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## An Examination of the Relationship Between Pre-K Programming and Third-Grade Math and Reading Achievement Outcomes in Oregon

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Running Head: An Examination of Pre-K Programming and Academic Achievement

AN EXAMINATION OF THE RELATIONSHIP BETWEEN PRE-K PROGRAMMING AND  
THIRD-GRADE MATH AND READING ACHIEVEMENT OUTCOMES IN OREGON

by

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and the School of Education, George Fox University

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Abstract

This study examined the relationship between preschool program type, race/ethnicity, socioeconomic status and measures of third-grade academic achievement outcomes, as measured by the standardized mathematics and English Language Arts assessments administered to third-grade students in Oregon. The study participants were fourth-grade students from a single participating school district in the Southern region of Oregon. Parents/guardians voluntarily consented to participation and provided a completed questionnaire specifying their child's preschool program type as attended the majority of the time (nine months or more) in the year prior to Kindergarten. Required statewide assessment in Mathematics and English Language Arts occur in third-grade. Therefore, post-hoc scores from the previous year's assessment for the participants were utilized. A one-way ANOVA and independent samples t-test were employed to determine the difference between group means in order to answer the research questions, "What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third-grade Smarter Balanced Assessment Consortium scores for both mathematics and English Language Arts?" The results of this study point to differences in mean scores between preschool program types most notably in the area of mathematics, in which students whose preschool program type 'In-Home Care' outperformed their peers attending 'Head Start' or 'Other' types of programs. Additionally, students whose race/ethnicity was coded by the Oregon Department of Education as 'White' outperformed their peers from all other race/ethnicity categories combined under the broad umbrella of 'Other' in both measures of academic achievement.

## ACKNOWLEDGEMENTS

The journey of completing this study has occurred against the backdrop of many life-transforming transitions, obstacles, and heartaches. As I reflect upon the past year and a half, I have an awareness that who I am at the end of this journey is much altered from who I was when I began this journey. I am reminded of Professor Patrick Allen's comments to our cohort upon admittance into the program. He related the role of the EdD department to that of a Sherpa. As we made the ascent toward the top of the mountain, we would know that we were never alone and always had support and guidance should our feet falter on the arduous voyage known as completing a dissertation. For me, my Sherpa in this journey has been Dr. Dane Joseph. If it were not for Dane, I would have fallen off of the mountain in despair long ago. Tragedies in my personal life diminished my desire to continue on the path and severely hampered my drive and ambition to complete what I had started. Dane exercised tremendous patience with me and my process this past year and half, and he has been eternally positive and supportive, while also helping me take one more step towards the top of the mountain. I am sincerely humbled by the time and effort he invested to ensure I was successful.

This process became richer with guidance from those who invested their time to read and re-read my written word. The insight of both Dr. Susanna Thornhill and Dr. Karen Buchanan has given me pause and allowed me invaluable opportunities to reflect and make intentional revisions to enhance the readability and flow of my document. I am grateful to both women for their unique perspective and for the high-quality, detailed feedback they offered me. Additionally, I would like to acknowledge Dr. Buchanan's counsel in the creation of the seven preschool program categories for the Questionnaire.

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I would like to acknowledge the eighty-two parents/guardians who voluntarily chose to return study materials, as they recognized how their input might impact ECE policy and programming within Oregon by enhancing an understanding of how attending preschool programs before Kindergarten may affect academic success in the early elementary grades. I am grateful for the support of the principals, teachers, and the students at the school sites for their willingness to deliver and manage study materials until the collection date.

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## CHAPTER 1

### INTRODUCTION

Across the nation, there is a growing emphasis on the importance of early childhood education (Gewertz, 2014; Karch, 2010). Determining the needs of our youngest students, ensuring they are ready for Kindergarten, and improving early childhood education is at the forefront of current national education reform (Gewertz, 2014; Hatcher, Nuner, & Paulsel, 2012). Policymakers and stakeholders are invested in creating a comprehensive system of education that is founded on the quality of preschool and Kindergarten programs (Maxwell, 2012; Temple & Reynolds, 2005). This nationwide trend of prioritizing early childhood education is highlighted by state policymakers investing nearly \$7 billion dollars in ECE programs in the 2015-16 fiscal year (Ali et al., 2016).

With the changing landscape of K-12 education increasing academic rigor through such initiatives as the Common Core State Standards, providing an effective, high-quality educational foundation for all children poised to enter the public-school system is critical to each child's academic success in Kindergarten and subsequent grades within Oregon's public school system. This study sought to explore the relationship between a child's access to preschool programming in the year prior to Kindergarten and their subsequent academic achievement outcomes measured by standardized assessments administered in third grade.

There are only a few short years between Kindergarten and third grade, at which point a child's performance is an indicator of long term academic outcomes (Alexander & Entwisle, 1993). A longitudinal study assessed 246 Kindergarten students on two separate measurements of school readiness and was able to predict achievement in reading and math four years later, thus supporting the argument that initial levels of school readiness have a lasting impact on

academic achievement (Chew & Morris, 1989). Lower levels of initial school readiness have also been shown to correlate with future grade retention (Davoudzadeh et al., 2015). Strengths and weakness possessed by children upon Kindergarten entry create discernible readiness profiles that influence future achievement outcomes (Cheung, Hans-Vaughn, McWayne, & Wright, 2012; Furlong, Quirk, & Nylund-Gibson, 2013). Kindergarten teachers are tasked with moving each child towards attainment of specified learning targets and standards, and some children enter Kindergarten better prepared than others to meet these academic demands based upon their prior life experiences (Buysse & Wesley, 2003). In fact, a growing number of children are identified as being unprepared for Kindergarten. (Fitzpatrick & Pagani, 2014; Whitted, 2011).

The experiences in a child's life prior to Kindergarten shape their readiness for school and correlate to later academic achievement outcomes across the child's formal years of schooling (Bryant, Christian, & Morrison, 1998; Davoudzadeh, Grimm, & McTernan, 2015; Furlong, Quirk, & Nylund-Gibson, 2013; Magnuson, Meyers, Ruhm, & Waldfogel, 2004). "Early brain and child development research unequivocally demonstrates that human development is powerfully affected by contextual surroundings and experiences" (Glassy & Roman, 2005, p. 187). An expanded awareness of the correlation between early childhood learning experiences and long-term academic achievement outcomes has made early childhood education a national priority (Johns, 2005).

Access to high-quality preschool programming has the potential to provide young children with the knowledge and skills needed to successfully enter today's Kindergarten classrooms. A large body of research exists to support the numerous individual and societal benefits of access to a high-quality preschool experience (Barnett & Carolan, 2013; Doyle,

Harmon, Heckman, & Tremblay, 2009; Duncan & Magnuson, 2013; Herman-Smith, 2012; Kaufman et al., 2015; Magnuson & Shager, 2010). Such benefits include short-term gains of increased academic achievement and reduced identification for special education classes or grade level retention, as well as longer term gains of increased high school completion rates and continued educational attainment, ability to earn a higher wage, higher tax revenues for society, and fewer incidence of crime (Clothier & Poppe, 2007; Doyle et al., 2009; Duncan & Magnuson, 2013; Herman-Smith, 2013; Kaufman et al., 2015). Thus, the early investment in educating our nation's youngest children may be costly to implement, but the benefits to society are increased adult productivity that result in sustained and long-term returns (Doyle et al., 2009; Temple & Reynolds, 2005).

