem

State lawmakers are given the authority to address kindergarten-related age issues, including compulsory school age, which in Michigan is age six. Michigan lawmakers set the minimum kindergarten entrance age requirement as reaching five years of age by September 1. State policy transitioned the change from December 1 to September 1 as the cut-off date for reaching the age of five to qualify for kindergarten enrollment; however, students can still be granted early entry to kindergarten with a parent signed waiver if they reach age five by the original December 1 deadline (ECS, 2014; Great Schools, 2015). Certain states, including Michigan and the District of Columbia also have policies that allow the practice of delaying entrance to kindergarten for a year beyond when they are eligible to enroll (ECS, 2018), allowing students who are already six years old to enter kindergarten alongside four- and five-year-old students. These “delayed entry” provisions result in the potential of students starting kindergarten in Michigan to range from age four to age six. The increasingly popular practice of delaying

entrance to kindergarten, also known as “redshirting” kindergartners, along with allowing the early entrance waiver have together contributed to a wider variance of ages within the same kindergarten classroom (Bazelon, 2008; Donath, Bates, Al-Bataineh, & Al-Rub, 2010; Dockett & Perry, 2003; Graue & DiPerna, 2000; Paul, 2010; Weil, 2007) and the further widening of the national age variance (ECS, 2014, 2018; NCES 2018).

The impact of the wide span of ages is illustrated in the following example. Johnny is four years old, turning five at the end of November, and Sam turned six in July. Both started kindergarten in the same classroom with the same curriculum and the same expectations, along with Susie, who turned five at the end of August, and Jenny, who was six at the beginning of June. This simple scenario depicts the typical variance of 18 months in any given U.S. classroom. These age differences are common because the entrance ages for starting school vary so widely from the youngest students to the oldest students within each state (ECS, 2014, 2018; NCES 2018).

Although kindergarten policies in Michigan allow four-, five-, and six-year-old students to enroll in kindergarten, only students who are six years old are required to attend school. Kindergarten is not required in Michigan, so parents of four- and five-year-old kindergartners (early entry and on time entry) are not compelled under the state’s compulsory attendance laws to enroll their children, while parents of six-year-old kindergartners (delayed entry) are compelled to do so. While some research exists on the topic of the varying school entrance criteria from state to state (ECS, 2018), not much has been known about how kindergarten entrance age (early entry, on-time entry, delayed-entry/redshirting) impacts children’s school attendance during early elementary school years.

Research has shown that more White, middle-class families are choosing to delay entrance to kindergarten (delayed entry/redshirt), while poor, minority students are more likely to begin kindergarten at age four or five (either early entrance or on-time entrance) (Datar, 2006; Graue, 2010). Several other studies have also explored kindergarten and academic achievement from a variety of perspectives (Chatterji, 2006; Davis, 2003; Elder & Lubotsky, 2008; Flanagan & McPhee, 2009; Halle, Forry, Hair, Perper, Wandner, Wessel, & Vick 2009; Janicki & Banicky 2013; Lloyd, 2015; Stipek, 2002; United States Department of Education, 2014; West, Denton, & Germino-Hausken, 2010; Zill, Loomis, & West,1997). These studies indicate that gender, race/ethnicity, and socioeconomic status are associated with significant differences in achievement even at the primary grades, including kindergarten (Lee & Burkham, 2002; Piotrowski, 2010; Yesil-Dagli, 2006; West, Meek, & Hurst, 2000). However, none include kindergarten attendance metrics.

Even though kindergarten is typically, but not specifically, required under compulsory attendance statutes, most educators and parents believe that kindergarten is an important foundational year in a child's education. Additionally, there are studies that suggest kindergarten has a positive association on the development of students' social and academic skills (Gottfried, 2011; Sprick, 2017; West et al., 2000). Since attendance is an important indicator of later academic success (Gottfried, 2011; Steward, Steward, Blair, Jo, & Hill, 2008), attendance can be considered important at the kindergarten level as well.

Chang and Romero (2008) indicate, however, that lower socioeconomic status students are absent more frequently than students from other economic subgroups, which may be associated with the achievement gap. This raises the question of whether or not there is a link between age at kindergarten grade level and attendance. Bruner, Discher, and Chang (2011)

point out that, nationally, almost 10% of kindergartners and first graders are chronically absent and in some districts, these attendance rates can rise as high as 50%. However, the published research had yet to include studies that explore whether a student's age at grade level is associated with attendance.

As parents, administrators and educators continue to debate the appropriate age for children for beginning school, the majority are still worrying that a young child cannot compete effectively with older classmates (Buchan & Stallions, 2018). Furthermore, the heads of schools also believe that if one enters kindergarten at an early age, meeting rigorous academic standards may be difficult and could eventually affect the school's accountability level. Literature has focused on the impact of age on overall school academic achievement, but insufficient information has been available regarding the attendance rate.

Finally, kindergarten entrance age frequently dominates school districts' readiness policies. Many school readiness surveys concentrate on asking questions regarding whether a child is too young to enroll. Kindergarten teachers argue that age is used to explain decisions relating to retention of children in kindergarten, and it is the factor that is figuring prominently in the definition and belief associated with readiness and attendance at kindergarten (United States Department of Education, 2016). Age, therefore, is being applied by society as a selection mechanism or an index for measuring eligibility. As such, a change in the age of kindergarten entry affects the percentages of students that meet certain skill or academic standards as well as boosts or diminishes a school district's standing on certain metrics.

Since the average age span in kindergarten for most states is 18 months, and there already exists a link between student attendance and their academic success, age discrepancy as a possible factor in attendance patterns is a point of research interest. The relationship between

kindergarten entrance age and its influence on attendance rates in grades K-2 – and the potential impact on later student achievement – could inform policy makers at the state and local levels concerning kindergarten entrance ages, attendance policies, and compulsory education laws.

Purpose Statement and Research Questions

The purpose of this study was to examine the relationship between age at initial kindergarten entry and attendance rates in kindergarten through second grade. This study also looked for where that relationship, if there was one, showed up in attendance rates compared to the attendance rate classifications defined by the State of Michigan on MiSchoolData.org (The Center for Education Performance and Information [CEPI], 2018). The following research questions guided the data analysis:

1. For a sample of urban students within one medium-sized district in a Midwestern state who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, what is the age (in days since birth) at the date they start kindergarten, and what is the absence rate distribution for those same students during their kindergarten year?
2. When controlling for SES for the same sample of students, does age at kindergarten entry predict absence rate in the kindergarten year?
3. When controlling for SES, does age at kindergarten entry predict absence rate in:
   a. grade 1 (for students entering kindergarten in 2013, 2014, 2015, and 2016); and
   b. grade 2 (for students entering kindergarten in 2013, 2014, and 2015)?
4. When controlling for SES, for students who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, does age at kindergarten entry predict chronic absence rate (≥10%) in the kindergarten year?
5. When controlling for SES, does age at kindergarten entry predict chronic absence rates (≥10%) in:

a. grade 1 (for students entering K in the fall of 2013, 2014, 2015, and 2016); and

b. grade 2 (for students entering K in the fall of 2013, 2014, and 2015)?

National research shows that up to 7.5 million students are chronically absent (Chang & Romero, 2008; Ginsburg, Jordan, & Chang, 2014). Researchers are beginning to determine that chronic absence in early elementary school is one of the most overlooked potential student achievement indicators (Chang & Jordan, 2010; Chang & Romero, 2008; Duardo, 2013; Education of the States, 2014; Romero & Lee, 2007; Sparks, 2010). Attending school on a regular basis in the early elementary years is particularly important for students to gain the social and academic skills needed for academic success in later grades (Gottfried, 2011; Sprick, 2017).

Previous studies suggest that attendance rates of 10% or more have the most significant negative relationship with student achievement (Ginsburg et al., 2014). Thus, rates of 10% or more have been labeled "chronic" (Sprick, 2017). Evidence suggests that students who are chronically absent in early elementary school are most likely to drop out of school before high school graduation (Demir & Karabeyoglu, 2015; Ginsburg et al., 2014).

Conceptual Framework and Narrative

State educational policies that determine what age students are required to begin formal K-12 schooling have created an age variance in every kindergarten classroom. This age variance continues and can even expand with retention or other interruptions in grade advancement throughout the remainder of the K-12 grade levels. As depicted in Figure 1, current Michigan kindergarten policies create classrooms with student ages ranging from the ages of four to six.

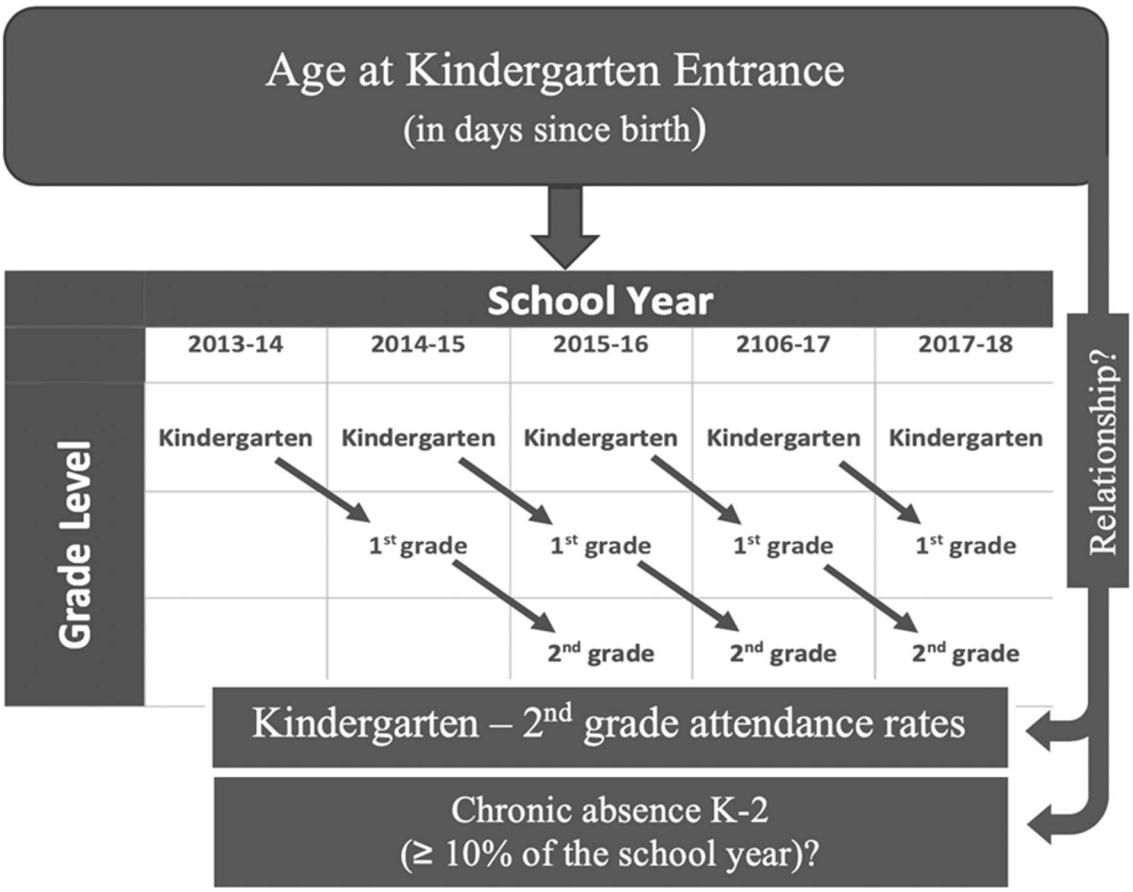

Figure 1. McDonald's conceptual framework for study.

Chronic student absence reduces even the best teacher's ability to provide learning opportunities for students to attain the academic and social skills needed to be successful (Chang & Romero, 2008). Students who attend school regularly achieve at higher levels than students who do not have regular attendance (Adelman & Taylor, 2006). This relationship between attendance and achievement begins to appear early in a student's school career. Romero and Lee (2008), in their study of young children, found that absenteeism in kindergarten led to negative first-grade outcomes; such students also had greater absenteeism in subsequent years and lower achievement in reading, math, and general knowledge.

While states must follow the ESSA guidelines of reporting chronically absent students (>10% absences), this is only required for those students who are six years old. Since four- and five-year-olds do not fall under the compulsory education law in Michigan, and chronic attendance rates can subsequently have negative outcomes later in their school careers, this study explored whether or not a student's attendance rate is associated with their kindergarten entrance age.

Methods Overview

This study examined the relationship between kindergarten entry age and attendance patterns in kindergarten over a three-year period for approximately 1,000 students from a Midwestern, urban school district. Since I did not attempt to change behavior or conditions and instead measured things as they are (Hopkins, 2008), I used a quantitative, correlational, ex post facto design approach. I utilized the district's student information system for student demographic (age, SES) and attendance data. Since the databases already existed and could not be manipulated, my study was categorized as non-experimental (Johnson, 2001). Creswell (2003) describes prediction research designs as those in which a correlation uses one or more independent variables as a criterion for one or more dependent variables. According to Mertens (2005), results from non-experimental research are not proof of cause and effect relationships. Johnson (2001), however, advocated that non-experimental research is important for educators to study non-manipulative variables, which are common in the field of education.

Significance

My study can provide educational leaders at the state and local levels with a better understanding of kindergarten attendance policies and attendance rates. While this study cannot be generalized to districts outside the one in the study, student attendance should still be of

interest to all educators, particularly for our youngest learners, since they are learning both social and academic skills in order to be successful in school. In light of the ESSA, which uses a different metric for attendance than ever used before, educators and policy makers at the state and local levels should find it helpful to know if current kindergarten entrance policies are in any way associated with kindergarten attendance rates. On one hand, if the data suggest a relationship between kindergarten entrance age and chronic absence attendance rates, this could allow the local educators to more intentionally focus on attendance and allocate more resources to the problem. On the other hand, if the data do not reveal a relationship between kindergarten entry age and chronic attendance rates in grades K-2, there could be fewer reasons to be concerned about the age of students as they enter kindergarten, since their attendance rates do not show an association with age.

Chapter I Summary

Researchers are beginning to determine that chronic absence in early elementary school is one of the most overlooked student achievement indicators. Attendance rates do not allow the student to gain needed social and academic skills to be successful in school (Gottfried, 2011; Sprick, 2017). This is because in order for students to be successful in school, they need to be in school. Evidence suggests that students who are chronically absent in early elementary school are most likely to drop out of school before high school graduation (Sparks, 2010). What has not been readily researched is attendance rates as defined by ESSA beginning as early as kindergarten. Students in Michigan are required to be in school at age six; however, there are kindergarten entrance policies that allow students to begin kindergarten at ages four and five. As schools and districts are trying to close the achievement gap, it is important to examine the association of kindergarten entry age and attendance rates. This study explored whether current

kindergarten age entrance policies are correlated to chronic attendance rates for our youngest students.

CHAPTER II

REVIEW OF THE LITERATURE

For many years, the field of education has wondered why some children seem to do well in school from the time they walk in the door, while others struggle. An area that is getting the attention of researchers is the notion that students must attend school regularly in order to learn. In a national analysis of testing data, Ginsburg et al. (2014) state an estimated 5 million to 7.5 million students miss nearly a month of school each year. However, states and school districts may overlook this problem because they are not considering the correct data. This chapter examines the effect of school entry age into kindergarten and attendance rates in order to investigate one possible overlooked data point. An in-depth review of attendance literature gives substance to the conceptual framework and ties together the importance of attendance for our youngest learners.