Glassy and Romano (2005) found that children who attend high-quality child-care programs have higher skills in the areas of math, language, cognition, social skills, self-regulation, and interpersonal relations as compared to their peers immersed in lower quality care prior to Kindergarten entry. In Georgia, Gibbs, Kees Taylor, and Slate (2000) investigated the effect on Kindergarten Readiness as measured by the Georgia Kindergarten Assessment Program based upon preschool access prior to Kindergarten and found that children who attended preschool scored higher on the overall GKAP than did students who did not attend preschool. In Oklahoma, students across all racial/ethnic groups and income brackets who attended Tulsa's Universal Pre-K program increased their Letter-Word Identification score by 52.95%, their Spelling score by 26.42%, and their Applied Problem score by 17.94% as compared to peers who did not attend the Tulsa Universal Pre-K program (Dawson, Gayer, Gormley, & Phillips, 2005). Of the children in the nationally representative cohort who attended a form of center-based care, Pre-Kindergarten programs were associated with the highest gains, which may be attributed to a

strong academic focus (Magnuson, Myers, Ruhm, & Waldfogel, 2004). Children living in poverty who attended Title 1 public Pre-K programs embedded within local elementary school sites showed greater gains in cognitive and language development than their peers who attended community based child-care programs (Bleiker, Hartman, Madigan, Manfra, Tran, & Winsler, 2008). This effect is also true for children who attend Pre-Kindergarten programs as compared to their peers who attend Head Start (Brooks-Gunn, Waldfogel, & Zhai, 2011). Upon analysis of the Early Childhood Longitudinal Study-Birth Cohort of 2001, which consisted of a nationally representative sample of 10,700 children, children who attended Head Start were shown to have lower school readiness scores than their peers who attended Pre-K or other center-based care, though their scores were higher than children in other forms of non-parental care or parental care (Brooks-Gunn et al., 2014).

Cox, Pianta, and Rimm-Kaufman (2000) reported that 52% of students entered Kindergarten successfully, 32% had a moderately successful entry with a few problems noted, and 16% of children had difficulty entering Kindergarten and experienced frequent and numerous problems, which highlights variability in school readiness found amongst children within a single Kindergarten classroom. In fact, an achievement gap is already present when children enter formal schooling that places impoverished children six months behind their peers; such initial disparities persist and impact graduation rates and future employment opportunities (Magnuson & Shager, 2010). The initial educational stratification established between ages three and seven persists and initiates an achievement trajectory, as evidenced by African-American children earning significantly lower marks in reading and math at the first marking period in first grade, as compared to their white peers, and children from families of low SES earning lower marks as compared to their peers from higher SES families (Alexander & Entwisle, 1993).

As all children stand to benefit from exposure to high-quality preschool programming, investigating the programs that create the largest sustainable gains for children will be important for Oregon policymakers to consider, as the literature has shown that Kindergarten readiness is impacted by pre-Kindergarten program types and quality. Research is needed that is specific to Oregon's children and state programs. This research aimed to add to the body of state-specific research needed to drive Early Childhood Education policy forward in order to provide a solid foundation for all children to be successful in Kindergarten and beyond by examining a student population within a specific school district within the state.

### **Purpose of the Study**

The purpose of this research was to determine if a relationship existed between categories of preschool programming accessed in the year prior to Kindergarten entry, in addition to race/ethnicity and socioeconomic status, and academic achievement outcomes four years later in third-grade. "We know little about what parents do to prepare their child for Kindergarten" (Bandyk, Diamond, & Reagan, 2000, p. 94), yet the changing landscape of K-12 education is correlated with the need for effective, high quality Pre-K programs and equitable access for all children to such programs. Additionally, the purpose of Kindergarten is evolving, as a shift from its conception as a place for children to be socialized is moving toward an increasingly academic model (Buysse & Wesley, 2003; Hatcher, Nuner, & Paulsel, 2012).

This study provided the governing School Board of the participating district with an in-depth examination of the relationship between third-grade achievement outcomes and a child's access to preschool programming opportunities in the year prior to Kindergarten. Data analysis highlighted which programs were most effective at preparing the community's children for academic success and sustaining those gains through third grade.



### **Research Questions**

1. What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third grade Smarter Balanced Assessment Consortium Mathematics score?
2. What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third grade Smarter Balanced Assessment Consortium English Language Arts score?

### **Significance of the Study**

With the implementation of full-day Kindergarten in Oregon, the Kindergarten population has changed dramatically. The Oregon Department of Education reported in the 2016 Enrollment Summary Report that the number of Oregon children enrolled in full-day Kindergarten has risen from 4,625 in the 2003-04 school year to 17,609 in the 2014-15 school year. Across Oregon school districts, there is wide variability in regards to the availability of high-quality preschool programs and access for children prior to Kindergarten entry. Not all children enter Kindergarten with the developed skills imperative to academic and social success, thus making a case for the increased access to and expansion of high-quality preschool programs across Oregon. This study contributes by exploring the types of preschool experiences that correlate with grade level achievement in the third-grade.

### **Limitations**

Multiple limitations were inherently assumed at the outset of this study. The chief limitation of the study was such that a comprehensive, reliable data set of preschool programs accessed by children is not collected nor preserved by the Oregon Department of Education. Granular, student-level data for the variables of race/ethnicity, SES, and SBAC scores are

collected and securely maintained by ODE, but the preschool programming variable remained unaccounted for, thus requiring this study to rely upon self-reporting by parents/guardians to determine preschool programming attendance prior to the commencement of Kindergarten. Self-reporting can in and of itself be considered a limitation, as in this study, it required the accurate recollection of an event from four years prior, as study participants had just begun the fall of their fourth grade year of schooling and data analysis was possible due to the availability of their SBAC scores from the spring of third grade. Additionally, parents/guardians who self-reported had to make a distinction between two categories that were difficult to isolate from one another: Private Preschool and Child-Care Center. It is possible that parents' incorrect interpretation of these broad categories influenced inaccurate responses, though in the process of analytics, these categories were collapsed into a combined category out of necessity.

Additionally, though research on the preschool program Head Start is extensive, the body of research on other preschool program types such as In-Home Care and Preschool in an Elementary School, is meager at best. Thus, providing a comprehensive overview of the variety of preschool programs in existence and their relationship to measures of academic achievement was impacted by the modest research on this topic from which to draw upon.

Finally, the sample size for this study negated any possibility for generalizability across the participating district, let alone to other school districts in Oregon with similar a composition and demographics. An estimated 46% response rate on the deployed questionnaire resulted in eighty-two potential study participants. The sample size thus limited both the depth and scope of the findings.

## **Summary**

Research, policy work, and the day-to-day life in the elementary classroom highlight the importance of exposure to high-quality learning opportunities for young children prior to Kindergarten entry. ECE stakeholders are called upon to align efforts, share data, and strengthen partnerships to better serve young children preparing for the transition into Kindergarten. As greater coherence and unity of efforts is achieved through the partnership between schools, families, and the community, young children stand to benefit, as they will increasingly enter Kindergarten with enhanced social and academic skills that are foundational for future academic success. This study sought to engage stakeholders in rich dialogue about both the needs and trajectories of our youngest learners embarking upon their K-12 educational journey.

## CHAPTER 2

### REVIEW OF THE LITERATURE

This review of literature contains analysis of outcomes for preschool programs previously studied, precursors to Kindergarten readiness that relate to future academic success, and predictors of academic achievement beyond Kindergarten. These studies offer a broader research narrative that informed this study. Additionally, Oregon legislative issues offer context for this study.

#### **Oregon's Early Childhood Legislation**

2012 marked the passage of Oregon House Bill 4165, which established the state-wide Kindergarten Assessment, Quality Rating and Improvement System (QRIS) for early childhood programs in the state, and began the work of alignment between early childhood stakeholders and providers (Children's Institute, 2015). Additionally, Oregon House Bills 3380 and 5016 were successfully passed in 2015, which invested twenty-seven million dollars in high-quality preschool programming in Oregon and an additional five million dollars in the Kindergarten Partnership and Innovation Fund, which in 2014 granted four million dollars to Oregon communities and school districts to increase alignment efforts between early childhood programs and the Oregon public school system (Children's Institute, 2015).

In addition to these recent acts of legislation in the state, Oregon's initial year of offering full-day Kindergarten statewide occurred in the 2015-16 school year. The Kindergarten Assessment was administered statewide in 2013 after its passage in 2012, and its first cohort of Kindergarteners to reach third-grade occurred in the 2016-17 school year. The Smarter Balanced Assessment Consortium exam was initially deployed to Oregon students in third-grade in 2014, thus making associations between Oregon's Kindergarten Assessment data and third-grade ELA

and Mathematics SBAC data impossible prior to the 2016-17 school year, though interest exists in the potential relationship between the two measures for Oregon's children.

### **Preschool Selection**

Parents and guardians of young children have the freedom to select the preschool program of best fit for their family, though access for their child may be limited due to financial constraints or availability of openings in the preferred program. Although access to high-quality childcare and preschool programming is often desirable, barriers such as cost prohibit equal access for children across tiers of socioeconomic status (Glassy, Romano et al., 2005). "Families facing economic constraints are limited in the quality and types of learning experience they can provide for their children" (Magnuson et al., 2004, p. 117). In the face of such findings, ECE stakeholders are called upon to examine who has access to which programs based upon SES, and moreover, to investigate how access to types of programs correlates to both initial and persisting academic achievement outcomes.

Impoverished children who access informal care are more likely than their economically advantaged peers to be in the care of a relative rather than a non-relative, which perpetuates the school readiness gap (Magnuson et al., 2004; Cooper Stoll & Delgado, 2015). In a national sample of 12,800 Kindergarten students in 1998, Magnuson et al., (2004) noted that 83% of children had received non-parental care in the previous year, with forms of center-based care being represented as 61%, while Head Start and other non-parental care each represented 11% of the care and educational opportunities afforded to young children.

### **Outcomes Associated with Preschool**

Of the children in the national cohort who attended a form of center-based care, pre-Kindergarten programs were associated with the highest gains, which may be attributed to a

strong academic focus (Magnuson et al., 2004). Children from low-income families have shown greater gains in expressive language in universal versus targeted Pre-K programs, though gains were made regardless of program type in the areas of letter naming, receptive language, rhyming, applied problems, and naming numbers (Bryant, Bruchinal, Dotterer, Early, & Pianta, 2013). Children living in poverty who attend Title 1 public Pre-K programs showed greater gains in cognitive and language development than their peers who attended community based child-care programs (Bleiker, Hartman, Madigan, Manfra, Tran, & Winsler, 2008). This effect is also true for children who attend Pre-Kindergarten programs as compared to their peers who attend Head Start (Brooks-Gunn, Waldfogel, & Zhai, 2011).

Gibbs, Kees-Taylor, and Slate (2000) investigated the effect on Kindergarten readiness as measured by the Georgia Kindergarten Assessment Program (GKAP) based upon preschool program access prior to Kindergarten and found that children who attended preschool scored higher on the overall GKAP, as well as the Physical and Personal indicators, than did students who did not attend preschool. A study in Oklahoma examined Tulsa's universal preschool program and deemed it most beneficial for Hispanic children, especially those whose primary home language was Spanish or whose parents were born in Mexico (Gormley, 2008).

### **Outcomes Associated with Child-Care Centers**

Attending center-based care in the year prior to Kindergarten has been linked to increased math and reading skills for children compared to their peers who experienced only parental care (Magnuson et al., 2004). Furthermore, center-based care increased reading and math skills from the 30<sup>th</sup> to the 37<sup>th</sup> and 35<sup>th</sup> percentile respectively for children from homes with low maternal education (Magnuson et al., 2004). A diverse sample of four-year-old children who attended community-based child-care programs made substantial gains in language, cognition, and motor

skills ending the year performing near the national average (Bleiker et al., 2008). Additionally, child-care centers have helped ethnically diverse, low income children obtain necessary school readiness skills in their year prior to Kindergarten (De Feyter & Winsler, 2009).

Attendance in child-care centers also produces high levels of math achievement for children most at-risk (Bryant et al., 1998). Furthermore, Latino children in child-care centers exhibit higher reading scores compared to Latino children who attend Head Start or informal care (Cooper Stoll & Delgado, 2015). Latino children who attend child-care centers also exhibit higher levels of cognitive, language, and fine-motor skills growth as compared to their peers who access childcare in the home of a non-relative (Ansari & Winsler, 2012). Although it should also be noted that the majority of child-care centers nationwide are rated poor to mediocre in quality (Glassy & Romano, 2005).

### **Outcomes Associated with Head Start**

Federal initiatives such as Head Start target a specific population of children ages 3-5 from low income families, and the funds are directly disbursed from the federal government to local service providers. Programs such as Head Start seek to equalize the educational opportunities for at-risk children from low-income homes, though Head Start is not adequately funded to serve all children who qualify nationwide, leaving a gap in accessibility for our nation's neediest children (Finn, 2014; Hustedt & Barnett, 2011).

Across the nation, Head Start serves less than 60% of eligible 3 to 5-year-old children living in poverty, highlighting issues of inadequate federal funding, while perpetuating early academic stratification (Alexander & Entwisle, 1993; Brooks-Gunn et al., 2011; Glassy & Romano, 2005). Head Start has been shown to improve cognitive development and social competence of children who are served, and children served have shown cognitive gains, as

compared to their peers in parental care (Brooks-Gunn et al., 2011). In contrast, no significant cognitive development effects are present when children who attended Head Start are compared to children who attended preschool or center-based care programs (Brooks-Gunn et al., 2011). Maternal education for children in Head Start programs was found to be lower than that of parents of children enrolled in preschool or center-based programs but higher than mothers whose child was in parental care (Brooks-Gunn et al., 2011). Such findings imply that the educational level of a child's mother has significant bearing on the educational opportunities afforded to the child prior to Kindergarten entry.

Upon analysis of the Early Childhood Longitudinal Study-Birth Cohort of 2001, which consisted of a nationally representative sample of 10,700 children, children who attended Head Start were shown to have lower school readiness scores than their peers who attended Pre-K or other center-based care, though their scores were higher than children in other forms of non-parental care or parental care (Brooks-Gunn, Han, Lee, Waldfogel, & Zhai, 2014). Cheung, Hans-Vaughn, Wayne, and Wright (2012) conducted an analysis of a nationally representative sample of Head Start children across cognitive and social indicators and delineated six distinct academic and social profiles, supporting the notion that within-group variability is present amongst children in poverty, and some are better poised for academic success than others. Head Start is deemed most beneficial for children with less-educated parents than for children whose parents have higher levels of education (Brooks-Gunn et al., 2014).

### **Model Programs**

Three early childhood programs are cited as model programs based upon longitudinal studies of their participants that show lifetime gains from early access to high quality, intensive, and comprehensive educational opportunities. The HighScope Perry Preschool Program was an



early education program in Ypsilanti, Michigan that in 1960 randomly assigned disadvantaged African-American children to a treatment and control group and followed participants through age 40 (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010). The two-year program consisted of half-day school sessions in which teachers with college degrees made home visits to partner with the child's mother in educating the child. Upon Kindergarten entry, the treatment group expressed cognitive gains of one standard deviation compared to the control group (Herman-Smith, 2012). The cost per each child participant receiving treatment was \$17,759, yet the annual rate of return to society was 5.8% (Heckman et al., 2010). The benefits to society are calculated through savings associated with reduced crime rates and decreased social dependence, as well as positive investments of increased educational attainment, increased earnings, and corresponding taxes paid back into society (Heckman et al., 2010). This study was limited by a small sample of 123 participants and is associated with a high per-child cost, which causes some to question its generalizability, especially to state-funded universal Pre-K programs (Finn, 2010).