In addition to long-standing federal and state policies concerning kindergarten entrance ages, 1983 marked the beginning of the era of educational federal standards and accountability, inspired by the publication of *A Nation at Risk* (United States Department of Education, 1983). Later, in 1992, the National Education Goals were adopted and stated, "by the year 2000, all children will start school ready to learn" (National Association for the Education of Young Children, 1995, p. 1). At the end of the 20th century and beginning of the 21st century, educators in several countries were being held accountable for student achievement (Borkowski & Sneed, 2006; Reutzal & Mitchell, 2005; Mabry & Margolis, 2006). This worldwide accountability movement was one of the main forces behind the NCLB Act of 2001. NCLB required all states to improve learning by testing student outcomes each year beginning in grade 3. NCLB also required schools to measure performance of all subgroups (Owens & Sunderman, 2006),

specifically low-income students, minority students, students with limited English proficiency, and students with disabilities (Weiner & Hall, 2004). Since NCLB required schools to measure student performance, researchers also studied student performance. Interestingly, Voyles (2011) found that age has a statistically significant effect on student's academic performance during their first and third grade years in her quantitative dissertation examining the possible relationship between a student's age and gender on a state mandated assessment. Older students usually scored higher academically than younger students. Further, Voyles points out that gender did not affect achievement scores among learners. In an earlier study, Nederi, Abdullahi, Aizan, Sharir, & Kumar (2009), in a multiple regression study of 153 participants, also found that school entry age has an influence on the performance of students, finding that older students had higher academic grades than did younger students. Nevertheless, findings for these studies were not specifically based on kindergarten students.

The students who had higher attendance rates had substantially more appropriate behaviors and emotionally mature, which positively affected their determination and success. According to Eisenberg, Michalik, Spinrad, Hofer, Kupfer, Valiente, & Reiser (2007), in their longitudinal study including 214 children, five assessments, each two years apart, noted that young students achieved relatively low grades because their emotional, intellectual, dispositional, and emotional selves were still developing. These factors also caused reduced attendance rates and low academic achievement. However, these results are limited by the fact that they were generalized across different academics and cannot provide a clear view about their attendance and performance levels among kindergarten students.

Weil (2007), observing a kindergarten class in North Carolina, argued that slight age differences influence students' learning in different activities and lessons. Kindergarten students

are usually on high pressure to meet expectations due to their rapid growth and development at a significant rate during their first few years of life. As a result, learning does not occur at the same level. According to Hughes (2016), there is a substantial statistical correlation between kindergarten entry age and reading scores. Looking at the relationship between kindergarten entry age and academic achievement in third grade of 1,039 students, Hughes states that students entering schools at early age performed more poorly than their older counterparts. Moreover, socioeconomic status and age had a significant impact on the academic performance among students. Similarly, Kowalczyk (2017) found in a quantitative, quasi-experimental study, that an older age at the start of kindergarten is the determinant of academic achievement, and she recommends that parents and early childhood educators should offer assistance in deciding when children are ready for school. Therefore, most studies support the notion that students who enter kindergarten at an older age have better academic achievement than those who started at an earlier age. However, these studies primarily focused on kindergarten entry age, socioeconomic status, and subsequent achievement but did not examine other variables such as attendance.

Attendance and Attendance Rates

Definitions and Metrics

The ESSA, the current iteration of the Elementary and Secondary Education Act, changed the attendance metric of measuring truancy, the number of unexcused absences in a year, to the percentage of days missed in any given school year (Schanzenbach, Bauer, & Mumford, 2016; Chang, Bauer, & Byrnes, 2018) with attendance rates defined as missing 10% or more of the school year. When calculating truancy, districts would determine their Average Daily Attendance (ADA). Under these metrics, a satisfactory ADA was 95%, which has been proven to hide individual student attendance issues. Bruner et al. (2011) confirm the premise that

districts and schools may fail to detect high levels of attendance rates by solely calculating the ADA. In their study of three urban districts, their analysis found that ADA can mask attendance rates, even those with a 95% ADA. Schools with ADA rates higher than 97% were found to rarely have a problem with attendance rates, while schools with ADA rates between 93% and 97% could have a high number of attendance rates, with additional data analysis necessary. Additionally, schools with ADA rates of 93% or below are most likely dealing with attendance issues. It is important to note that measuring attendance rates account for all absences and do not depend on the reason. The ADA only accounts for unexcused absences to measure truancy, while attendance rates include all days a student spends out of school for "unexcused absences (truancy), exclusionary disciplinary action (out-of-school suspension), sick days, family vacations, or being kept at home" (Schanzenbach et al., 2016, p. 6).

Link Between Attendance and Academic Achievement

There is a growing body of research demonstrating that chronic absence from school is a primary cause of low academic achievement (Balfanz & Byrnes, 2012b; Chang et al., 2018; Ginsburg et al., 2014; Gottfried, 2009; Navarro et al., 2015; Schanzenbach et al., 2016; Therriault, Heppen, O'Cummings, Fryer, & Johnson, 2010). In a study analyzing national testing data, students with higher absenteeism rates scored lower on national standardized tests than students with satisfactory attendance (Ginsburg et al., 2014). Schanzenbach et al. (2016) summarize lessons learned from NCLB and how they relate to the new accountability metric under ESSA and noted that when students are not in school learning what is being taught, they score lower on coursework, course exams, and standardized tests. Marburger (2006) investigated the impact of enforcing an attendance policy on absenteeism and student performance and the evidence suggested that students scored higher on assessments when they were present for the

learning of the material while absent students scored lower. As Schanzenbach et al. point out, every policy in education assumes students are attending school, while Marburger posits that student attendance matters in order to learn all the needed material in classes. In 2016, the Michigan Legislature passed a law requiring schools to identify learners who struggle with reading. The law states that third grade students may repeat third grade if they are more than one grade level behind beginning with the 2019-2020 school year (Michigan Department of Education, 2019). Ginsburg et al. (2014) explained that not only does early elementary attendance matter, but lost instructional time due to absences exacerbates dropout rates and achievement gaps along with making it difficult to master reading by the end of third grade.

During the early elementary years, students are learning basic social and academic skills that are necessary for school success. If students are unable to attain the social and academic skills by third grade, they are at a higher risk for dropping out of school in later years. However, low attendance rates in elementary schools are typically overlooked (Chang & Jordan, 2010; Chang & Romero, 2008; Duardo, 2013; ECS, 2014; Romero & Lee, 2007; Sparks, 2010). In order to deepen their understanding of attendance rates in the early elementary years, Chang and Romero (2008) conducted a national study using the Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K). Their research found that chronic absence in kindergarten is impactful for all children. Within this same study, Chang and Romero found that elementary schools that serve mostly poor, Black, and Hispanic students have higher incidents of attendance rates. This issue is a contributing factor to the achievement gap between poor, Black, and Hispanic students and their White, Asian, and middle-class peers (Duardo, 2013). Attendance problems that surface in kindergarten are likely to continue into first grade. Duardo (2013) investigated the reasons why some kindergarten students are chronically absent, and pointed out

that students continue to fall behind in reading, math, and general knowledge by the end of first grade. Poor children, defined as those eligible for the National School Lunch Program (NSLP), continue to fall behind with attendance rates in kindergarten strongly associated with lower reading and math performance in fifth grade (Chang & Romero, 2008; Duardo, 2013).

While national research reveals that up to 7.5 million students have chronic attendance rates, it is likely that attendance rates are even more problematic in some districts and schools (Chang & Romero, 2008) than the national data suggest. Ginsburg et al. (2014) analyzed national testing data showing students with higher absentee rates have lower scores on national standardized tests. In their study, they conducted a state-by-state analysis with their findings holding true at every age, in every racial and ethnic group, and in every state and city examined. They concluded that students with more absences have achievement levels that are up to two years below their peers. While students from low-income families are more likely to be chronically absent: however, missing too much school affects the achievement level of students across all socio-economic groups.

To understand the effects of attendance rates, the Rhode Island Department of Education (2019) reproduced the national study to determine if the attendance patterns still held true at theie state level. RIDE found that kindergartners with chronic attendance issues scored lower in reading and math, which mirrors the national data. This study also found that chronic attendance in kindergarten showed negative math and reading achievement in subsequent years. The achievement gap actually grew larger at each grade level if the student was a kindergartner with chronic attendance rates. Overall, Rhode Island reported public elementary schools with ADA rates of around 90%; however, over the course of the year, with the chronic attendance metric, 39% of the students were chronically absent. The problem of chronic attendance in Rhode Island

had gone unnoticed until they began to look at the attendance data differently, that is calculating both the ADA and the percentage of chronic attendance. Rhode Island's state-level research also concluded that poor, Hispanic and Black students have the highest percentage of students with chronic attendance, which also matches the national data. Bruner et al. (2011) explain that it is important for schools and school districts to study attendance rates since there are national and state-level studies indicating that attendance rates is concerning as early as kindergarten.

Several large, urban districts, New York City (Balfanz & Byrnes, 2012b), Baltimore City Schools (Connolly & Olsen, 2012) and the School District of Philadelphia (Rogers, Duncan, Wolford, Ternovski, Subramanyam, & Reitano, 2017) have conducted research considering chronic attendance measures. Each district used the information from *Present, Engaged, and Accounted For* (Chang & Romero, 2008) to begin their journey in combating chronic attendance. Each of the studies mentioned that chronic attendance rates is a national problem, citing Balfanz and Byrnes (2012a), "it is estimated that between 5 million and 7.5 million students nationwide are not attending school regularly" (p. 5). Interestingly, in these studies, New York City did not break down the data by grade level, only by chronic attendance rates. Baltimore and Philadelphia did not include kindergarten in their studies of chronic attendance; they began in first grade, even though the national study (Chang & Romero, 2008) and Rhode Island's data show kindergarten attendance matters. Nationally, approximately 10% of kindergartners are chronically absent, with some communities as high as 25% (Bruner et al., 2011), and chronically absent children fall behind their peers in first grade academically. For instance, the chronically absent students at both kindergarten and first grade could not read proficiently by the time they left the third grade. The study showed that of the students who missed school for less than 4.9% (satisfactory attendance), three-quarters of them were proficient readers in third grade. Schools within the

same district can have a range of attendance rates from less than 1% to more than 50%. In March 2011, then U.S. Secretary Arne Duncan noted that most at-risk students are those who are missing too many days of school per year (Campaign for Grade-Level Reading, 2011).

Gottfried (2010) in an empirical study evaluating multiple measures of achievement found a positive correlation between academic success and students' attendance. The result showed a positive and statistically significant relationship between academic achievement and student attendance for both elementary and middle school students. Fedelemoula (2018) confirmed Gottfried's findings by finding a positive correlation between final exam performance with mandatory attendance in college courses. Although this study was formed from a small sample size, Fedelmoula indicated that class attendance is critical for learning; however, he indicated further studies ought to be conducted including English language proficiency, gender, and grade point average with a larger sample size. Kassarnig, Bjerre-Nielsen, Mones, Lehmann, and Lassen (2017), based on their study which measured attendance data of 1,000 undergraduate students, showed that class attendance is a key predictor of student's performance and subsequent course achievement with a strong correlation between attendance and academic performance. Similarly, Irwin, Burnett, and McCarron (2018) argued that there is a statistically significant and positive correlation between performance on final examinations and attendance. Their study focused on the relationship between attendance and academic performance at the university level unlike my study which investigated attendance during kindergarten through second grade.

Davis (2011) in her study of first year university students also had results suggesting a positive correlation between attendance and academic achievement. She proposed that attendance has a significant impact on academic achievement in the first year, whereby, higher

attendance rates enhance success. Olufunmilayo (2017) revealed a significant effect between a student's performance and class attendance when he investigated the impact of classroom attendance on academic performance of second year university students. The issue of class attendance and performance has been a concern for students in higher learning institutions, particularly for first- and second-year students. To that end, my study focused on kindergarten students and the impact of kindergarten age at entry and attendance rates.

Link Between Attendance and Other Student Success Factors

High school completion and student engagement are success factors that can be linked to positive student attendance.

High school completion. Research indicates there is no single risk factor for predicting high school dropout. Instead, there are many risk factors, that in combination with each other, raise the chance that a student will drop out of high school (Gleason & Dynarski, 2002). Gleason and Dynarski (2002) summarized the implementation and impact findings from a large evaluation of federally funded drop-out prevention programs. High school dropout rates particularly correlate with high poverty rates, poor school attendance, poor academic performance, grade retention (i.e., being held back), and disengagement from school. Hammond, Linton, Smink, and Drew (2007) had similar results in their collaboration with the National Dropout Prevention Center while conducting a comprehensive study of the drop out crisis in the United States. There is a growing body of research to help prevent high school dropout by addressing problem behaviors, promoting academic success, and enhancing overall health and wellbeing for students. One factor contributing to attendance rates are school suspension rates, which are included in a student's overall absence rate and are also associated with dropping out

of high school (Balfanz et al.,2015). Chronic attendance data is a valuable indicator in determining whether a student will graduate from high school (Schanzenbach et al., 2016).

Studies indicate that a student dropping out of school is a culmination of a long process that could start long before an individual discontinues attendance. According to Demir and Karabeyoglu (2015), in study investigating factors leading to absenteeism in high school, their survey of 581 students indicated that getting used to being absent from school in their first years of learning contributed to their absenteeism in high schools and dropping out of school. The researchers established that when students are fond of being absent, the passion to be in school diminishes at a snowballing rate. Moreover, high school graduation is affected by attendance rates, which later reduces the chances of succeeding in college. The findings confirm those of Ginsburg et al. (2014), with both studies reinforcing the importance of intervening during early stages when students start recording successive absences. However, these studies do not show the differences in attendance rates based on the kindergarten entrance age even though kindergarteners with chronic attendance rates will be our future dropouts (Campaign for Grade-Level Reading, 2011).

High school completion is also determined by the educational expectations of parents regarding their children determine whether a student from different cultural background persists towards completing high school (Demir & Karabeyoglu, 2015). Irwin et al. (2018) stipulate that high-school completion is also influenced by significant positive predictors, such as parents' participation in school functions. Therefore, there is a need to expand culturally sensitive and developmentally appropriate policies to promote family and school engagement.

Engagement. Student engagement relates to the degree of attention, interest, passion, and optimism that a learner demonstrates while being taught, which also extends to their motivation

of learning and progressing in their education. Improving students' engagement is among the instructional objectives that educators express. Dubay and Holla (2016) state that chronically absent students in prekindergarten are likely to be chronically or severely absent in their elementary schooling. Their research consisted of examining attendance in grades from pre-school through second grade. Their findings showed other factors contributing to attendance rates included family challenges, such as chronic homelessness, child health problems, parental attitudes, and unemployment. Dubay and Holla reiterate Chang and Romero's (2008) notion that attendance is important in elementary school since students must be present and engaged to learn. Even if a child becomes engaged in a given sport, absenteeism may interfere with their progress and ability to grasp vital tactics. The situation makes it hard for them to be engaged because the only effective method to improve the attendance of young students is through collaborative efforts of partners including the school management, teachers, and community organizations support. The study, however, used a small sample size to represent a whole Chicago County. Therefore, the findings could not be generalized for a large population.

Cassell (2007) found a positive correlation between student attendance and engagement in his dissertation examining the relationship between student attendance and test scores on a criterion referenced test. He asserted that students who attended school on a regular basis were more engaged in their classwork. The findings were in tandem with those of Adelman and Taylor (2006) who offer in-depth understanding for a wide variety of barriers to student learning, as well as, a learned synthesis of the best thinking about student motivation and healthy development. However, they did not categorize the performance according to the attendance patterns. Lee, Tsai, Chai, & Koh (2014), based on their study that surveyed over 700 secondary school students with the results validating the four-factor structure model, argued that effort in

learning, particularly behavioral and emotional engagement, significantly contributes to reading performance. Nevertheless, the study was not specific to attendance parameters when measuring engagement for younger students.