The second model program noted is the Carolina Abecedarian Project. 111 infants from low income families were assigned to one of two groups. The treatment group received full-day care year-round from infancy to Kindergarten entry. Similar to the Perry Preschool Program, home visits were made by teachers with a bachelor's degree who taught parents skills in how to teach their child and monitor their well-being (Herman-Smith, 2013). The benefits of the program included entry into Kindergarten nearly one standard deviation ahead of the control group on cognitive development measures, as well as higher standardized achievement scores, reduced special education placement and grade retention, increased graduation rates, along with increased college enrollment (Herman-Smith, 2013).

The third model program is the Chicago Child-Parent Centers that are federally-funded, located in high poverty neighborhoods, and are accessible to preschool-age children through second or third grade (Temple & Reynolds, 2007) A longitudinal study followed 1,539 low-income, mostly African-American children, 989 who attended CPC in 1983-1984 and compared these children to 550 who attended a Kindergarten intervention without having attended CPC preschool. Participants were followed through age 22, and the rate of return on investment to the public for children who attended CPC preschool programs was calculated at \$10.15 per dollar spent (Temple & Reynolds, 2007).

### **Matters of Program Quality**

Burchinal et al. (2013) examined the relationship between child-care center quality and Kindergarten readiness as defined by language, mathematics, social skills, and externalized problem behaviors for a sample size of 6,268 through a secondary data analysis of four large-scale studies defined as the NICHD Study of Early Child Care and Youth Development, Early Childhood Longitudinal Study-Birth Cohort, National Center for Early Development and Learning, and Early Head Start. Three measures of child-care quality were employed in the studies including the Early Childhood Environment Rating Scale-Revised (ECERS-R), which was used in three of the four large-scale studies to examine global classroom quality, the Observational Record of the Caregiving Environment, and the Classroom Assessment Scoring System (CLASS), which was also measured through observation. Burchinal et. al (2013) determined a significant relationship between the quality score from the ECERS-R and the language outcomes for the nationally representative sample of 1,400 in the ECLS-B study. Additionally, the CLASS score of quality significantly impacted language outcomes for the

2,435 children in the 11 state NCEDE study. Increases in language and mathematics outcomes were correlated to increases in preschool center quality (Burchinal et.al, 2013).

Miller and Vortuba-Drzal (2016) conducted a meta-analysis of eight large-scale studies of preschool and child-care centers to examine the relationship between program quality and developmental and readiness outcomes for children who were served, the majority identified as being from low SES households who accessed Head Start or publically funded Pre-K, thus impeding generalizability to a broader population. Preschool programs established to higher quality standards produced positive gains in literacy and language outcomes (Miller & Vortuba-Drzal, 2016). Additionally, the quantity of instructional time was a strong predictor of math, language, and literacy skills (Miller & Vortuba-Drzal, 2016). Quality and indicators of school readiness beyond language and literacy have not been strongly associated, which may be a result of the over-utilization of a measurement instrument (ECERS-R) criticized for its poor psychometric properties. (Miller & Vortuba-Drzal, 2016). This global instrument of quality has been influential in the development of the Quality Rating and Improvement Systems used in states across the country, including Oregon, to establish the quality of the preschool and childcare programs within the state, therefore, Miller and Vortuba-Drzal (2016) counsel that there is an “urgent need to identify exactly what constitutes high-quality preschool when it comes to promoting school readiness skills.” (pg. 104). Furthermore, Miller and Vortuba-Drzal (2016) found that instruments measuring global quality of programming were less likely to predict child developmental and academic outcomes than domain-specific instruments measuring quality such as the Teacher Behavior Rating Scale (TBRIS) and Early Language and Literacy Classroom Observation (ELLCO). Miller and Vortuba-Drzal (2016) state:

The take-home message is that if we want preschool to promote certain skills and competencies more effectively in children, we have to implement classroom practices that target these skills in explicit, intentional ways. Simply providing children with safe, stimulating and nurturing environments, as indexed by global quality measures such as the ECERS-R, may produce modest gains in school readiness, but the largest gains will be realized in classrooms where teachers use evidence-based practices to target specific skills and competencies underlying school and life success. (p. 107)

### **A National Focus on Kindergarten Readiness**

While Kindergarten readiness is deemed a national priority, it lacks a universally agreed-upon definition (Buyse & Wesley, 2003; Calkins, Halle, Hair, Lavelle, & Terry-Humen, 2006; Choi et al., 2005; Fulgini et al., 2008; Gorrell, Lawrence, & Lin, 2003; Hatcher et al. 2012). “Kindergarten readiness is a complex idea linked to multiple meanings and factors” (Hatcher et al. 2012, p. 1). Early childhood advocates who are well-versed in the development of children believe that the definition of Kindergarten readiness should encompass the whole child and not solely be based upon an academic skill set (Buysee & Wesley, 2003; John, 2005). With a growing number of children identified as being unprepared for Kindergarten, (Cox et al., 2000; Fitzpatrick & Pagani, 2014; Whitted, 2011), determining which critical skills and characteristics these students lack will inform the definition of readiness. Furthermore, as the purpose of this foundational year of formal schooling evolves, parents and educators must determine, examine, and respond to the emerging critical characteristics that define Kindergarten readiness. This endeavor should be viewed as a shared responsibility between home and school environments (Fulgini et al., 2008).

The literature highlights various aspects of a child's development and skill attainment as being critical to Kindergarten readiness without agreeing upon a precise list of attributes, characteristics, or skills. Additionally, there is not consensus of these skills' significance in relation to creating academic gains. Boones, Cassidy, & Mims (2003) delineate five domains that impact a child's readiness for Kindergarten: physical health and motor development, social and emotional development, language development, cognition and general knowledge, and approaches towards learning. Much of the literature expands upon these domains, while also adding additional layers of readiness such as developed executive functioning skills, ability to attend to personal needs, interpersonal skills, and age or maturity.

### **Precursory Skills**

Literacy skills are fundamental to Kindergarten readiness and include letter recognition, associating letters with sounds, recognizing sight words, and writing one's own name (Brown & Gasko, 2012; Buisse & Wesley, 2003; Hatcher et al, 2012; Irvin et al, 2015). Language skills are closely related to measures of general intelligence (Fitzpatrick & Pagani, 2014). Furthermore, cognitive functioning is a strong indicator of Kindergarten readiness and academic success (Field, Kupersmidt, Voegler-lee & Willoughby, 2012).

The ability to pay attention is another critical component of being ready to learn. Executive functioning skills have consistently been shown to strongly correlate with academic achievement (Cantin, Hund, & Mann, 2012; Messier & Pagani, 2012). Gorrell, Lawrence, and Lin (2003) found that the ability to express thoughts and needs, not be disruptive, and follow directions were determined to be the most critical variables of Kindergarten readiness as determined by Kindergarten teachers. Children who lack executive functioning skills have difficulty sustaining attention, completing tasks, and engaging in self-regulation which impedes

academic and social success (Cantin, Hund, & Mann, 2012). Difficulty following directions is one of the most commonly identified problems in Kindergarteners who struggle to meet the demands of school (Cox et al., 2000).

Social and emotional development, such as appropriately interacting with peers and adults, following rules, managing emotions, expressing needs, and being independent are foundational to school adjustment and academic success (Buysse & Wesley, 2003; Irvin, Tindal, Nese, & Slater, 2015; Reid & Webster-Stratton, 2004). “Socially competent children are also more academically successful, and poor social skills are a strong predictor of academic failure” (Reid & Webster-Stratton, 2004, p. 96). Children who lack social-emotional skills are more likely to experience alienation in the school setting. Additionally, lacking these necessary skills can produce a negative relationship between the child and Kindergarten teacher, which is correlated to behavioral and academic problems in the lower elementary grades (Whitted, 2011).

Motor skills are often overlooked as a critical component of Kindergarten readiness. Yet early math skills, which correlate with school success, have been strongly linked to motor skills (Fitzpatrick & Pagani, 2014; Messier & Pagani, 2012). Children with hyperactive-inattentive behavior have a greater susceptibility towards fine motor deficits, while children who suffer from emotional distress in the form of being depressed, anxious, or worried are more likely to exhibit difficulties with gross motor development (Messier & Pagani, 2012). With 46% of the school day devoted to tasks that utilize fine motor skills, these skills have been found to predict performance at Kindergarten entry (Bell et al., 2012). In a study conducted in Jordan asking teachers to rate the necessity of thirty-nine skills across seven broad domains, the physical/motor domain had the highest mean score for being necessary to Kindergarten readiness (Taleb, 2013). This evidence

points to the need to include a physical/motor descriptor in the definition of Kindergarten readiness.

### **Screening for Indicators of Kindergarten Readiness**

It is imperative that screening tools be developed and utilized for early detection of academic and behavior skill deficits at the entry to Kindergarten, as poor ratings of readiness are associated with negative outcomes for the individual child such as ongoing behavioral and academic difficulties (Herman, King, Owens, & Reinke, 2015). “Screening children’s overall behavioral and academic readiness during their entry into Kindergarten presents an opportunity for identifying children unprepared for this significant life event” (Herman et al., 2015, p. 213). Early identification of skill deficits must be coupled with a plan for timely intervention focused on intentionally developing the necessary skills.

Magnuson, Meyers, Ruhm, and Waldfogel (2004) measured each participant’s math and reading skills at the beginning and end of Kindergarten, as well as the beginning of first grade. The assessment tool was composed from aspects of preexisting instruments including the Peabody Individual Achievement Tests-Revised and the Woodcock-Johnson Psycho-Educational Battery-Revised (Magnuson et al., 2004). Gibbs, Slate, and Taylor (2000), utilized the Georgia Kindergarten Assessment Program as a measurement tool of school readiness; this tool was created by the state’s Content Review Committee, which consisted of eighteen members with expertise in the areas of Early Childhood Education and school readiness. Of the three components of school readiness identified by the National Education Goals Panel based upon a review of the literature, Calkins, Hair, Halle, Lavelle, and Terry-Humen (2006), selected one component of NEGP’s framework (readiness in the child) to conduct their study. The component

of a child's readiness was measured within five specified domains developed from the literature based upon the researchers matching key indicators of the domains to the ECLS-K data.

### **Kindergarten Readiness Assessment in Oregon**

In 2012, the Early Learning Council in Oregon adopted the Kindergarten Assessment (KA) to be utilized annually in public schools within the state and administered in the first six weeks of Kindergarten each school year in order to assess the readiness skills of children entering the Oregon public school system. After its initial launch in the fall of 2013 with a 95% participation rate statewide, the first results were available for review in 2014 and highlighted the presence of an early achievement gap that was especially notable between children living in poverty and their peers from higher SES households due to inequities in access to high-quality early learning opportunities and lack of exposure to early literacy and mathematics concepts (Adarkar, 2014). 33% of incoming Kindergarten students recognized no more than five letters, and 37% could not identify sounds for any letters in the alphabet (Adarkar, 2014). "The best indicators of a child's future school success are not found in only children's behavior but also include their pre-academic skills such as early literacy and numeracy" (Green, Love, McClelland, & Squires, 2014, p. 1).

### **Preparing for the Kindergarten Transition**

Across various studies, parents have expressed anxiety about their children not being ready for Kindergarten due to the increased academic demands and behavioral expectations (Bandyk et al., 2000; Hatcher et al., 2012). One of the difficulties parents face is having a limited understanding of the school's view of readiness and what is expected of their child (Buysse & Wesley, 2003; Choi et al., 2005). Educators are also unclear as to how readiness is encouraged in the home environment.



As stakeholders strive for consensus in defining Kindergarten readiness, it will be imperative for educators and families to actively partner to prepare young children for entry into a formal school environment (Buysse & Wesley, 2003; Choi et al., 2005; Cox et al., 2000). Families can aid in Kindergarten readiness by providing rich, stimulating opportunities for learning in the home environment, while preparing the child to be emotionally ready for the transition (Buysse & Wesley, 2003; Fulgini et al., 2008). Furthermore, exposing young children to group settings and assisting them in separating from figures of attachment will also aid in the transition to Kindergarten (Buysse & Wesley, 2003). Prior to Kindergarten entry, professional educators in a study by Buysse and Wesley (2003), determined that children learn by:

the use of all five senses, play and pretending, relationships and social interactions, imitation, hands-on experiences with materials, active exploration of environments both indoors and outdoors, repetition, a balance of adult instruction and opportunities to choose one's own activities, conversations, looking at books and being read to, music, and predictable daily routines" (p. 361).

Educators must intentionally create opportunities to communicate such information regarding child development and best practices with the families of incoming Kindergarten students. Additionally, sharing positive parenting strategies is an avenue to bolster development of social and emotional competencies in young children prior to Kindergarten entry (Reid & Webster-Stratton, 2004).

### **Kindergarten Readiness Beliefs of Educators and Parents**

Multiple studies have examined the beliefs held by educators and parents about what constitutes Kindergarten readiness. Parents and teachers agree that Kindergarten readiness is multifaceted with social and emotional skills at the core of its conceptualization (Buysse &

Wesley, 2003; Choi et al., 2005; Gorrell et al., 2003; Hatcher et al., 2012). Parents and teachers alike understand that schools are both academic and social environments which require skills in both dimensions (Hatcher et al., 2012). Parents place great emphasis on academic skill acquisition when determining if their child is Kindergarten-ready (Bandyk, Diamond, & Reagan, 2000). In a study conducted by Herman, King, Owens, Reinke, and Stormont (2015), academic and overall readiness were expressed in near perfect correlation supporting the notion that teachers greatly weighted a student's academic background when making a determination about their overall school readiness. Gorrell, Lawrence, and Lin (2003) found that younger teachers placed greater emphasis on the necessity of academic skills when making a determination about Kindergarten readiness. One might infer this finding correlates with the shift that is occurring nationwide to increase academic rigor and alignment across our system of education as expressed by such initiatives as the Common Core State Standards (Barnett & Carolan, 2013).

### **Preparing the School Environment**

Multiple studies have called into question the school's ability to be ready for the Kindergarten child. Knowledge of early childhood development, appropriate instructional strategies, and the environment are key components to address when determining if a school is ready to receive Kindergarten students (Buysse & Wesley, 2003). "All too often, children are forced to be 'ready' for an inappropriate environment that contains few of the components that would make it 'ready' for them" (Cassidy et al., 2003, p. 199). Kindergarten teachers have voiced feeling conflicted when expressing what is developmentally appropriate for Kindergarteners versus the skills of which children would need to demonstrate mastery by the end of the Kindergarten year (Buysse & Wesley, 2003). Coming to consensus around a clearly articulated definition of Kindergarten readiness is one aspect of a school being ready for

incoming Kindergarteners (Buysse & Wesley, 2003). Furthermore, strengthening the alignment of curriculum and practices between early childhood education programs and elementary schools is crucial to ensuring children are Kindergarten ready (Brown & Gasko, 2012; Desimone, Fedoravicius, Finn-Stevenson, Henrich & Payne, 2004).