The probability of a being successful in school and graduating from high school is affected by active parental engagement in their children's education process, with the main elements that should be under control including, but not limited to, healthcare, parental care, food and shelter Burleson and Thoron (2017) assert that unless the basic elements of Maslow's hierarchy of needs are met, students cannot fully engage in school. Zorc, O'Reilly, Matone, Long, Watts, & Rubin (2013) longitudinally followed a cohort of at-risk children ages 5 to 8 years old and argue that engagement increases positive relationships with teachers and peers. The Oregon Chief Education Office in their executive summary to better understand attendance rates and hear from student and families most likely to be chronically absent, state approximately 46% of students that drop of out of school indicate the school environment and lack of school engagement can discourage a person completely, especially if the teachers fail to understand the family background of students (Stevens & Kim-Gervey, 2016). Furthermore, in their policy recommendations to school boards, Talbert-Johnson and Russo (2013) state that school staff must build strong relationships and develop partnerships with schools and families. Through those strong relationships, high-lighting the value of attendance and the consequences of poor attendance, schools may help alleviate issues that contributes significantly to attendance rates.

Dunlap (2016) investigated the influence of chronic absenteeism in a cross-sectional, correlational, explanatory study of 220 middle school students in New Jersey. Dunlap found that when parents do not engage in the academic activities of their children, there is an increased possibility of school drop-out with an approximate of 69% in high school. Similar to Talbert-

Johnson and Russo, offering families, along with their students, a role in improving attendance is essential to engage the students in school and promote positive relationships with the school community. Perceived low expectations from parents can induce declining self-esteem among students who are nonperformers and eventually lead to demotivated students in the classroom (Talbert-Johnson & Russo, 2013). The study by Lee et al. (2014) revealed that student's experiences may be associated with completion of homework and full engagement in class and, if these two elements are not motivating and are sufficiently challenging, there is increased likelihood of chronic attendance rates and academic failure.

Influences on Attendance and Absenteeism

There are several influences that can contribute to the attendance rates of students.

Academic failure. Attendance and the link to academic failure have been researched for many years. Perry (2010) in her quantitative study determining whether the age at kindergarten had an effect on literacy and language arts achievement from kindergarten to eighth grade argued that young students who miss school regularly are weaker in language arts and literacy achievement during the first and second grades. The students who are absent more frequently from school are referred to special education at a higher rate than are classmates who attend regularly. While the absenteeism appeared to be the link to failing academically, there may be other factors leading to learning problems and failure. Taylor, Klein, Anselmo, Minich, Espy, & Hack (2011) in their longitudinal study involving a cohort of 148 children born between January 1, 2001, and December 31, 2003, with extremely preterm birth, defined as less than 28 weeks' gestation or having a birth weight of less than 1000 g, and 111 classmate control individuals born at term with normal birthweight, stated that learning problems are associated with neonatal risk factors, socioeconomic status among students with extremely preterm birth, and early childhood

neurodevelopmental impairment. In regards to this, they supported efforts to provide more extensive interventions and monitoring before and during the first year of school. Abbasi, Kalhori, Taheri, Heidari, & Dehghani (2015) from their qualitative study with data collected in face-to-face interviews exploring factors causing academic failure, stated that student's academic failure is associated with multiple elements. These elements include teaching methods, lack of formative assessments of teachers, failure to comply with lesson plans, curriculum, large numbers of students in class, and lack of interaction between the faculty and the class. However, Abbasi et al.'s research is limited by the fact that a small study population was used, with data from only 21 students analyzed. Moreover, the results were based on university students and, cannot act as a good representation of kindergarten students.

Social/emotional influences. As noted previously, students have lower performance in school when absent from school. These high absentee rates can also affect their classmates with higher attendance since teachers use class time to repeat or remediate lessons that were missed (Schanzenbach et al., 2016). Therefore, when children are chronically absent, the educational experiences for their classmates can also be diminished. Teachers diverted their attention to the social and academic learning of the chronically absent students when they did attend (Chang & Romero, 2008). Gottfried (2011) found that certain kindergarten social skills, including the ability to pay attention, working independently, additivity, and persistence, were lacking in students with chronic attendance rates. These students were not willing to learn new things and were less engaged in classroom activities even though the kindergartners began the school year with similar levels of engagement.

School takes a pivotal role in a child's academic, emotional and social development. From extant literature, it is clear that frequent absence from school leads to poor academic

outcomes and other factors, such as future unemployment, economic deprivation, and social deprivation. Finning, Ukoumunne, Ford, Danielson-Waters, Shaw, Romero, De Jager, Stentiford, & Moore (2019) in a meta-analyses of 4930 qualitative studies found that poor mental health is also a risk factor that reduced school attendance, and in particularly students' anxiety. Considering that various facets in the school setting have the potential to evoke anxiety, such as the social interaction with peers and educators, academic stress, and separation from primary caretakers. Some students avoid school by all means. Somatic symptoms such a fatigue, headaches and stomachaches are common with children with anxiety and exacerbate school refusal, as adults may interpret it as physical health issues. Some end up being diagnosed with severe social and emotional problems, when it is simply anxiety. Finning et al.'s meta-analyses also showed a strong association between anxiety and truancy, as well students refusing to go to school.

In Sahin, Arseven, and Kilic's (2016) qualitative case study, 64 primary and secondary school principals were interviewed regarding causes of students' absenteeism and school dropouts resulting in five categories: causes originating from the family, causes originating from the director and teacher behaviors, causes originating from the school setting, causes originating from the student and environmental causes. Their study recommended cooperation between the school and the family should be maintained and the awareness of families regarding the attendance at school should be raised.

Home influences. According to Hixson (2012) a student's family structure influences their school attendance, which in turn influences achievement. In this study, excessive absenteeism was associated with family challenges, including minimal support for academic endeavors. Students with eight or more absences had low reading achievement scores as

compared to those with fewer absences was the focus of this quantitative, causal-comparative study. It was designed to determine which factors are associated with students whose reading achievement suffers the most from school absences for 6th, 7th, and 8th grade students in a Georgia middle school. This study was limited to reading, therefore, an assessment of other subject areas and/or grade levels may reveal more insights on how family structure impacts the attendance of students. Erbstein and Olagundoye (2016) identified in their study of 191 chronically absent students in the Sacramento Unified School District, ten obstacles that hinder students from regularly attending school. Among high ranking attendance challenges are parent health, unfulfilled basic needs, transportation, and student responsibilities outside of school. These factors could be regarded as home influences, as they are outside of school. On transportation, for instance, a student could not get to school due to the family car breaking down or not having transportation. The responsibilities of outside of school category included factors such as family care, housework, jobs, and non-school sponsored activities or clubs.

Jones and Dagli (2012) used the Early Childhood Longitudinal Study (ECLS-K) 1998-99 in a longitudinal survey study which captured information about children's development, their family, home and school environments. They acknowledged that the family (parents) of a child determined when to start school. Therefore, the decision of whether a child started early, on time or delayed was entirely at the parents' discretion. Children from less advantaged backgrounds and non-Whites benefitted from early or on-time enrollment than they did from delayed enrollment. Students who a delayed kindergarten enrollment had stronger mathematics skills as compared to their counterparts who enrolled on time and by far to those who enrolled earlier. Differences in home environment, such as availability of educational toys, computers, home tutoring and enrollment in better schools among other factors associated with high

socioeconomic status (SES) contributed to better performance among children, even if they were redshirted. Likewise, the relationship between school enrollment status and gender, race, and SES revealed inconsistent findings considering that the aspects function differently for different genders and races. The fact that the study utilized a nationally representative sample acted as strength for the research and increased its chances of yielding reliable results that could influence policymaking.

Behavioral influences. The Federal Law mandates academic performance as a top priority for all students across the U.S. in public schools. Although teachers work diligently to efficiently accomplish these higher levels of academic excellence, behavioral factors compromise that progress. In relation to this, Kremer, Flower, Huang, & Vaughn (2016) stated that behavior problems have a negative relationship with academic performance. Their study examined the association of externalizing and internalizing behavior and academic achievement through a longitudinal survey that collected demographic information and socioeconomic characteristics from a nationally representative sample of individuals and their families. The results suggest that there is an inverse relationship between achievement and behavior and that this relationship has lasting effects over time. Morgan and Sideridis (2013) stated that prevalence rates in the U.S. for problem behavior range between 10% and 30% and managing problem behaviors at school is an ongoing reality for classroom teachers. Compiling correlational and experimental studies concerning problem behaviors in schools, Morgan and Sideridis noted some of the behavior influences, such as out of school suspension, could not be used to predict academic achievement. In fact, inattention and other learning-related behaviors interfered classroom learning, which adversely affected their performance. Blazar and Kraft (2017), drawing from a dataset from the National Center for Teacher Effectiveness (NCTE) which

consisted of upper-elementary classrooms that collected teacher–student links, observations of teaching practice that were scored on two established instruments, found that attitudes and behaviors of both teachers and students have a significant impact on student's performance and long-term success. Similarly, Banerjee (2016), in their systematic review of 771 studies conducted to identify factors linked to underachievement of disadvantaged pupils in school science and math, stated that underachievement in math and science was associated with lack of positive environment and support, which contributed to behavioral problems that eventually affected performance.

Strategies to Improve Attendance

The literature revealed several strategies that have been studied in an attempt to improve student attendance.

Academic systems of support (MTSS, alternative programming). Hagans and Powers (2013) define Multi-tiered Systems of Support (MTSS) as an integrated, comprehensive framework for local educational agencies (LEA) that helps in aligning social-emotional, behavioral, and academic learning to benefit all students. Therefore, it implies that MTSS seeks to align resources and initiatives within the schools and offers potential opportunities for creating systematic change via intentional integration of supports and services. According to Sugai (2012), educators using the support system quickly identify and focus on individualized student's needs by employing student-centered-learning, differentiated learning, core instruction, and aligning systems that enhance social, behavioral and academic success. By intentionally designing supports and services using Positive Behavioral Interventions and Supports (PBIS) and Response to Intervention (RTI), which are part of MTSS, the potential exists for creating

required systematic changes that are associated with school attendance (Ziomek-Daigle, Goodman-Scott, Cavin, & Donohue, 2016).

Despite establishing data-driven frameworks for promoting positive behavioral and academic outcomes among the students, Hagans and Powers (2013) argue that MTSS is also associated with the establishment of favorable and safe school climates. School counselors promote the concept of MTSS by taking the leadership role in developing and implementing these useful frameworks (Ziomek-Daigle et al., 2016). As a result, school counselor gets opportunities to use MTSS to create a lasting impact on behavioral development as well as the students' academic success in kindergarten. According to Ziomek-Daigle et al. (2016), the six key tenets of a successful the MTSS framework implementation include: school-wide stakeholder collaboration, students' needs determine the degree of support given, school and student data drive procedures and decisions, the system utilizes evidence-based practices, it is rooted in prevention and proactivity and lastly, with adequate support, all students can achieve grade-level learning. Tertiary, secondary and primary tiers comprise the MTSS continuum of prevention tiers. The approximate number of successful students receiving behavioral and academic curriculum or only primary prevention is 80% (Sink & Ockerman, 2016). Some of the support strategies may involve applying evidence-based academic curricula and techniques, as well as teaching expected behaviors throughout the school.

In kindergarten, approximately 5% of the students receive tertiary prevention and 15% receive specialized secondary intervention to meet their elevated needs (Cook, Lyon, Kubergovic, Wright, & Zhang, 2015). Behavioral and academic success for each kindergarten child requires educators to provide higher degrees of supports and interventions (Wexler, 2018). To determine the level of need, academic benchmark assessments and behavioral data are used to

screen the students. Although, some schools are making significant efforts to move to universal screening with the aim of identifying children with current mental health issues, such as depression and anxiety (Eagle, Dowd-Eagle, Snyder, & Gibbons, 2015). All the three tiers comprise evidence-based practices, which are also data-driven. The six tenets of a successful MTSS frameworks are integrated into four main components. The first component as highlighted by Sugai (2012) is positive behavioral support whereby district and school staff select and implement the programs collaboratively to achieve the learning and social outcomes considered to be important in the child's life and transition to primary school. The entire school system requires consistent, predictable and strong classroom management structures to enhance the integration of intervention and instructional strategies that support systemic changes (Sink & Ockerman, 2016). The second component is an integrated data system that seeks to ensure adequate collaboration among district and site staff in creating an integrated data collection system. The system should comprise essential elements, such as data collection methods of parent surveys for continuous systemic improvement, informing decisions regarding tiered support placement through teacher observations and assessments, including progress monitoring, diagnostics, universal screening and state tests (Averill, & Rinaldi, 2013). The third component encompasses sustainable and systemic changes based on MTSS principles for promoting continuous improvement processes in grade, school site, and district levels. To sustain effective processes, Wexler (2018) argued that collaborative restructuring efforts are needed for successful implementation of strategies and supports, identification of key initiatives and collection, analysis and reviewing data. The fourth and final element is differentiated, high-quality classroom instruction, whereby students receive linguistically and culturally relevant, standards-

based instruction in the education classroom settings with a primary focus on Common Core State Standards (CCSS).

Social/emotional systems of support. Kearney and Graczyk (2014) suggested that families experiencing difficulties need to be referred to support systems, such as community services. At the same time, schools need to nominate some of the staff to track the attendance of learners and communicate to guardians and parents regarding absences. Similarly, Kendziora and Yoder (2016) asserted that introducing school-based therapy interventions will enable those with special needs to remain in school rather than skipping classes to attend the services. Developing an effective program can play an instrumental role in improving students' self-esteem and how to cope with life situations, including peer differences, family, depression, and anxiety. Finally, Mills, Howell, Kubler, Tomaszewski, Lynch, & Philips (2017) proposed that implementing connective approaches can motivate learners and improve the relationships between school, family and the student. Incentive approaches, such as rewarding students for improved attendance with certificates or prizes and sanction-based measures (or enforcing attendance laws) through penalizing students for absenteeism automatically, improve attendance.

Parent/home involvement. Bradley (2015) suggested that transportation support, parental involvement and increased communication between school and home would help improve attendance. Parents should be willing to supervise, guide and discipline where necessary. Similarly, Mahuro and Hungi (2016) note that greater level of parent engagement and the parents holding positive perceptions with low expectations on the performance of their children reduces the absenteeism. Holding a shared belief requires everyone's input and working together to instill a commitment to reducing absenteeism (Connolly & Olson, 2012). In a later study, Buchan and Stallions (2018) posited that parent's involvement in the school, for instance

through joining the parents and teachers' association, lowers the rates of absenteeism. Additionally, Buchan and Stallions proposed that absenteeism should be approached in a manner that shows concern, such as identifying why students are absent and helping with the barriers rather than focusing on compliance of attendance policies. Rafiq, Fatima, Sohail, Saleem, & Khan (2013) argued that when schools develop programs focusing on family and community partnerships, the rates of absenteeism go down. However, the study used a small sample size of secondary school students, which may not be wise to generalize the results to a wide population, more so to a kindergarten level.

Parental involvement is a significant variable that can have either positive or negative influence on the child's education especially in student's performance, educational development and academic success (Bouguen, Gumede, & Gurgand, 2015). Park and Bills (2015) state that children in elementary schools depend entirely on their teachers and parents and thus, there should be a close connection between school and home. For instance, a parent can be involved in helping the child complete homework or sometimes attend parent-teacher committee meetings in the school. However, the study by Masabo, Muchopa, and Kuoth (2017) showed that parents may have completely differently interpretations regarding the participation in the student's academic progress, which may lead to misperceptions that parents are over-involved. Likewise, parents may not be involved in school activities because of traditional beliefs that a parent lacks basic education to teach their children at home.