Teachers can be trained in strategies that promote social skills within their students, as the interaction between the teacher and student affects a child's social and emotional outcomes (Reid & Webster-Stratton, 2004). The Ready to Learn Program created measurable positive outcomes in the areas of listening comprehension, attending to task, and social skills for children in the treatment group, confirming that students can be taught the skills necessary for school success (Brigman & Webb, 2003). Even with such resources available, Kindergarten teachers in a study by Buysse and Wesley (2003) lamented that with the current focus on preparing the children for academic assessments, time was not available to support the necessary social and emotional development of their students.

### **The Formative Years Preceding Kindergarten**

Children from homes that do not promote literacy and children who have mothers with lower educational levels or lower levels of financial status are most at-risk for academic difficulties upon entrance into Kindergarten (Bryant et al., 1998). In a study of 538 Kindergarten students, Bryant et al., (1998) found that children from homes with low maternal education and low levels of home literacy environments scored lower on all academic measures and lacked necessary academic skills as compared to their peers, making them the most at-risk group entering Kindergarten.

The quality of a child's home literacy environment in their preschool years is positively associated with measures of academics upon Kindergarten entry, including reading recognition,

receptive vocabulary, general information, and letter recognition (Baker, Cameron, Grissmer, & Rimm-Kaufman, 2012; Bryant et al., 1998; Cooper Stoll & Delgado, 2015). To illustrate its importance, children from homes with low maternal education but high home literacy environments scored higher on academic measures as compared to their peers from homes with high maternal education and low home literacy environments (Bryant et al., 1998).

### **Outcomes Associated with Socioeconomic Status**

Children living in poverty may less frequently experience stimulating learning experiences in their home environments; additionally, such children have lower enrollment rates in center-based care programs (Magnuson et al., 2004). Children from homes with low levels of maternal education exhibit higher scores in school readiness, receptive vocabulary, reading achievement, and math achievement when accessing a formal child-care setting prior to Kindergarten, as compared to their peers from homes with low levels of maternal education who were in the care of their parent (Boivin et al., 2010).

In a study by Dotterer, Iruka, & Pungello (2012), their findings were such that, “as SES decreased, negative/intrusive parenting behaviors increased, which were in turn associated with children’s lower pre-academic knowledge scores” (p. 665). The predictive power of SES is mitigated by nurturing parenting styles and home learning stimulation (Baker, Cameron, Grissmer, & Rimm-Kaufman, 2012). An analysis of the Early Childhood Longitudinal Study Kindergarten class of 1998-1999 revealed four school readiness profiles at Kindergarten entry across a nationally representative sample of 17,219 children: “comprehensive positive development,” “social/emotional and health strengths,” “social/emotional risk,” and “health risk” (Calkins et al., 2006). Children identified in the profile “comprehensive positive development” were more likely to be advantaged both economically and socially, as well as were more likely

than the other profiles to be female, White, and live in a smaller household in which English was spoken with two parents who had higher levels of income and education.

Of the four profiles, children in the “comprehensive positive development” profile exhibited the highest levels of school readiness which in turn predicted their first-grade math and reading achievement outcomes, while children from disadvantaged backgrounds whose parents had lower levels of education and income were more likely to fall into one of the two risk profiles. These disadvantaged children’s readiness gap was shown to persist through the end of first grade, at which time they performed poorly on academic measurements of reading and math (Calkins et al., 2006).

Children from low-income families less frequently experience educationally stimulating home environments that promote brain development (Herman-Smith, 2013; Magnuson & Shager, 2010). Neurological risk, human genetics, and parenting practices have been implicated in academic disparities in children of low income homes (Herman-Smith, 2013). In a longitudinal study of 5,000 children who attended Educare centers nationwide, which support low income families and children from birth to Kindergarten entry, researchers determined that the longer a child is exposed to high-quality care, the higher their level of school readiness skills (Yazejian, Bryant, Freel, & Burchinal, 2015). “Thus, the promise of early education to remediate disadvantaged children’s achievement rests on its ability to provide enriching social and academic environments that compensate for the range of disadvantages low-income children face” (Magnuson & Shager, 2010, p. 187). The correlation between access to high-quality early learning programs and third-grade achievement outcomes was examined in Oklahoma by Adelstein, Gormley, and Hill (2015) who found math achievement gains of 19-points in third

grade for students eligible for free-lunch who had attended Tulsa's Universal Pre-K Program as compared to their like peers who did not attend the program.

### **Outcomes Associated with Race and Ethnicity**

In a study of pre-academic knowledge of European American children and African-American children, a gap was already present at 36 months of age with European American children scoring higher than their African American counterparts on measurements of school readiness (Dotterer, Iruka, & Pungello, 2012). Upon Kindergarten entry, an achievement gap is present between economically advantaged White children and Latino children who live in poverty (Furlong, Quirk, & Nylund-Gibson, 2013; Han, Lee, & Waldfogel, 2012). The math and reading achievement gap between African-American children and their White peers widens over the course of the Kindergarten year, while the reading achievement gap between White children and their Hispanic peers remains steady (Quinn, 2015). Yet differences in standardized test scores attributed to ethnicity or family type are more frequently shown to be outcomes of poverty (Alexander & Entwisle, 1993; Quinn, 2015).

### **The Importance of Program Quality and Monitoring**

The National Institute for Early Education Research promotes 10 standards of quality for preschool programs that include level of teacher education, annual professional development, class size, ratio, learning standards, providing comprehensive care, nutrition, and on-going monitoring of quality (Barnett & Corlan, 2013). NIEER began reporting on the quality of state Pre-K programs in 2003. 78% of programs met quality standards in 2008-2009, but this fell to 62% in 2011-2012, which may have been an outcome of the recession (Barnett & Corlan, 2013). Herman-Smith (2013) reviewed the outcomes associated with preschool intervention programs and found that preschool programs that produced both short and long-term change for at-risk

children included an out-of-home preschool classroom, a minimum of half-day programming five days a week for the standard school year, low staff-to-child ratios, trained staff, and home visits or other forms of direct interaction with families to help them engage their children in optimal growth and development. In 2009-2010, 18 states required Pre-K teachers across settings to hold a Bachelor's degree, while the remaining 22 did not enforce such a requirement (Hustedt & Barnett, 2011). Kansas piloted a preschool program in 6 counties whose quality controls included requirements for teacher qualification and low teacher-to-child ratios (Clothier & Poppe, 2007). "Because quality is theorized and measured in many different ways, there is not one universally accepted definition as to what constitutes high-quality learning environments" (Dydia, Justice, Kaderavek, Logan, & Pelatti, 2016, p. 831).

Dydia et al., (2016) used regression models to analyze the structural and process quality of eighty-five Early Childhood Education and seventy-nine inclusive Early Childhood education classes from two large-scale studies as measured by the Classroom Assessment Scoring System (CLASS) and teacher and observation questionnaires. Higher levels of education by the lead teacher were associated with higher levels of process quality, while conversely, higher percentages of children from low-SES households within the sampled classrooms were associated lower levels of quality in classroom organization and instructional support (Dydia et al., 2016).

### **Summary**

The Preschool Promise Legislative Report (2016) notes, "high-quality preschool is well documented to be one of the most effective strategies for closing opportunity gaps and raising school achievement" (p. 4). Yet, limitations to access of such programming persists for the children in Oregon. Policymakers in the state are called upon to further mobilize efforts to

increase access of early childhood programming for Oregon's children, improve standards of quality of such programming, and to align the early childhood system with the public-school system in the state. Based on the findings of referenced studies, such efforts will improve school readiness and positively impact future academic success for Oregon's children in the public K-12 system.



## CHAPTER 3

### METHODS

The following chapter describes the study's methodology, which encompasses the study's design, sampling plan, instrumentation, and analytics. This research aimed to answer the following overarching research questions in order to ascertain the relationship between Pre-K program type, race/ethnicity, family SES, and third-grade achievement outcomes.