Engaging a parent in the child's school lives can increase home support, as well as the provision of knowledge needed in the completion of assignments and development of a life-long interest of learning (Park & Holloway, 2016). Ntekane (2018) found close relationships between home and school results in profound changes in classrooms because high engagement leads to

entire class' motivation, increase in grades, and portrayal of desirable behavior from students. There is a need to encourage parent engagement because it is universally recognized as the best strategy that creates positive learning environments for students from diverse cultural backgrounds. Furthermore, Ntekane argued that creating a community built on parent-teacher relationships requires sharing of responsibilities with the aim of improving how children in kindergarten learn and meet different educational goals and expectations. However, Bouguen, Gumede and Gurgand (2015) suggested that in the U.S., parents who value education have made commitments to prioritize academic success and teachers should commit to provide encouraging environments that foster collaboration with parents.

Educational researchers argue that a close connection exists between academic achievement and home involvement, and improving parent engagement is the most effective strategy to raise student's performance (Park & Bills, 2015). Future engagement opportunities to create stronger foundations for student's success depend on the ability to establish parent partnerships during kindergarten entry. Similarly, the research findings from Masabo, et al., (2017) reveal that parent engagement is associated with decreasing chronic absenteeism, as students with increased family involvement in their school activities report fewer days of school missed or dropout cases. Two-way communications between teachers and parents contribute significantly to committing students to raise their class participation levels and also promote daily school attendance.

Positive behavior support systems. According to Gill (2017), positive behavior interventions and supports (PBIS) decrease disruptive behavior; thus, enhancing attendance. In light of this, Reinke, Herman, & Stormont (2012) suggested that a universal tiered system of support for attendance and behavior, as it would be applicable to all students in the school.

Dunlop (2013) argued that a targeted tiered system puts the needs of the at-risk students into perspective. Intensive programs, such attendance awareness campaigns, contain information regarding impacts of absences, posts promoting attendance, parents' reminder emails, and an "attendance awareness month", which focuses on increasing attendance for the habitually truant and chronically absent students.

Climate/culture strategies. A student's culture and upbringing has profound effects on how they perceive the world and information processing. As a result, students' low academic achievements may be a result of the cultural, social and linguistic nature of their home environment that has not prepared them for the expected school activities (Maxwell, Reynolds, Lee, Subasic, & Bromhead, 2017). For instance, a kindergartener may not have the necessary equipment at home to carry out homework given by their teachers, so they cannot succeed in homework activities. Additionally, vocabulary development is affected negatively by inabilities to read, as well as verbal interactions at home (Hampden-Thompson & Galindo, 2017). From the cultural deficit theory, a deficiency in the home environment can lead to challenges in behaviors, knowledge and skills, which eventually result in poor school performance. Students from different cultural backgrounds are approaching learning and education in different ways, and teachers should be aware of the differences existing between the school climate and home atmosphere (Espelage, Polanin, & Low, 2014). There is a need for incorporating a broad range of instructional strategies in the classrooms for accommodating varying cultural notions and beliefs that students have when they are brought to school especially during kindergarten entry. Discrimination has to be avoided at all costs, and students should be treated equally by setting high expectations for every individual without considering age, gender, sex, and cultural settings

(Reynolds et al., 2017). This step will allow the students to strive on achieving their full potential based on academic achievement and success.

According to the Attendance Works framework, teachers are required to establish positive relationships with their students and families, in general. For example, they are asked to take attendance in a caring manner through greeting a student who has been away by name and welcoming them back (State of New Jersey, 2018). As a result, the student feels connected to the class and school community. Moreover, welcoming each family at the beginning of the year, postcards to welcome learners into the classroom, as well as, warm messages to the parents' portal motivate students to attend classes. Attending to the culture and climate of schools and classrooms can impact students' willingness to attend school (Attendance Works, 2018).

Absenteeism and Age

Attendance is a reflection on how schools, families and communities address the young learners' needs. In Michigan, the compulsory education law requires students to be enrolled at age six. Although kindergarten in Michigan is not required, the research in this study is related to chronological age of kindergartners in days since birth upon their initial enrollment, and Chang and Romero (2008) state that thousands of our youngest learners are at-risk academically due to absences. In their study, Chang and Romero found that chronic absence decreased when there was active communication between the school, community, students and the parents, including reaching out to families with children who start showing excessive absence patterns. While chronic early absence is a fundamental issue for school districts, it is often overlooked. At least under NCLB, there is tracking of attendance and unexcused absences at the elementary level. At the kindergarten level, however, attendance is not usually overemphasized. Chang and Romero synthesized the challenge of chronic early absence with the intention of addressing the problem

before it is intractable. Their study had almost similar objectives to the current study only that contrary to the ensuing study objective of establishing a link between kindergarten age entry and rate of absenteeism.

Age span at kindergarten. Most people think of formal schooling beginning at age 5 in a classroom being called "kindergarten." However, the NCES (2018) reports the compulsory school age, the age at which children are required to enter formal schooling, varies by four years across the 50 states and the District of Columbia (NCES, 2018). State lawmakers are given the authority to address kindergarten-related age issues, which include compulsory school age, kindergarten entrance age, early entrance to kindergarten, skipping kindergarten and kindergarten exemption (ECS, 2018). Due to each state creating separate policies, kindergarten entrance cut-off dates vary by seven months nationally, with additional policies that allow for early or delayed kindergarten entrance further widening the age variance (ECS 2014, 2018; NCES 2018). According to the ECS (2018), four states and the District of Columbia have entrance cut-off dates between December 1 and January 1, which leads to a mix of 4- and 5-year-olds enrolled in kindergarten. Thirty-five states have entrance cut-off dates between August 31 and October 16. These dates lead to a smaller number of 4-year-olds attending kindergarten, but still with a mix of 4- and 5-year-olds entering kindergarten each fall. Four states use August 15 as the entrance cut-off date, which would have all students turning 5-years-old before school begins in the fall. Six states leave the entrance cut-off date up to the local districts, and one state allows local districts to choose their entrance cut-off date.

Certain states and the District of Columbia have policies that allow the practice of delaying entrance to kindergarten (ECS, 2018), also referred to as kindergarten redshirting (Bazelon, 2008; Dockett & Perry, 2003; Donath et al., 2010; Graue & Diperna, 2000; Paul, 2010;

Weil, 2007). The practice of redshirting can create a mix of 4, 5 and 6-year-old children in the same kindergarten classrooms. According to many scholarly and popular reports, redshirting in kindergarten, the practice of delaying a child's entry into kindergarten for a year beyond when they are age eligible to enroll has become an increasingly common practice (Bazelon, 2008; Dockett & Perry, 2003; Graue & DiPerna, 2000; Paul, 2010; Weil, 2007). The idea of redshirting kindergartners comes from the redshirting practice in college athletics. Redshirting delays a college student-athletes participation in order to lengthen the period of eligibility. Typically, a college students athletic eligibility is four seasons, which corresponds to the four years of academic classes that are typically required to complete a bachelor's degree. As a redshirted athlete, students may attend classes at the college or university, practice with their athletic team, and dress for play but may not compete in games. By redshirting the athlete, he or she has up to five academic years to use the four years of eligibility.

In contrast, according to Lincove and Painter (2006), when redshirting a child for kindergarten, he or she may or may not participate in any academic or school preparation prior to enrolling in kindergarten. According to Donath et al. (2010), kindergarten redshirting is between 5% and 16% of all kindergarten students. Such redshirting, coupled with some states changing the age requirement for kindergarten entry (ECS, 2014), means that some students are beginning school when they are slightly older.

Age and academic success. In addition to long-standing federal and state policies concerning kindergarten entrance ages, 1983 marked the beginning of the era of educational federal standards and accountability, inspired by the publication of *A Nation at Risk* (United States Department of Education, 1983). Later, in 1992, the National Education Goals were adopted and stated, by the year 2000, all children will start school ready to learn (National

Association for the Education of Young Children, 1995, p. 1). At the end of the 20th century and beginning of the 21st century, educators in several countries were being held accountable for student achievement (Borkowski & Sneed, 2006; Reutzal & Mitchell, 2005; Mabry & Margolis, 2006). This worldwide accountability movement was one of the main forces behind the NCLB, with this law requiring all states to improve learning by testing student outcomes each year beginning in grade 3. NCLB also required schools to measure performance of all subgroups (Owens & Sunderman, 2006), specifically low-income students, minority students, students with limited English proficiency, and students with disabilities (Weiner & Hall, 2004). Since NCLB required schools to measure student performance, researchers also studied student performance. Interestingly, Voyles (2011) found that age has a statistically significant effect on student's academic performance during their first and third grade years. Older students usually scored higher academically than younger students on the mathematics assessments. Further, Voyles points out that gender did not affect achievement scores among learners. In an earlier study, Nederi et al. (2009) also found that school entry age has an influence on the performance of students, finding that older students had higher academic grades than did younger students. Nevertheless, findings for these studies were not specifically based on kindergarten students.

Not only does age affect performance, but Bakken, Brown, and Downing (2016) found that students with higher grades also have higher attendance rates compared to their lower performing peers. The students who had higher attendance rates had substantially more appropriate behaviors and emotionally mature, which positively affected their determination and success. Eisenberg et al. (2007) noted that young students achieved relatively low grades because their emotional, intellectual, dispositional, and emotional selves were still developing. These factors also caused reduced attendance rates and low academic achievement. However, these

results are limited by the fact that they were generalized across different academics and cannot provide a clear view about their attendance and performance levels among kindergarten students.

Age and other student success factors. Academic performance of first-grade students is affected by chronological age differences despite the fact that there are other factors involved (Kagan, Moore, & Bredekamp, 1995). Weil (2007) argued that slight age differences influence student's learning in different activities and lessons. Kindergarten students are usually on high pressure to meet expectations due to their rapid growth and development at a significant rate during their first few years of life. As a result, learning does not occur at the same level. According to Hughes (2016), there is a substantial statistical correlation between kindergarten entry age and reading scores. In regards to this, the scholar states that students entering schools at early age performed more poorly than their older counterparts (Hughes, 2016). Moreover, socioeconomic status and age had a significant impact on the academic performance among kindergarten students. Similarly, Kowalczyk (2017) found that an older age at the start of kindergarten is the determinant of academic achievement, and she recommends that parents and early childhood educators should offer assistance in deciding when children are ready for school. Therefore, most studies support the notion that students who enter kindergarten at an older age have better academic achievement than those who started at an earlier age. However, these studies primarily focused on kindergarten entry age and socioeconomic status and did not examine other variables such as ethnicity and attendance.

Chapter II Summary

The literature shows that students learn basic academic and social skills during their elementary years, and a positive correlation exists between students' attendance and academic success. As a result, class attendance is critical for learning (Paul, 2010). Attendance rates are

associated with factors such as school suspension rates, which contribute significantly to students dropping out of high school (Paul, 2010; State of New Jersey, 2018). Regular school attendance in kindergarten increases student engagement with students grasping new concepts and social skills. Conversely, attendance rates can affect students' abilities to gain needed social skills, such as, the ability to pay attention, work independently, and persistence. The students who are chronically absent may not be willing to focus on new learning or remain in the classroom as part of classroom activities despite the fact that the kindergarteners may have with similar levels of engagement.

Absenteeism can also result from having bad relations with peers, dislike for school and certain lessons and general school phobia. Some students consider dropping out or remain absent when they have negative attitudes towards a particular subject or if there are bad relationships with teachers and friends in the school (Kendziora & Yoder, 2016). From the existing studies, school absence is influenced by family structure which eventually leads to severe implications on academic achievement. Family challenges such as insufficient support for academic endeavors can lead to chronic attendance rates (Lee et al., 2014).

The literature reveals that low attendance rates have a significant impact on student's outcomes, social-emotional development, student disciple, and grade retention. Creating a secure learning environment motivates students to attend classes on a daily basis. MTSS can be applied to create a lasting impact on behavioral development, as well as the students' academic success in kindergarten (Balfanz & Byrnes, 2013; Chang & Romero, 2008; Gottfried, 2014). To improve attendance, effective communication between home and school, transportation support, and parental involvement is necessary. Involvement requires parents to willingly discipline, guide, and supervise children where necessary (Ginsburg et al., 2014; Jackson, 2016; Jeynes, 2014 & 2015). Attendance

can be enhanced by utilizing PBIS strategies that decrease disruptive behaviors. While thinking of appropriate ways to enhance academic achievement and school attendance, policy makers need to understand that not all states mandate kindergarten attendance and do not have the same policies for the age at which students are required to attend formal schooling.

Let us now turn to Chapter III, which details the methods for my study.

CHAPTER III

METHODOLOGY

My study examined whether current kindergarten entrance age policies are contributing to attendance rates in the youngest students. Specifically, this study examined the relationship between kindergarten entry age and attendance rates in kindergarten, first, and second grades based on data provided by a medium-sized, urban school district in a Midwestern state. This chapter provides a research methodology for this study in detail. The research design and methods are presented with a crosswalk table that provides a snapshot of data sources, measures/variables, and statistical analyses, organized by the research question. Population, data collection procedures/rationale, and limitations are also presented in this chapter.

Research Design

In order to address my research questions, I used a quantitative, correlational, ex post facto design approach using existing databases to determine if there was a relationship between the age children enter kindergarten and their attendance rates in grades K-2. Quantitative approaches usually focus on objective measurement of the numerical, statistical, and mathematical analysis of data gathered through surveys or questionnaires (Creswell, 2013). In this case, quantitative data was collected by manipulating pre-existing statistical information using computational approaches and then analyzed for any relationship between age of kindergarten entrance and their rate of attendance in early elementary school.

Correlational research focuses on examining the relationships between two or more variables. Correlational research is used when the statistical relationship is believed to be causal, but it is unethical or impractical to manipulate the independent variables (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005). In correlational research, the independent variables are

not controlled as in experimental research (Stuart-Hamilton, 2007) and, since the variables of my study already existed, it is considered non-experimental (Johnson, 2001).

Information from correlational research is used either to explain a phenomenon (explanatory design) or to make predictions (predictive design) (Ruane, 2016). Ruane explains that both explanatory and prediction correlational designs have a place in understanding data. Which correlational design to use depends on the goals of the research and/or the research questions. This research was designed to predict relationships between the independent variable (kindergarten entrance age) and the dependent variables (attendance rates in kindergarten, first, and second grades). Prediction research uses correlations between one or more predictive variables as the criteria for one or more outcome variables (Creswell, 2013; Vik, 2014) to anticipate outcomes by using certain variables as predictors (Creswell, 2013). Since this study was predicting relationships between kindergarten entrance ages and attendance rates, a predictive, correlational design was most appropriate.

Population and Sample

This study analyzed data from a population of kindergarten students in a medium-sized, urban school district in a Midwestern state. For students who enrolled in the district during the first week of their kindergarten year for the academic years of 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18, they must have remained enrolled in the district through their second grade year for their de-identified data to be included. For those students enrolled in 2016-17, they must have remained enrolled in the district through their first-grade year (i.e. 2017-18) and for the kindergartners enrolled in 2017-18, they must have remained enrolled through their kindergarten year for their de-identified data to be included. With a smaller sample, the independent variables

could have been too small, which would "do a poor job in representing the population" (Ruane, 2016, p. 236).

Data Collection Procedures

Once I received approval from the Western Michigan University Human Subjects Institutional Review Board (HSIRB), I submitted my proposal to the District official in charge of data collection and analysis. The District official created a data file with de-identified data points for the sample described therein. The data file included only de-identified data and each student record was created using a District created code established only for the purpose of creating the data file. After the data file was created with new code identifiers for each student record, there was no record maintained by the District or received by me that would link the new code identifiers to actual students. This resulted in the highest level of security and protection of anonymity in deriving the needed data from the District student information system for analysis.

A de-identified student record was created for all students who enrolled in the District during the first week of their kindergarten year for the academic years of 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18. Each de-identified dummy coded data record included:

1. Age at kindergarten entry (in days since birth)
2. Number of number of days present during the kindergarten year for all years of data
3. Number of number of days present during the first-grade year for academic years 2013-14 through 2016-17
4. Number of number of days present during second grade for academic years 2013-14 through 2015-16.
5. Socioeconomic status for the kindergarten year for students enrolled in kindergarten for the 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 school years.