Research Questions:

1. What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third-grade Smarter Balanced Assessment Consortium Mathematics score?
2. What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third-grade Smarter Balanced Assessment Consortium English Language Arts score?

#### Design

The research design was a secondary data analysis study aimed at determining the relationship between several independent variables, (preschool program type, race/ethnicity, and socioeconomic status), and the dependent variables of third Grade Math and English Language Arts achievement, which was measured using scores from the Smarter Balanced Assessment Consortium Mathematics and English Language Arts standardized achievement tests.

Several multiple regression models were to be attempted in order to examine the predictiveness of the defined independent variables of preschool program type, race/ethnicity, and socioeconomic status on the dependent variables of SBAC ELA and Mathematics outcomes.

A post-hoc data set for the identified population was sought from the Oregon Department of Education. With the exception of utilizing student identification numbers assigned to each

student upon entry in Oregon public schools, the data set included the de-identified assessment scores from the Smarter Balanced ELA and Mathematics Assessment Consortium matched to the individual student's race/ethnicity and socioeconomic status. Additionally, a questionnaire (see Appendix A) was deployed to parents/guardians of all potential study participants in the identified school sites in the participating school district. The locally developed questionnaire honed in upon the educational opportunities via established provider (i.e. preschool program type) afforded each study participant in the year prior to entry into Oregon's public school system at the Kindergarten grade level. Questionnaires were labeled by school officials and in some instances students themselves with each individual student's SSID number, before being dispersed and collected by the fourth grade classroom teachers. Subjects with completed questionnaire data, including a study consent form signed or initialed by the parent or guardian, were matched to the secondary data sets (SBAC Mathematics and ELA scores) provided by the Oregon Department of Education based upon each subject's SSID number. Demographic variables added additional opportunities for analysis of relationships between identified variables. Demographic variables requested in the secondary data set from ODE included race/ethnicity and socioeconomic status.

Previous studies have examined both short-term initial gains upon Kindergarten entry as a function of preschool status, as well as have examined the lasting impact of preschool programming on academic achievement. The state of Oklahoma has been a pioneer in the movement towards universally-offered, voluntary, state-funded preschool and thus, the research inquiries and study designs in Oklahoma provide a model of replication for researchers studying similar phenomenon in Oregon. Students in a study by Adelstein, Gormley and Hill (2015) participated in Tulsa's Public Pre-K system (the treatment) and were compared to their peers

who did not attend Tulsa's Public Pre-K system (the control group) based upon standardized measures of achievement testing in third grade.

### **Sampling Design**

The participants in the study were fourth grade students attending public school in a participating school district in the state of Oregon during the 2017-18 school year. Fourth grade students were selected, as they had completed the third-grade SBAC assessments in the spring of 2017, and their scores were available for review at the time this study took place. A convenience sampling plan was utilized, as the researcher had political connections to the district. These established connections allowed access by permission of the Director of School Improvement to six fourth-grade classrooms in two local elementary school sites, which was essential for determining the sample and ascertaining each study participant's preschool program type. Similarly, researchers in Oklahoma have utilized a convenience sampling plan when examining the difference in achievement outcomes based upon access to preschool programming. Adelstein, Gormley, and Hill (2015), selected a sample that was specific to Oklahoma with Tulsa being the district of study. Children were selected based upon availability of existing data.

Elementary school sites composed of similar student demographic variables with roughly equivalent population sizes were selected for the study at the discretion of the Director of School Improvement. Each fourth-grade classroom teacher in the identified school sites deployed the voluntary questionnaire to the parents/guardians of every student in the classroom to ensure a quality sampling size was established through completed questionnaires. Principals and lead secretaries partnered with the Director of School Improvement and supported the fourth-grade teachers at their school sites in their efforts to deploy the locally developed questionnaire for parents/guardians to voluntarily complete. Questionnaire responses identified the student solely

by SSID number and were matched to the corresponding Smarter Balanced Assessment Consortium scores based upon this SSID number.

Third grade achievement data for study participants was collected via standardized Smarter Balanced Assessment Consortium state testing data in the areas of Math and English Language Arts for the 2016-17 school year. Assessment data is collected from school districts statewide and securely compiled and stored by the Oregon Department of Education. A Data Use Agreement was submitted by the researcher to the Oregon Department of Education to secure individual variables for each study participant except for the variable of preschool program attended, as this variable is not procured by ODE.

### **Instrumentation and Administration**

A post-hoc data set was collected from the Oregon Department of Education, as this study's primary focus was fourth-grade children in public schools in the participating school district. The Oregon Department of Education is required by law to systematically collect and securely store third-grade grade achievement data annually from all public school districts in the state of Oregon.

Smarter Balanced Assessment Consortium Mathematics and English Language Arts standardized tests of achievement are administered annually in third grade in Oregon public schools. Common Core State Standards are assessed via a computer in a secure testing environment. Test Administrators, School Test Coordinators, and District Test Coordinators are held accountable for strict adherence to protocols for test administration, test supervision, and test security to ensure valid and reliable results. Assessments may be deployed to third-grade students who are not exempt after sixty-six percent of instructional days for the school calendar

year have been completed. The assessments are comprised of a Computer Adaptive Test and a Performance Task.

A voluntary questionnaire was distributed to parents/guardians of all fourth-grade students on the rosters of the six classrooms at the two participating elementary school sites. Students were identified on the questionnaire strictly by SSID number. The questionnaire probed for the identification of Pre-K status in the year prior to Kindergarten entry (In-Home Care with a Relative, In-Home Care with a Non-Relative, Head Start, Child-care Center, Private Preschool, Preschool in an Elementary School Site, and Other) for each fourth-grade student included in the study. The voluntary questionnaire was sent home to parents in September of 2017. Completed responses that included a signed study consent form that were received by September 29, 2017, which established the sample for the study.

### **Data Analysis Procedures**

Several multiple-regression models were to be attempted in order to predict third-grade achievement outcomes based upon the established independent variables. Independent variables were weighted equally. According to Laerd Statistics, eight assumptions must be met in order to utilize a multiple regression model (Lund Research Ltd., 2013). The first and second assumptions were met prior to initiating the study, as the dependent variables (SBAC Mathematics and SBAC ELA) are measured on a continuous scale, and two independent, categorical variables (Pre-K Status and Demographics) were present.

The remaining six assumptions could not be tested prior to employing tests of multiple regression. Independence of observation is verified using the Durbin-Watson statistic. Scatterplots and partial regression plots are utilized to determine the presence of a linear relationship. Homoscedasticity is established if the variance remains similar along the line of

best fit (Lund Research Ltd., 2013). The lack of multicollinearity is determined if the independent variables are not highly correlated to one another (Lund Research Ltd., 2013). The lack of significant outliers coupled with normally distributed residuals represent the final of Laerd's eight assumptions for a multiple-regression model.

In the table that follows, independent and dependent variables in addition to statistical test that were applied are identified for the research questions.

Table 1

*Statistical Tests Selected*

Research Question	Independent Variables	Dependent Variable	Covariate	TEST
#1	Pre-K Program Type, Demographic Variables	Third-grade SBAC Mathematics Score	NA	Multiple Regression
#2	Pre-K Program Type, Demographic Variables	Third-grade SBAC English Language Arts Score	NA	Multiple Regression

Tests of standard multiple regression have been applied by researchers in previous studies who have examined similar phenomenon and aimed at predicting future achievement outcomes based upon Pre-K program type. Dawson, Gayer, Gormley, and Phillips (2005) used a one-way ANCOVA to determine the difference in means across specified variables with identified covariates of children who attended Tulsa Public Preschool and children who did not attend Tulsa Public Preschool in addition to employing a test of standard multiple regression. Magnuson, Meyers, Ruhm, and Waldfogel (2004) analyzed data using the statistical test of

standard multiple regression in order to predict math and reading outcomes in the fall of a child's Kindergarten year based upon their child-care setting in the year prior to Kindergarten.