For research questions one, two, and three: kindergarten entrance ages were coded as number of days since birth to September 1 of their kindergarten year. Attendance rates were coded as the number of days absent for the academic year. For research questions four and five: kindergarten entrance ages were coded as number of days since birth to September 1 of their kindergarten year. Attendance rates were calculated based on the ratio of days present to number of scheduled days (membership) for the academic year which resulted in >90% for chronic attendance coded as 0 and ≤90% for chronic attendance coded as 1. Since the attendance rates provided by the district were for days present, it is important to note that the attendance rates coded as 0 were for <10% absences, and coded 1, for ≥10% absences, to stay in alignment with the state and federal definition of chronic absences. The data will be coded as 0 for no (i.e. not free or reduced lunch eligible) and 1, for yes (i.e. free or reduced lunch eligible).

I worked with District officials to guide the creation of the data files for this study and conducted the analysis. I estimated that the entire process of creating the data files and running the analysis on district software would take approximately one month or less, and I started the process as soon as I received HSIRB approval. Confidentiality of the data will be maintained through restricting access by unauthorized individuals.

Data Analysis

District officials provided a protected Excel data file. To conduct the data analysis, the data was uploaded from that file to a statistical analysis application called Intellectus Statistics to run the descriptive and regression analyses. For question one, descriptive descriptions were used to describe the distributions of the independent and dependent variables of age of kindergartners from the fall of 2013, 2014, 2015, 2016, and 2017 and the attendance rates for students in grade 1 (2014, 2015, 2016, and 2017 only) and grade 2 (2015, 2016 and 2017 only).

Multiple linear regression was used for questions two and three, since both the independent variables and the dependent variable were expressed as continuous data. A linear regression line has an equation of the form $Y = a + bX_1 + bX_2$, where X_1 and X_2 are the independent variables and Y is the dependent variable. The slope of the line is b, and a is the intercept (the value of y when x = 0).

Logistic regression was used for questions four and five, since the dependent variable was expressed as a binary choice i.e. either chronic absence (value of 1) or not chronic absence (value of 0). The logistic curve relates the independent variable, X, to the rolling mean of the dependent variable, $P(\bar{y})$, with the formula written as $P = \frac{e^{a+bX}}{1+e^{a+bX}}$. P is the probability of a 1 (the proportion of 1s, the mean of Y), e is the base of the natural logarithm, and a and b are the parameters of the model. The value of a yields P when X is zero, and b adjusts how the probability changes with changing X by a single unit.

For this study, a linear regression was used to determine where, if at all, age at kindergarten entrance predicts attendance rate. A logistic regression was used to determine if any predictive value between the independent and dependent variables shows up specifically at the state and federal absence category of "chronic" i.e. ≥10% absence rate for the number of days in an academic year. My research questions, independent variables (IV) and dependent variables (DV), and statistical methods are included in Table 1.

Table 1

Data Analysis Crosswalk Table

Research Questions	Variables	Analysis
1. For a sample of urban students within one medium-sized district in a Midwestern state who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, what is the age (in days since birth) and attendance rate distribution of students at the date they start their kindergarten year?	IV: Kindergarten entrance age DV: Kindergarten attendance rates	Descriptive Statistics
2. When controlling for SES for the same sample of students, does age at kindergarten entry predict attendance rate in the kindergarten year?	IV: Kindergarten entrance age IV: Socioeconomic Status DV: Kindergarten attendance rates	Multiple Linear Regression
3. When controlling for SES, does age at kindergarten entry predict attendance rate in: a) grade 1 (for students entering kindergarten in 2013, 2014, 2015, and 2016), and b) grade 2 (for students entering kindergarten in 2013, 2014, and 2015)?	IV: Kindergarten entrance age IV: Socioeconomic Status DV: Grade 1 attendance rates DV: Grade 2 attendance rates	Multiple Linear Regression
4. When controlling for SES, for students who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, does age at kindergarten entry predict chronic attendance rate (≥10%) in the kindergarten year?	IV: Kindergarten entrance age IV: Socioeconomic Status DV: Chronic attendance (≥10%)	Logistic Regression
5. When controlling for SES, does age at kindergarten entry predict chronic attendance rates (≥10%) in: a) grade 1 (for students entering K in the fall of 2013, 2014, 2015, and 2016), and b) grade 2 (for students entering K in the fall of 2013, 2014, and 2015)?	IV: Kindergarten entrance age IV: Socioeconomic Status DV: Grade 1 Chronic attendance (≥10%) DV: Grade 2 Chronic attendance (≥10%)	Logistic Regression

Note. IV=Independent Variable; DV=Dependent Variable

Test of Hypotheses According to Research Questions

Intellectus Statistics (2020) was used in order to find an association between the independent variable of age at kindergarten entry and the dependent variable of kindergarten through second grade attendance. Descriptive statistics were used to describe the data in a meaningful way and did not allow us to make conclusions beyond the distribution and mean for the analyzed data. Specifically, for question one, the use of descriptive statistics described the distributions of the independent and dependent variables of age of kindergartners from the fall of 2013, 2014, 2015, 2016, and 2017 and their attendance in kindergarten (2013, 2014, 2015, 2016, 2017), first grade (2014, 2015, 2016, 2017) and second grade (2015, 2016, 2017). Socioeconomic status was also described using meal status codes: qualified (reduced or free lunch status) or not qualified.

Regression is a statistical method for analyzing a data set in which there are one or more independent variables determining an outcome. The outcome can be measured with a dichotomous variable – two possible outcomes – or a continuous variable. Multiple linear regression was used for questions two and three, since both the independent variables and the dependent variables were expressed as continuous data. Logistic regression was used for questions four and five, since the dependent variable was expressed as a binary choice, i.e., either chronic attendance (value of 1) or not chronic absence (value of 0).

For my study, I used linear regression to determine where, if at all, number of days of age at kindergarten entrance predicted the number of absences in grades K-2. I also used logistic regression to determine if there was any predictive value between the independent variable of kindergarten entrance age and the dependent variable of absences, specifically at the state and

federal absence category of "chronic," i.e., 10% or more absences for the number of days in an academic year.

For continuous variables, it was tempting to divide kindergarten age into categories early, on-time, delayed). However, this is not good practice since cutoffs tend to be arbitrary and part of the information can be lost (Ranganathan, Pramesh, & Aggarwal, 2017). For attendance, it was also tempting to categorize students according to state and federal attendance categories, but these also may be arbitrary and may not as sensitive to a predictive relationship as raw number of absences. With that said, the state and federal definition of chronic absence is used for so many policy requirements, it was sensible to run the analysis with both continuous and dichotomous data to test the particular high stakes attendance category of chronic.

Limitations and Delimitations

The students in this study were from one medium-sized, urban Midwestern school district. Therefore, results are only generalizable to the setting for this study or demographically similar populations from similar districts. While the results of this study are not generalizable beyond the particular setting for this study or districts in the same state with similar demographics, the findings may have implications for states with similar compulsory education and kindergarten entrance age requirements resulting in a 15 or greater month variance in kindergarten entrance age. By controlling for district level variables by drawing from the entire school population who enters kindergarten and remains enrolled in the district for the entire period covered by the data for this study, the design reduces the influence of contextual factors, but some other variables can still influence results. For example, there was a potential for incomplete or inaccurate student attendance records, if teachers create errors or omissions in recording daily student attendance. Likewise, there is a potential for incomplete or inaccurate

information being loaded into the district's student information system when indicating a student is a free/reduced lunch price student or a full paid student when considering their SES status.

Another limitation to my study was the absence of preschool data. Since Michigan has yet to create a universal preschool program for all 4-year old children to begin their formal education, kindergarten is the starting place for formal schooling within this study. While some students attend Headstart, which is a federal program, and some attend the Great Start Readiness Program (GSRP), a state funded program, there was too much variability within the preschool data. Districts include a question about preschool on their kindergarten registration forms and it is completed by the parent or person enrolling the student. One person may check preschool because the child attended a GSRP program while another may check preschool and in reality, that student stayed home with grandma and didn't really attend a preschool program. Without a uniform method of collecting preschool data or a universal preschool program, there was no way to control for students beginning formal education prior to kindergarten.

Chapter III Summary

This study was a quantitative design that utilized ex post facto data from a district's student information database in order to address the research questions. With the quantitative approach, it is possible that the study effectively predicted relationships between age at kindergarten entry and attendance rates in grades K-2. The data was collected from a medium-sized, urban school district in a Midwestern state and included 977 kindergarten students from 2013-14, 2014-14, 2015-16, 2016-17 and 2017-18 school years. The relevant data was collected in statistical and numerical form and analyzed using descriptive statistics, linear regression and logistic regression. This research was susceptible to the risk of generalization by assuming the

findings apply to all kindergarten students across the United States. Chapter IV provides the results of the statistical analyses presented in this chapter.

CHAPTER IV

RESULTS

The purpose of this study was to examine the relationship between age at initial kindergarten entry and attendance rates in kindergarten through second grade. This study also looked for where that relationship, if there was one, showed up in attendance rates compared to the attendance rate classifications defined by the State of Michigan on MiSchoolData.org (The Center for Education Performance and Information [CEPI], 2018). The following research questions guided the data analysis:

1. For a sample of urban students within one medium-sized district in a Midwestern state who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, what is the age (in days since birth) at the date they start kindergarten and what is the attendance rate distribution for those same students during their kindergarten year?
2. When controlling for SES for the same sample of students, does age at kindergarten entry predict attendance rate in the kindergarten year?
3. When controlling for SES, does age at kindergarten entry predict attendance rate in:
    a. grade 1 (for students entering kindergarten in 2013, 2014, 2015, and 2016); and
    b. grade 2 (for students entering kindergarten in 2013, 2014, and 2015)?
4. When controlling for SES, for students who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, does age at kindergarten entry predict chronic attendance rate (≥10%) in the kindergarten year?
5. When controlling for SES, does age at kindergarten entry predict chronic attendance rates (≥10%) in:
    a. grade 1 (for students entering K in the fall of 2013, 2014, 2015, and 2016); and

b. grade 2 (for students entering K in the fall of 2013, 2014, and 2015)?

This chapter presents the results of my research in both descriptive text and tables.

Operationalization of Analysis Variables

The variables collected were operationalized according to the criteria for this study and summarized in this section.

Age in days since birth for students was calculated from the students' date of birth to September 1 of their kindergarten year. September 1 was chosen as the cut-off since it is also the cut-off date for kindergarten entry in the state of Michigan without a waiver signed by the parent. The student age in days from birth to September 1 of the kindergarten entrance year provided a consistent way to assign an age in days value to each student record to produce the continuous the independent variable of student age at kindergarten start for this study. This provided a continuous age variable for both the linear regression and logistic regression analyses.

To produce a continuous variable for attendance rates, the participating district was asked to provide the actual number of days that school was in session for each year of the study as reported to the State through official student attendance data per the Michigan pupil accounting attendance guidelines. For the purposes of this study, the number of officially reported days of school per year provided by the participating district will be referred to as the "membership number of days". *Attendance rate* was calculated by dividing the days a student was present by the membership number of days defined as the number of days possible for a student to be present in a given school year. The membership for 2013-14 had 168 possible days; 2014-15 had 169 possible days; 2015-16 had 172 possible days; 2016-17 had 178 possible days; and, 2017-18 had 175 possible days. While the district did not provide reasons for the inconsistent number of membership days, they could be due to district allowable closures, such as, inclement weather or

a high number of illness. According to Section 101 of the Michigan State School Aid Act (MCL 388.1701), subsection 3(b) states that beginning in 2016-17, the required minimum number of days of student instruction is 180 days, which explains the higher membership beginning in 2016-17. However, not having the required, minimum180 days membership could also be due to district closures for various, allowable reasons. Attendance rate was the dependent variable in this study and is presented as a continuous variable for the linear regression and as a dichotomous variable in the logistic regression analyses. As a dichotomous variable, the students at or above the state and federal definition of "chronic absence," those missing 10% or more of the school year, have a 90% or less attendance rate. Students with a 91% or more attendance rate are considered not chronic.

Socioeconomic status is based on the National School Lunch Program (NSLP). Children from families with incomes at or below 130% of the Federal poverty level are eligible for free meals. Families with incomes between 130 and 185% of the Federal poverty level are eligible for reduced-price meals (United States Department of Agriculture, 2019). Students who qualify for free or reduced-price lunches are considered having a low socioeconomic status. Students who do not qualify for free or reduced priced lunch are considered paid lunch status with a high socioeconomic status. This variable is dichotomous and was controlled for in both the linear and logistic regression analyses.

Population and Demographic Findings

The study District enrolled a total of N=1,301 students in kindergarten for the five academic years included in this study. This study excluded data from any student who repeated a grade from kindergarten through second grade which reduced the sample to n=1,219 students. The District also experiences student attrition due to serving a high-poverty population with high

rates of transiency. Therefore, this study excluded data of any student who did not remain enrolled in the study district from kindergarten through second grade reducing the number of de-identified student records to a total of *n*=977 students.

The summary statistics for research question one were examined by each school year in the sample. The age of kindergarten entry was analyzed in days since birth and in the conclusions, year equivalents are also included in order to match the literature of kindergarten students typically entering kindergarten between the ages of four- and six-years-old. Interestingly, the youngest students' ages entering kindergarten stayed fairly constant only varying by 7 days (1,737 to 1,744 days) while the oldest students varied by 106 days (2,425 to 2,531 days). The range of age in days since birth from the youngest kindergartner to the oldest kindergartner increased by 100 days over the 5 years of data. Students in the kindergarten classrooms ranged in ages from 4.75 to 6.93 years. This does make sense in the fact that beginning with the 2013-14 school year, Michigan law changed the kindergarten entrance age from being five-years-old by December 1 by one month each year until the date became September 1 as the birthdate cut-off to enroll (2013-14 December 1; 2014-15 November 1; 2015-16 October 1; 2016-17 September 1). However, with a parent requested waiver, students with birthdays between September 2 and December 1 can still enroll in kindergarten prior to their fifth birthday. These summary statistics can be found in Table 2.

Table 2

Summary Statistics for Age in Days Since Birth and Attendance Rates in Kindergarten

Variable	*M*	*SD*	*n*	Min	Max	SE_M
Age in days since birth	1998.53	140.65	977	1737.00	2531.00	4.50
Attendance rate in kindergarten	94%	0.06	977	54%	100%	0.00

Research question one also examined attendance rates of kindergartners with the mean ranging from 91% to 95%. The range of attendance rates for individual students ranged from 54%-100%. The following are the results of the summary statistics for research question one.

For 2013-2014, the observations of age in days since birth had an average of 1,976.77 days (5.41 years) (*SD* = 135.27, Min = 1737, Max = 2425, SE_M = 10.47). The age in days since birth ranged from 1737 days (4.75 years) to 2425 days (6.64 years). The difference in age of the youngest kindergartner to the oldest kindergartner was 688 days (1.88 years). For 2013-2014, the observations of attendance rate in kindergarten had an average of 94% (*SD* = 0.06, Min = 70%, Max = 100%, SE_M = 0.00) with the lowest attendance rate at 70% to the highest attendance rate at 100%.

For 2014-2015, the observations of age in days since birth had an average of 1,992.16 days (5.45 years) (*SD* = 140.57, Min = 1744, Max = 2432, SE_M = 11.52). The age in days since birth ranged from 1744 days (4.77 years) to 2432 days (6.66 years). The difference in age of the youngest kindergartner to the oldest kindergartner was 688 days (1.88 years). For 2014-2015, the observations of attendance rate in kindergarten had an average of 94% (*SD* = 0.05, Min = 74%, Max = 100%, SE_M = 0.00) with the lowest attendance rate at 74% to the highest attendance rate at 100%.

In 2015-2016, the observations of age in days since birth had an average of 1,999.53 days (5.47 years) (*SD* = 138.38, Min = 1739, Max = 2454, SE_M = 9.44). The age in days since birth ranged from 1739 days (4.76 years) to 2454 days (6.72 years). The difference in age of the youngest kindergartner to the oldest kindergartner was 672 days (1.96 years). For 2015-2016, the observations of attendance rate in kindergarten had an average of 95% (*SD* = 0.05, Min = 0.71,

Max = 1, SE_M = 0.00) with the lowest attendance rate at 71% to the highest attendance rate at 100%.

For 2016-2017, the observations of age in days since birth had an average of 2,006.04 days (5.49 years) (*SD* = 151.37, Min = 1737, Max = 2472, SE_M = 10.00). The age in days since birth ranged from 1737 days (4.75 years) to 2472 days (6.77 years). The difference in age of the youngest kindergartner to the oldest kindergartner was 735 days (2.01 years). For 2016-2017, the observations of attendance rate in kindergarten had an average of 95% (*SD* = 0.05, Min = 71%, Max = 100%, SE_M = 0.00) with the lowest attendance rate at 71% to the highest attendance rate at 100%.

For 2017-2018, the observations of age in days since birth had an average of 2,010.71 days (5.51 years) (*SD* = 134.26, Min = 1743, Max = 2531, SE_M = 9.11). The age in days since birth ranged from 1743 days (4.77 years) to 2531 days (6.93 years). The difference in age of the youngest kindergartner to the oldest kindergartner was 788 days (2.16 years). For 2017-2018, the observations of attendance rate in kindergarten had an average of 91% (*SD* = 0.08, Min = 54%, Max = 100%, SE_M = 0.01) with the lowest attendance rate at 54% to the highest attendance rate at 100%. The summary statistics can be found in Table 3.

Table 3

Summary Statistics for Interval and Ratio Variables by Year of Entry for Kindergarten

Cohort	*M*	*SD*	*n*	Min	Max	SE_M
Age in days since birth						
2013-2014	1976.77	135.27	167	1737.00	2425.00	10.47
2014-2015	1992.16	140.57	149	1744.00	2432.00	11.52
2015-2016	1999.53	138.38	215	1739.00	2454.00	9.44
2016-2017	2006.04	151.37	229	1737.00	2472.00	10.00
2017-2018	2010.71	134.26	217	1743.00	2531.00	9.11
Attendance rate in kindergarten						
2013-2014	94%	0.06	167	70%	100%	0.00
2014-2015	94%	0.05	149	74%	100%	0.00
2015-2016	95%	0.05	215	71%	100%	0.00
2016-2017	95%	0.05	229	71%	100%	0.00
2017-2018	91%	0.08	217	54%	100%	0.01

Multiple Linear Regression Analysis

For research question two, a multiple linear regression analysis was conducted to assess whether the independent variable of age in days since birth significantly predicted the dependent variable of attendance rate in kindergarten while controlling for socioeconomic status (SES). The results revealed that model was significant, $F(2,974) = 18.97$, $p < .001$, $R^2 = 0.04$, indicating that approximately 4% of the variance in attendance rate in kindergarten is explainable by socioeconomic status and age in days since birth. While a 4% variance is low, I was mainly interested in understanding the relationship between the kindergarten entrance age in days since birth and attendance rates, and therefore a low R^2 does not negate the importance of any significant variables. Even with a low R^2, statistically significant *p*-values continue to identify relationships. Since my primary goal was to understand the relationship between age at kindergarten entrance and attendance rates, a low R-squared in not a problem. I have no cause to discount these findings (Frost, 2019). Age in days since birth did not significantly predict

attendance rate in kindergarten, β = -0.00, $t(974)$ = -1.71, p = .087. However, socioeconomic status did significantly predict attendance rate in kindergarten, B = 0.02, $t(974)$ = 5.80, $p < .001$. This indicates that on average, students with high SES attend school 2% more than low SES students in kindergarten. Table 4 summarizes the results of the regression model.

Table 4

Linear Regression: Socioeconomic Status and Age in Days Since Birth Predicting Attendance Rate in Kindergarten

Variable	*B*	*SE*	CI	β	*t*	*p*
(Intercept)	0.98	0.03	[0.92, 1.03]	0.00	37.04	< .001
Socioeconomic status	0.02	0.00	[0.02, 0.03]	0.18	5.80	< .001
Age in days since birth	-0.00	0.00	[-0.00, 0.00]	-0.05	-1.71	.087

Note. CI is at the 95% confidence level. Results: $F(2,974) = 18.97$, $p < .001$, $R^2 = 0.04$
Unstandardized Regression Equation: attendance rate in kindergarten = 0.98 + 0.02*socioeconomic status - 0.00*age in days since birth

A multiple linear regression analysis was conducted for research question three to assess whether the independent variable of age in days since birth significantly predicted the dependent variable of attendance rate in first grade while controlling for SES.

The results of the linear regression model were significant, $F(2,757) = 4.78$, p = .009, R^2 = 0.01, indicating that approximately 1% of the variance in attendance rate in first grade is explainable by socioeconomic status and age in days since birth. Again, the variance of 1% is low, however, a small R^2 doesn't nullify or change the interpretation for an independent variable that is statistically significant. (Frost, 2019). Age in days since birth did not significantly predict attendance rate in first grade, B = -0.00, $t(757)$ = -0.68, p = .498. Based on this sample, age in days since birth does not have a significant effect on attendance rate in first grade when holding socioeconomic status constant. However, socioeconomic status did significantly predict attendance rate in first grade, B = 0.02, $t(757)$ = 2.97, p = .003. This indicates that on average,

students with high SES attend school 2% more than low SES students in first grade. Table 5 summarizes the results of the regression model.

Table 5

Linear Regression: Socioeconomic Status and Age in Days Since Birth Predicting Attendance Rate in First Grade

Variable	*B*	*SE*	CI	β	*t*	*P*
(Intercept)	0.96	0.05	[0.85, 1.07]	0.00	17.93	< .001
Socioeconomic status	0.02	0.01	[0.01, 0.04]	0.11	2.97	.003
Age in days since birth	-0.00	0.00	[-0.00, 0.00]	-0.02	-0.68	.498

Note. CI is at the 95% confidence level. Results: $F(2,757) = 4.78$, $p = .009$, $R^2 = 0.01$
Unstandardized Regression Equation: Attendance rate in first grade = 0.96 + 0.02*Socioeconomic status - 0.00*Age in days since birth

A multiple linear regression analysis was also conducted to assess whether age in days since birth significantly predicted attendance rate in second grade for research question three. When using Intellectus Statistics, putting variables together in the model is a way of controlling for each other's impact.

The results of the linear regression model were not significant, $F(2,527) = 2.68$, $p = .069$, $R^2 = 0.01$, indicating age in days since birth did not explain a significant proportion of variation in attendance rate in second grade. Since the overall model with was not significant, the individual predictor of SES was not examined further. Table 6 summarizes the results of the regression model.

Table 6

Linear Regression: Socioeconomic Status and Age in Days Since Birth Predicting Attendance Rate in Second Grade

Variable	*B*	*SE*	CI	β	*t*	*P*
(Intercept)	0.94	0.05	[0.84, 1.05]	0.00	17.41	< .001
Socioeconomic status	0.02	0.01	[0.00, 0.03]	0.10	2.30	.022
Age in days since birth	-0.00	0.00	[-0.00, 0.00]	-0.00	-0.08	.934

Note. CI is at the 95% confidence level. Results: $F(2,527) = 2.68$, $p = .069$, $R^2 = 0.01$
Unstandardized Regression Equation: Attendance rate in second grade = 0.94 + 0.02*Socioeconomic status - 0.00*Age in days since birth

Assumptions

There are assumptions which justify the use of linear regression models for purposes of inference or prediction.

Normality. The assumption of normality was assessed by plotting the quantiles of the model residuals against the quantiles of a Chi-square distribution, also called a Q-Q scatterplot (Oppong & Yau, 2016). For the assumption of normality to be met, the quantiles of the residuals must not strongly deviate from the theoretical quantiles. Strong deviations could indicate that the parameter estimates are unreliable. Figures 2, 3 and 4 present Q-Q scatterplots of the model residuals. There were slight deviations in the Q-Q scatterplots, indicating normality was not met. However, Howell (2013) indicates that violations of normality are not problematic when the sample size exceeds 50 cases. Figures 2, 3, and 4 present Q-Q scatterplots of the model residuals.

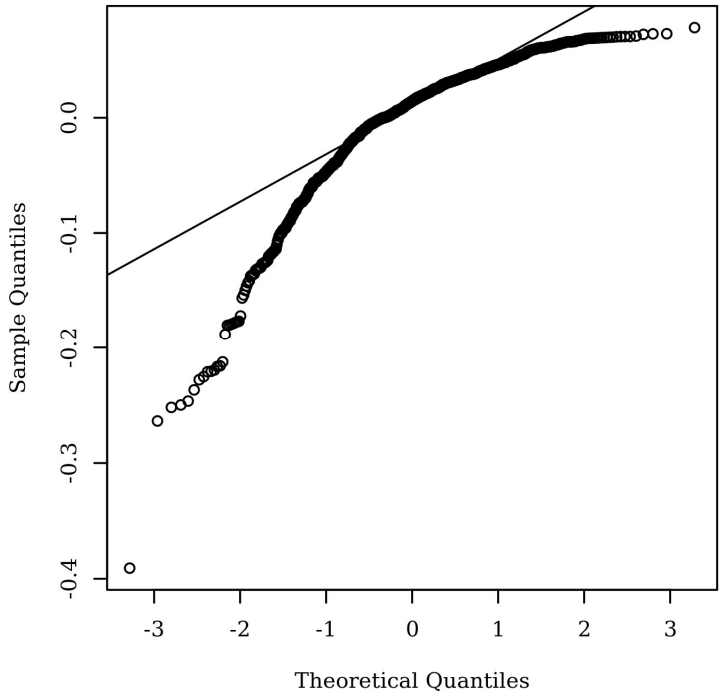

Figure 2. Q-Q scatterplot for normality of the residuals for the regression model for kindergarten.

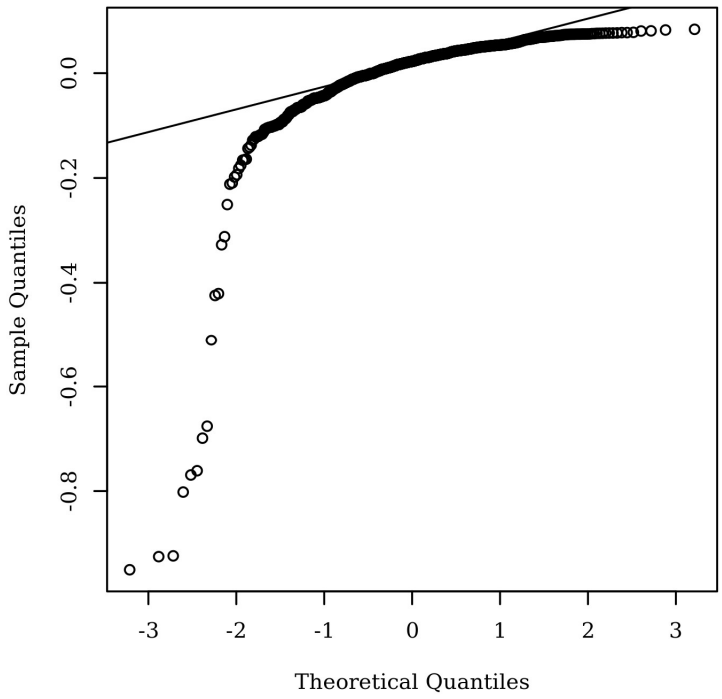

Figure 3. Q-Q scatterplot for normality of the residuals for the regression model for first grade.

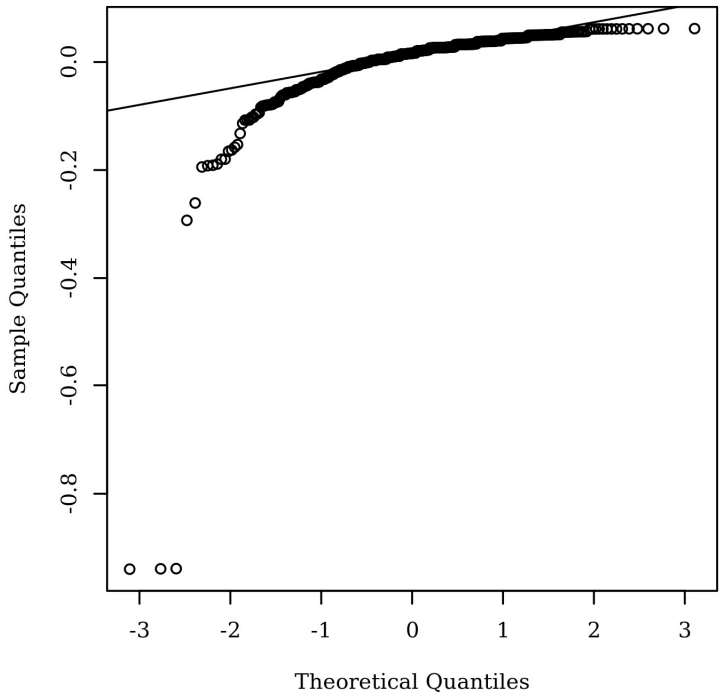

Figure 4. Q-Q scatterplot for normality of the residuals for the regression model for second grade.

Homoscedasticity. Homoscedasticity was evaluated by plotting the residuals against the predicted values (Bates et al., 2014; Field, 2013; Osborne & Walters, 2002). The assumption of homoscedasticity is met if the points appear randomly distributed with a mean of zero and no apparent curvature. Homoscedasticity appears to be violated due to the two distinct clusters which can be attributed to the categorical nature of socioeconomic status. Figures 5, 6, and 7 present scatterplots of predicted values and model residuals.

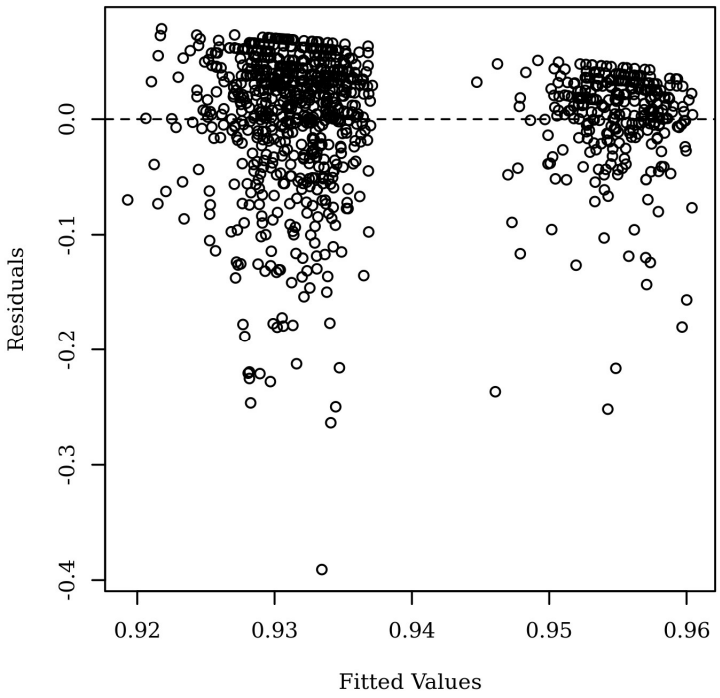

Figure 5. Residuals scatterplot testing homoscedasticity for kindergarten

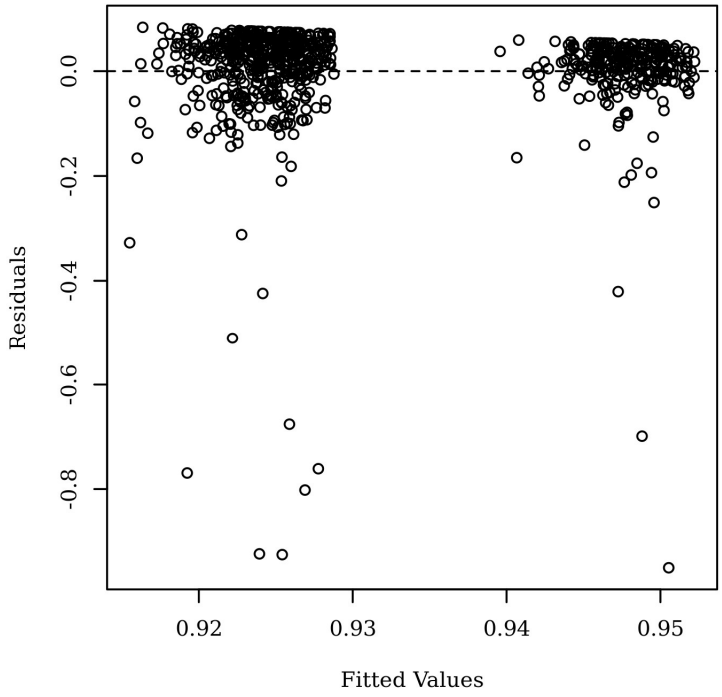

Figure 6. Residuals scatterplot testing homoscedasticity for first grade

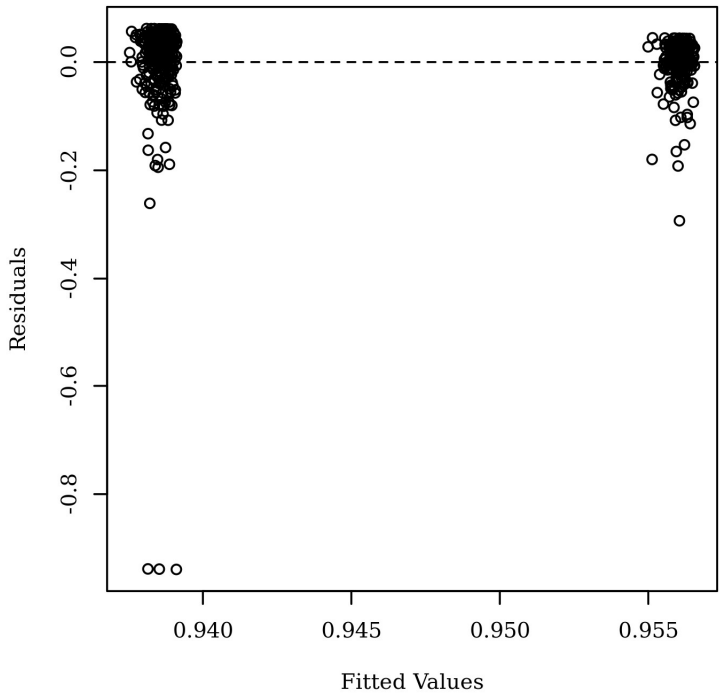

Figure 7. Residuals scatterplot testing homoscedasticity for second grade

Multicollinearity. Variance Inflation Factors (VIFs) were calculated to detect the presence of multicollinearity between predictors. High VIFs indicate increased effects of multicollinearity in the model. VIFs greater than 5 are cause for concern, whereas VIFs of 10 should be considered the maximum upper limit (Menard, 2009). All predictors in the regression model have VIFs less than 10. Tables 7, 8, 9 present the VIF for each predictor in the model.

Table 7

Variance Inflation Factors for Socioeconomic Status and Age in Days since Birth

Variable	VIF
Socioeconomic status	1.00
Age in days since birth	1.00

Table 8

Variance Inflation Factors for Socioeconomic Status and Age in Days since Birth

Variable	VIF
Socioeconomic status	1.00
Age in days since birth	1.00

Table 9

Variance Inflation Factors for Socioeconomic Status and Age in Days since Birth

Variable	VIF
Socioeconomic status	1.01
Age in days since birth	1.01

Binary Logistic Regression

A binary logistic regression was conducted for research question four to examine whether age in days since birth had a significant effect on the odds of observing the chronic attendance rate in kindergarten.

The model was evaluated based on an alpha of 0.05. The overall model was significant, $\chi^2(2) = 34.09$, $p < .001$, suggesting that socioeconomic status and age in days since birth had a

significant effect on the odds of observing the chronic attendance rate in kindergarten. McFadden's R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit (Louviere et al., 2000). The McFadden R-squared value calculated for this model was 0.04, which does not indicate an excellent fit and is most likely attributed to age in days since birth not having a significant effect while controlling for socioeconomic status. The regression coefficient for socioeconomic status was significant, x^2=26.53, OR = 0.32, $p < .001$, indicating that if students were all paid lunch and not free/reduced price lunch eligible, the odds of observing the chronic attendance rate in kindergarten would decrease by approximately 68%. The regression coefficient for age in days since birth was not significant, x^2=1.28, OR = 1.00, $p = .258$, indicating that age in days since birth, did not have a significant effect on the odds of observing the chronic attendance rate in kindergarten. Table 10 summarizes the results of the logistic regression model.

Table 10

Logistic Regression: Socioeconomic Status and Age in Days since Birth Predicting Chronic Attendance Rate in Kindergarten

Variable	*B*	*SE*	95.0% CI	χ^2	*P*	*OR*
(Intercept)	-2.43	1.15	[-4.68, -0.18]	4.48	.034	
Socioeconomic status	-1.14	0.22	[-1.57, -0.71]	26.53	< .001	0.32
Age in days since birth	0.00	0.00	[-0.00, 0.00]	1.28	.258	1.00

Note. $\chi^2(2) = 34.09$, $p < .001$, McFadden $R^2 = 0.04$.

A binary logistic regression was conducted for research question five to examine whether age in days since birth had a significant effect on the odds of observing the chronic attendance rate in first grade.

The binary logistic regression model was evaluated for based on an alpha of 0.05. The overall model was significant, $\chi^2(2) = 33.40$, $p < .001$, suggesting that socioeconomic status and age in days since birth had a significant effect on the odds of observing the chronic attendance

rate in first grade. McFadden's R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit (Louviere et al., 2000). The McFadden R-squared value calculated for this model was 0.04, which did not indicate an excellent fit and is most likely attributed to age in days since birth not having a significant effect when we controlled for socioeconomic status. The regression coefficient for socioeconomic status was significant, x^2=1.12, OR = 0.33, $p < .001$, indicating that if students were all paid lunch and not free/reduced price lunch eligible, the odds of observing the chronic attendance rate in kindergarten would decrease by approximately 67%. The *p*-value of the regression coefficient for age in days since birth showed significance, x^2=4.94, OR = 1.00, $p = .026$, indicating that an increase in age in days since birth would raise the odds of observing the chronic attendance rate in first grade. However, that increase is approximately .1%. Table 11 summarizes the results of the regression model.

Table 11

Logistic Regression: Socioeconomic Status and Age in Days since Birth Predicting Chronic Attendance Rate in f

First Grade

Variable	*B*	*SE*	95.0% CI	χ^2	*P*	*OR*
(Intercept)	-3.97	1.29	[-6.51, -1.44]	9.42	.002	
Socioeconomic status	-1.12	0.23	[-1.57, -0.66]	23.21	< .001	0.33
Age in days since birth	0.00	0.00	[0.00, 0.00]	4.94	.026	1.00

Note. $\chi^2(2) = 33.40$, $p < .001$, McFadden $R^2 = 0.04$.

A binary logistic regression was also conducted for research question five to examine whether age in days since birth had a significant effect on the odds of observing the chronic attendance rate in second grade while controlling for socioeconomic status (SES).

The overall model was not significant based on an alpha of 0.05, $\chi^2(2) = 5.85$, $p = .054$, suggesting that age in days since birth did not have a significant effect on the odds of observing

the chronic attendance rate in second grade. McFadden's R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit (Louviere et al., 2000). The McFadden R-squared value calculated for this model was 0.01. Since the overall model was not significant, the individual predictor of socioeconomic status was not examined further. Table 12 summarizes the results of the regression model.

Table 12

Logistic Regression: Socioeconomic Status and Age in Days since Birth Predicting Chronic Attendance Rates in Second Grade

Variable	*B*	*SE*	95.0% CI	χ^2	*P*	*OR*
(Intercept)	-3.22	1.84	[-6.82, 0.39]	3.06	.080	
Socioeconomic status	-0.60	0.28	[-1.15, -0.05]	4.52	.034	0.55
Age in days since birth	0.00	0.00	[-0.00, 0.00]	0.73	.392	1.00

Note. $\chi^2(2) = 5.85$, $p = .054$, McFadden $R^2 = 0.01$.

Chapter IV Summary

This chapter presented the statistical results of the statistical analysis of each research question detailed in Chapter III. The preliminary analyses were conducted for a better understanding of the sample. The interpretation, implications, and ideas for further research are discussed in Chapter V.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the relationship between age at initial kindergarten entry and attendance rates in kindergarten through second grade. This study also looked for where that relationship, if there was one, showed up in attendance rates compared to the attendance rate classifications defined by the State of Michigan on MiSchoolData.org (CEPI, 2018). This chapter includes the following: links to previous research, key findings, conclusions, implications of the findings, and recommendations for future research.

Links to Previous Research

Relationship Between Study Purpose and Previous Research

There is a wide span of age for students entering kindergarten (NCES, 2018) and previous research shows there is a relationship between student age and student achievement. The research linking age to academic achievement is shown in Table 13. When education policies are created, it is assumed that students are attending school regularly (Marburger, 2006). The issue of attendance is consistently identified in education research as having a strong correlation to student achievement. While both kindergarten entrance age and student attendance have shown a correlation to student achievement, there has been little research found regarding the relationship of kindergarten entrance age and student attendance in the primary grades. This information is particularly important due to the Third Grade Reading Law (Michigan Department of Education, 2019) which requires districts to consider retention in third grade if students are not reading at grade level. Table 14 identifies the research concerning student attendance and achievement.

Table 13

Summary of Studies Linking Age and Achievement

Age and Achievement	Studies and Findings
Age and achievement	• Hughes (2016) - Students entering school early performed more poorly than older counterparts. • Kowalczyk (2017) – Older age at the beginning of kindergarten is a determinant of academic achievement. • Nederi et al. (2009) – School age entry influences academic grades with older students performing higher. • Voyles (2011) – Older students usually scored higher academically than younger students. • Lee & Burkham, 2002; Piotrowski, 2010; Yesil-Dagli, 2006; West et al., 2000 – Gender, race/ethnicity, and socioeconomic status are associated with significant differences in achievement including the primary grades, including kindergarten.

Table 14

Summary of Studies Linking Attendance and Achievement

Attendance and Achievement	Studies and Findings
Attendance and achievement	• Bakken, et al. (2016) - Students with higher grades also have higher attendance rates compared to their lower performing peers. • Bruner et al. (2011) – Students with chronic absences fall behind their peers in first grade and do not read proficiently by third grade. • Chang & Romero (2008) – Chronic attendance is higher in schools that serve a higher number of poor and minority students which contributes to the achievement gap. • Duardo (2013) – Attendance problems in kindergarten are likely to continue into first grade. • Dubay & Holla (2016) – students who are chronically absent in pre-kindergarten are likely to have chronic absences in elementary school. • Gottfried (2011) – There are significant relationships between academic achievement and student attendance for middle school and elementary students. • Rhode Island Department of Education (2019) – Kindergartners with attendance issues showed negative achievement in subsequent years. • Schazenbach et al. (2016) – students who are not in school learning what is being taught score lower on coursework, exams, and standardized tests.

Since student achievement was separately linked in the literature to both age and attendance, it was important to determine if this was an overlooked relationship that could be attributing to the achievement gap when linked together. The findings from this study do not support a statistically significant positive or negative relationship between age at the start of kindergarten and attendance from kindergarten through grade two; however, given the summary of findings in Tables 13 and 14 suggesting that age and attendance both influence student

achievement in the early grades, the attendance patterns for all students in primary grades should be monitored carefully. For students whose age falls in the younger ranges of students in the primary grades, monitoring attendance may be especially important because, as the cited studies in Tables 13 and 14 suggest, both younger students and students with poor attendance can fall behind academically. While the results of this study do not directly link early age and attendance, other future studies with larger samples could produce more evidence that age and attendance are also linked and, thus, of even greater concern when monitoring the progress of students in the primary grades.

Key Findings

Overall, this study has several key findings in regards to kindergarten entrance age and attendance rates in kindergarten through grade 2. Table 15 provides an overview of the results by research question. Overall, age at kindergarten entrance does not have a significant effect on attendance rates in kindergarten, first, or second grades. Interestingly, socioeconomic status has a significant effect in kindergarten and first grade, but it no longer has a significant effect on attendance in second grade.

Conclusions Related to Research Question 1

Research question one examined a sample of urban students within one medium-sized district in a Midwestern state who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, to determine the age (in days since birth) and attendance rate distribution at the date they started their kindergarten year. Age differences in kindergarten are common due to Michigan policies that allow students to enroll in kindergarten early, i.e., turning 5 between September 1 and December 1. There are also state compulsory education policies in place that require students to be enrolled in school by age 6. Due to these policies, typical classrooms have a

variance of 18 months or 1.5 years (ECS, 2014, 2018; NCES, 2018). Students in this study had a kindergarten entrance age variance of 2.18 years. Under the Average Daily Attendance (ADA) metric that calculates truancy, a satisfactory ADA is 95%. The average attendance rate of students in this study ranged from 91%-95%. Others have shown, however, that ADA hides individual student attendance issues (Bruner et al., 2011), which was true for this study, given individuals attendance rates ranged from 54%-100% attendance.

Conclusions Related to Research Question 2

For the same sample of students, research question two controlled for socioeconomic status (SES) when examining whether or not age at kindergarten entry predicted attendance rate in their kindergarten year. While age did not significantly predict attendance rates in kindergarten, socioeconomic status was a significant predictor.

Conclusions Related to Research Question 3

Research question two controlled for socioeconomic status (SES) with the same sample of students examining if age at kindergarten entry predicted attendance rate in their first and second grade years. This is important because attendance problems in kindergarten are likely to continue into first grade (Duardo, 2013). Again, for the present study, age did not significantly predict the attendance rates of first graders. However, as with kindergarten, when controlling for socioeconomic status in first grade, attendance rates were significant. Interestingly, the effect of age at kindergarten entrance by second grade was not significant, so it was not investigated further.

Conclusions Related to Research Question 4

Research question four examined whether socioeconomic status and age in days since birth had a significant effect on the odds of observing the chronic absences (≥10%) in the

kindergarten year. The odds of kindergartners who are eligible for free or reduced lunch (SES) having chronic absences (≥10%) are significant while their ages are not significant for predicting chronic absences. Interestingly, it has been noted that most at-risk students are missing too may days of school per year (Campaign for Grade-Level Reading, 2011), however, students who are free/reduced price lunch eligible are also considered at-risk and low attendance rates in elementary school are often overlooked (Chang & Jordan, 2010; Chang & Romero, 2008; Duardo, 2013).

Conclusions Related to Research Question 5

Research question five examined whether socioeconomic status and age in days since birth had a significant effect on the odds of observing the chronic absences (≥10%) in the first and second grade years. Like kindergarten, the odds of first grade students who are eligible for free or reduced lunch (SES) having chronic absences (≥10%) are significant while their ages are not significant for predicting chronic attendance.

The conclusions from the research questions led to implications and recommendations for future studies.

Table 15

Key Findings for Each Research Question

Research Question	Key Findings
1. For a sample of urban students within one medium-sized district in a Midwestern state who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, what is the age (in days since birth) and attendance rate distribution of students at the date they start their kindergarten year?	Mean age in days since birth (years): • 2013-14 school year: 1976.77 (5.41) • 2014-15 school year: 1992.16 (5.45) • 2015-16 school year: 1999.53 (5.47) • 2016-17 school year: 2006.04 (5.49) • 2017-18 school year: 2010.71 (5.51) Range for age in days since birth (years): • 2013-14 school year: 1737-2425 (4.75-6.64) • 2014-15 school year: 1744-2432 (4.77-6.66) • 2015-16 school year: 1739-2454 (4.76-6.72) • 2016-17 school year: 1737-2472 (4.75-6.77) • 2017-18 school year: 1743-2531 (4.77-6.93) Difference in age from youngest to oldest kindergartner: • 2013-14 sch yr: 688 days; 1.88 years • 2014-15 sch yr: 688 days; 1.88 years • 2015-16 sch yr: 715 days; 1.96 years • 2016-17 sch yr: 735 days; 2.01 years • 2017-18 sch yr: 788 days; 2.16 years Mean attendance rate in kindergarten: • 2013-14 sch yr: 94% • 2014-15 sch yr: 94% • 2015-16 sch yr: 95% • 2016-17 sch yr: 95% • 2017-18 sch yr: 91% Range of attendance rate in kindergarten: • 2013-14 sch yr: 70%-100% • 2014-15 sch yr: 74%-100% • 2015-16 sch yr: 71%-100% • 2016-17 sch yr: 71%-100% • 2017-18 sch yr: 54%-100%

Research Question	Key Findings
2. When controlling for SES for the same sample of students, does age at kindergarten entry predict attendance rate in the kindergarten year?	Prediction of attendance rates in kindergarten: • Accounts for 4% of the variance in the model • Age at kindergarten entrance did not significantly predict kindergarten attendance rates when controlling for SES. Each day a student is older or younger changes the attendance rate by 0%. • Socioeconomic status did significantly predict attendance rates in kindergarten. Each student moving from free/reduced lunch to paid lunch or vice versa accounts for a 2% decrease or increase to the attendance rate.
3. When controlling for SES, does age at kindergarten entry predict attendance rate in: a. grade 1 (for students entering kindergarten in 2013, 2014, 2015, and 2016), and	Prediction of attendance rates in first grade: • Accounts for 1% of the variance in the model • Age at kindergarten entrance did not significantly predict first grade attendance rates when controlling for SES. Each day a student is older or younger changes the attendance rate by 0%. • Socioeconomic status did significantly predict attendance rates in first grade. Each student moving from free/reduced lunch to paid lunch or vice versa accounts for a 2% decrease or increase to the attendance rate.
a. grade 2 (for students entering kindergarten in 2013, 2014, and 2015)?	Prediction of attendance rates in second grade: • The results of the linear regression model were not significant for predicting attendance rate in second grade
4. When controlling for SES, for students who entered kindergarten in the fall of 2013, 2014, 2015, 2016, and 2017, does age at kindergarten entry predict chronic attendance rate (≥10%) in the kindergarten year?	Prediction of chronic attendance in kindergarten: • Age at kindergarten entry did not have a significant effect on predicting chronic attendance in kindergarten. • Socioeconomic status was significant with the odds if kindergarten students were all paid lunch status with no free/reduced lunch status, the chronic attendance rate in kindergarten would decrease by approximately 68%.
5. When controlling for SES, does age at kindergarten entry predict chronic attendance rates (≥10%) in: a. grade 1 (for students entering K in the fall of 2013, 2014, 2015, and 2016), and	Prediction of chronic attendance in first grade: • Age at kindergarten entry did not have a significant effect on predicting chronic attendance in first grade. • Socioeconomic status was significant with the odds if first grade students were all paid lunch status with no free/reduced lunch status, the chronic attendance rate in kindergarten would decrease by approximately 67%

Research Question	Key Findings
b. grade 2 (for students entering K in the fall of 2013, 2014, and 2015)?	Prediction of chronic attendance in second grade: • The results of the linear regression model were not significant for predicting attendance rate in second grade.

Implications

Although the results did not indicate age at kindergarten entry is a significant predictor of attendance rates, they do have implications for educators. The literature has already made a link between student achievement and regular school attendance (Gottfried, 2011; Sprick, 2017) Regular attendance during the early elementary years is imperative since children gain social and academic skills that are critical for academic success in later grades (Gottfried, 2011; Sprick, 2017), although low attendance rates are typically overlooked in elementary schools (Chang and Jordan, 2011). Since age at kindergarten entry was not a significant factor for attendance in kindergarten through second grade, it is one area that does not need additional study, even with the new metrics of the ESSA. However, since low socioecomic status was a significant factor in attendance rates in both kindergarten and first grade, the educators in this district could earmark funding for students with free/reduced lunch by creating incentives or removing barriers for regular school attendance. Ginsburg et al. (2014) noted that early elementary attendance matters because lost instructional time due to absences makes it difficult to master reading by third grade. Perhaps the importance and ramifications of the Third Grade Reading Law (Michigan Department of Education, 2019) becomes more prevalent and discussed more frequently in second grade, prompting parents to make sure their students are in school. This could be an explanation of why the overall model in second grade was not significant.

Since there is a link to student achievement in later grades, educators cannot afford to wait until students already are labeled with a chronic attendance issue before instituting ways to get students to school regularly. A concern that educators have expressed concerning the attendance of young students is that parents need to be held accountable for the attendance in the early years. Perhaps incentivizing parents for getting their children to school would help raise the attendance rates of students with free/reduced lunch.

The aim of this study was to determine if a relationship existed between age at kindergarten entry and attendance rates and to share the findings with educators. Although age is a common conversation among teachers of young children, during the enrollment process, parents of students who are not yet five years old can request a waiver to begin if the student will turn 5 by December 1. Since age was not a significant factor with attendance rates, educators can no longer claim the student is too young to be in kindergarten, at least with respect to attendance. The waiver should be signed and the socioeconomic status of the student considered, with strategies put into place in order to ensure that student will have a satisfactory attendance rate in kindergarten and first grades. This study can inform policy makers at the state and local levels that age-related waivers are a non-issue for attendance.

It is important to note, however, that although the results were not significant for age at kindergarten entry predicting attendance rates, the age span of kindergartners has increased in the study years. As depicted in Figure 8, the youngest students' ages remained constant varying only seven days while the oldest students varied by 100 days with the gap growing wider each year of my study. The youngest students enrolling in kindergarten remained relatively constant across all five years of data at 4.76-4.77 years (or 1,737-1,744 days) of age , while the age of the oldest students increased each year from 6.64 to 6.93 years (or 2,425 to 2,531 days)—an increase of 106

days or .29 year. If policy makers expected to reduce the age gap between students in the primary grades by changing the kindergarten entrance date from December 1 to September 1, they failed to accomplish that. In fact, the combination of waivers (that still allow students who do not turn five years of age by September 1 to start as long as they reach age five by December 1) and parent choice to delay kindergarten entrance have increased the age gap by almost a third of a year in the participating district. Thus, the expected typical 18 month or 1.5 year age variance for students in kindergarten classrooms (ECS, 2014, 2018; NCES, 2018) has grown to 2.16 years in this district's kindergarten classrooms. This could result in several implications for teacher practice in the primary grades.

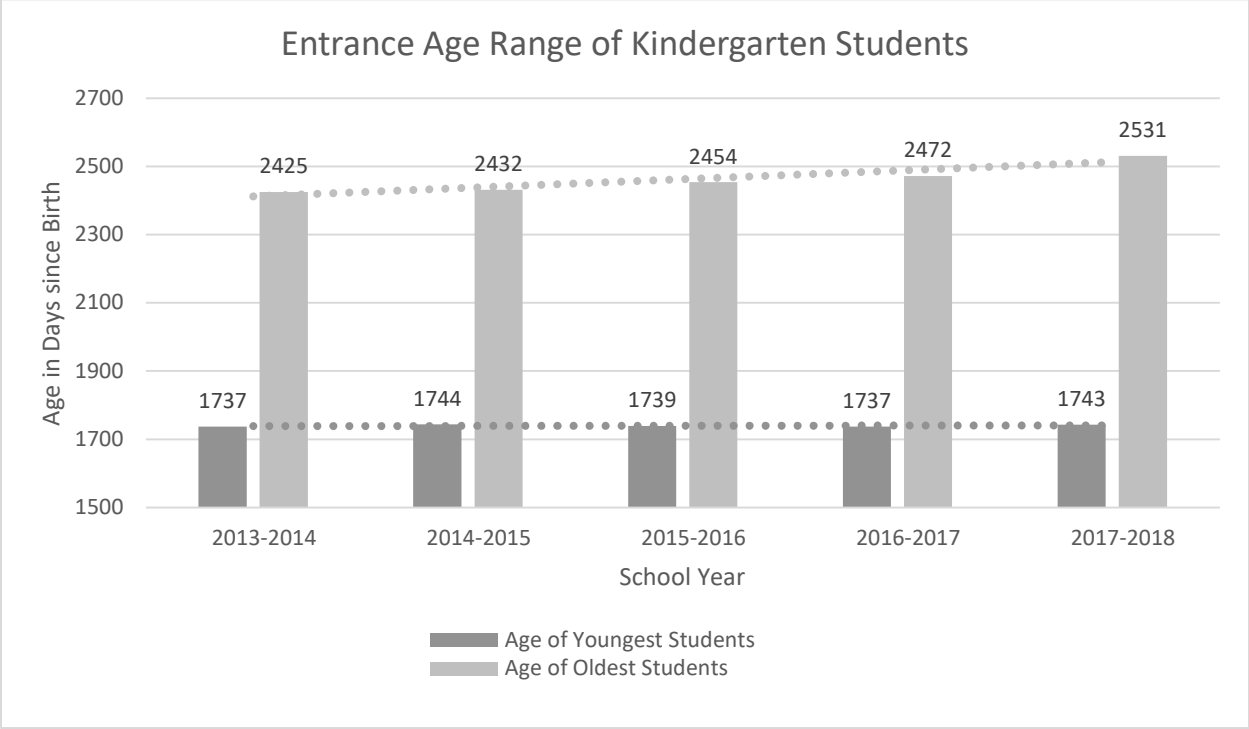

Figure 8. Entrance age range for kindergarten students.

In order to effectively teach, teachers need professional development in instructional practices, particularly in differentiation, to meet the needs of students who range in age by two years or more, especially when considering that two years is one-third of a six-year old's life.

Teachers in the primary grades need a kindergarten through second grade curriculum that provides strategies and materials to meet the needs of all students. Along with access to an aligned grades K-2 curriculum with proper scaffolding for differentiation, teachers also need better a repertoire of instructional strategies that are developmentally appropriate for up to a two year age span and they need an assessment toolbox of validated tools to monitor early learning development and inform differentiation of instruction. Current methods of assessing learning in the primary grades are inconsistent, weak or non-existent in most states (Kaurez, 2006).

Recommendations for Future Study

This study clearly supports other previous research in that a low socioeconomic status is a contributing factor to attendance rates (Chang & Romero, 2008; Duardo, 2013; Ginsburg et al., 2014). It would be interesting to look further into the reasons why the students who miss the most school are absent. Perhaps a focus group with the parents of students with the highest absent rates in kindergarten and first grade would help determine the barriers and/or reasons their students do not come to school regularly. Based on the barriers and/or reasons, the district could devise specific attendance interventions. Since this study did not have a statistically significant finding in the overall model in second grade, it would also be interesting to determine parents' views on the importance of attendance in kindergarten and first grade and if there is a difference in their view of the importance of attendance in second grade. Likewise, it would be interesting to determine if the importance of coming to school is communicated from the onset of kindergarten or is it ramped up in second grade due to the Third Grade Reading Law.

In my study, I was looking for relationships between age at kindergarten entrance and attendance rates at the district level. Another future study could look at the same variables in this district by building and using a Hierarchical Linear Model (HLM) (Huta, 2014) instead of the

Multiple Linear Regression Model utilized in this study since I was only interested in a Level 1 analysis. The HLM analyses would provide a Level 2 analysis, in this case, to examine any mediating influence at the individual school level in the district. HLM could also provide Level 3 and 4 analyses with data from all city schools – Level 3 and county schools – Level 4. HLM would be a natural future study for this district if they want to know the relationships of age at kindergarten entrance and attendance rates across schools with varying school-level characteristics, e.g. student SES, rural vs. urban, etc. .

It is important for educators to understand why students are not coming to school and these types of studies could inform this district of underlying issues keeping students from having a satisfactory attendance rate. Since this study was conducted with data from a population of kindergarten students in a medium-sized, urban school district in a Midwestern state, it is not generalizable to other districts or states. However, it is still important, as Bruner et al. (2011) points out, for schools and school districts to study attendance rates since there are national and state-level studies indicating that attendance rates are concerning as early as kindergarten.

Conclusions

Regular school attendance is vital for young students to gain both social and academic skills, particularly in the early years. My study provided data showing that age at kindergarten entrance, for this district, does not impact attendance rates. However, socioeconomic status of did negatively impact student attendance if the student has a low socioeconomic status. As educators continue to evaluate attendance rates of students, breaking down the socioeconomic status of students may be beneficial to determine appropriate plans to increase attendance rates. Overall, this study adds to the body of knowledge concerning the effects of socioeconomic status on attendance of our youngest learners, which is consistent with the national and state studies

(e.g., Balfanz & Byrnes, 2012; Connoly & Olsen, 2012; Chang & Romero, 2008; Rogers et al., 2017, RIDE, 2019).

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Appendix A

Approval Letter from the Human Subjects Institutional Review Board

WESTERN MICHIGAN UNIVERSITY

Institutional Review Board
FWA00007042
IRB00000254

Date: December 19, 2019

To: Patricia Reeves, Principal Investigator
Julie McDonald, Student Investigator for Dissertation

From: Amy Naugle, Ph.D., Chair

Re: IRB Project Number 19-12-38

This letter will serve as confirmation that your research project titled "Relationship Between Kindergarten Entrance Age and Attendance Rates" has been **approved** under the **exempt** category of review by the Western Michigan University Institutional Review Board (IRB). The conditions and duration of this approval are specified in the policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes to this project (e.g., ***add an investigator, increase number of subjects beyond the number stated in your application, etc.***). Failure to obtain approval for changes will result in a protocol deviation.

In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB for consultation.

The Board wishes you success in the pursuit of your research goals.

A status report is required on or prior to (no more than 30 days) December 18, 2020 and each year thereafter until closing of the study. The IRB will send a request.

When this study closes, submit the required Final Report found at https://wmich.edu/research/forms.

Note: All research data must be kept in a secure location on the WMU campus for at least three (3) years after the study closes.

Office of the Vice President for Research
Western Michigan University
1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
WEBSITE: wmich.edu/research/committees/irb

Parkview Campus, Room 251 W. Walwood Hall

Appendix B

Change Confirmation Letter from the Human Subjects Institutional Review Board

WESTERN MICHIGAN UNIVERSITY

Institutional Review Board
FWA00007042
IRB00000254

Date: March 4, 2020

To: Patricia Reeves, Principal Investigator
Julie McDonald, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: IRB Project Number 19-12-38

This letter will serve as confirmation that the change to your research project titled "Relationship Between Kindergarten Entrance Age and Attendance Rates" requested in your memo received February 28, 2020 (to replace data source [Kalamazoo Public Schools] with Jackson Public Schools) has been approved by the WMU Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: **December 18, 2020**

Office of the Vice President for Research
Western Michigan University
1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
WEBSITE: wmich.edu/research/compliance/irb

Room 251 W. Walwood Hall