### **Significance of the Study**

This purpose of this study was to provide Oregon educational policymakers with statistical data regarding levels of third-grade achievement outcomes based upon a child's access to educational programming opportunities in the year prior to Kindergarten. This information highlights which programs are most effective at preparing the participating communities' children for academic success and sustaining those gains through third grade. The variable of preschool program attendance is not systematically collected by ODE, and thus, insight into this variable and its relationship to achievement outcomes is beneficial to ECE stakeholders in Oregon.

### **IRB Approval**

Upon approval of the Dissertation Proposal and prior to the initiation of this study, the appropriate IRB forms (see Appendix A) and supporting documentation were submitted to the George Fox University Doctor of Education department. IRB approval was granted on June 10, 2017 by George Fox University Institutional Review Board representative Terry Huffman, Ph.D. Following this approval, a Data Use Agreement (see Appendix B) was submitted to the Oregon Department of Education on August 31, 2017. At the direction of the Assistant Superintendent of the Office of Research and Data Analysis, revisions were made to the Data Use Agreement, and it was approved on September 14, 2017. Class sets of study materials were disbursed to participating schools on September 20, 2017 following both the IRB and Data Use Agreement approvals. Following the determination of the study's sample on September 29, 2017, the

Oregon Department of Education was contacted in an effort to gain access to the secondary data set that was representative of the defined variables which were securely preserved by ODE.

### **Research Ethics**

There were no known conflicts of interest or inherent ethical issues embedded within the design of the study or relations with the subject matter, ECE programming providers, or local elementary school sites that would jeopardize the validity of the findings of the study. The researcher has no personal relationship with or knowledge of the fourth-grade students in the participating district, nor their parents/guardians. Educators disbursed the study materials and were under no obligation to persuade students to turn in their materials. Each fourth-grade teacher received a \$25.00 coffee gift card to either Starbucks or Dutch Brothers simply for handing out the study materials to each child and collecting materials which were voluntarily returned. Teachers understood that they would receive the coffee gift card regardless of the number of their students who returned study materials. Students who voluntarily returned study materials were provided with one standard serving size of fruit snacks. Thus, neither students nor teachers experienced duress nor felt forced to contribute to an explicit demand for a sample size or questionnaire return rate. The sample size was created by voluntary participation. No specific outcome was sought through this study by the researcher nor Superintendent or Director of School Improvement for the participating district, thus eliminating a purpose for the intrusion of unethical behavior.



## CHAPTER 4

### RESULTS

The results in the following chapter encompass a thorough analysis of the statistical tests utilized to examine potential relationships between the defined independent and dependent variables and exhaustively report such findings. It is necessary to note that a change in analytics was deemed unavoidable in order to complete sound analysis of the variables and their interactions with one another. A multiple-regression model was not a viable option due to the markedly smaller sample size than the originally projected three hundred participants. Thus, a determination was made to alter the data analysis procedures outlined in Chapter 3 and to select an alternate statistical test that could examine the defined variables and their interactions with one another. A one-way ANOVA was therefore utilized in place of a multiple-regression model.

This study's ability to access granular, student-level data hinged upon the voluntary participation of one school district in the state of Oregon, as a data warehouse of individual students' Pre-K program participation does not exist in the state of Oregon, and the best means of collecting this data was determined to be a questionnaire deployed and collected via classroom teachers. Due to unforeseen circumstances, the school district that had formerly committed to participation in the study via the Superintendent was no longer a viable option. This not only delayed the timeline of the study's completion by months but impacted the expected response-rate and therefore, the final sample size was severely diminished.

In August of 2017, eight school district Superintendents in the Southern region of Oregon were contacted via email regarding the potential of study participation. An overview of the study, stated research questions, significance of the study, and study timeline were provided. Study participation by the district was explicitly defined as voluntary, and Superintendents of school

districts willing to voluntarily participate needed to provide notice of participation no later than August 31, 2017. Based upon this formal request seeking participation, two districts' representatives regretfully declined participation, five districts did not respond to the request, and one district voluntarily chose to participate in the study.

### **Data Linking**

On August 31, 2017, a Data Use Agreement was submitted to the Oregon Department of Education's Procurement Services Division. This agreement specified the administrative and security requirements agreed upon by the Data User in exchange for protected educational data under the FERPA Act securely housed at ODE. The Assistant Superintendent for the Office of Research and Data Analysis ensured that all student data was meticulously matched to the Oregon SSID assigned to each student, and took additional measures to match students with their state-assigned SSID number in the instances where the internal district identification number was provided. The Assistant Superintendent created multiple data files in order to provide comprehensive figures for each independent and dependent variable per study participant as requested by the Data User. These data files were securely transferred via Oregon Department of Education's secure transfer site. Upon receipt of the data files, files were merged into a data set that contained all variable information for each SSID number. This data was used for statistical analysis and interpreted using SPSS Statistical Software.

In the following chapter, descriptive statistics are presented for SBAC Mathematics and English Language Arts outcomes by a trichotomy of Pre-K program type variables (In-home care vs. Head Start vs. Other), a dichotomy of race/ethnicity variables (White vs. Other), and dichotomy of SES variables (Free and Reduced Lunch: Yes/No). It was necessary to recode the seven Pre-K program types into three broad program types to make statistical analysis viable for

the small sample size. In-home Care with a Relative and In-home Care with a Non-Relative were combined and recoded as In-Home Care. Head Start remained a category in and of itself due to a large body of pre-existing research on this particular Pre-K program, as well as the strict federal regulations which clearly define the program. Center-based care, Private Preschool, Preschool in an Elementary School Site, and Other were collapsed and recoded into the broad category of Other.

### **Descriptive Statistics**

The participating school district is comprised of six elementary schools, two middle schools, and one high school. At his discretion, the Director of School Improvement selected two of the six elementary schools for participation in the study. Study materials, including the locally developed student questionnaire, IRB Parent/Guardian Consent, and disbursement and collection directions for the fourth-grade teachers were delivered to the secretaries of both elementary schools who then dispersed the study materials to the fourth-grade teachers. The student questionnaire (offered in both English and Spanish) was stapled to the IRB Parent/Guardian consent form. Class sets of thirty were made for each of the three fourth-grade teachers at both elementary school sites. Thus, students in a total of six fourth-grade classes were given the study materials, and participation by their parent/guardian was stressed as voluntary. Study materials were returned for eighty-two students of one-hundred-eighty students. However, when controlling for missing data, the sample size was seventy-seven ( $n=77$ ), or 43%, for the SBAC Mathematics and seventy-nine ( $n=79$ ), or 44%, for the SBAC ELA.

Apart from two email conversations (included in Appendix C) which were initiated by one fourth-grade teacher and one administrator seeking clarification on the provided study guidelines outlining disbursement and collection procedures, no interactions took place between

the researcher and the educators who were responsible for study material disbursement and collection. Additionally, not a sole interaction between the researcher and the students who were potential study participants- nor between the researcher and the parents/guardians of potential study participants - took place at any time before, during, or after the study's process and conclusion. The identity of students and their families thus remained protected to the highest possible degree of confidentiality.

**Independent Variable: Pre-K Program Type**

Of the eighty-two responses to the Questionnaire, which asked parents/guardians to select the Pre-K program attended by their child the majority of the time (9 months or more) in the year prior to Kindergarten entry, the frequency of each program selected as the primary response was as follows: In-Home Care with a Relative: seventeen (n=17), In-Home Care with a Non-Relative: five (n=5), Head Start: thirteen (n=13), Child Care Center: thirteen (n=13), Private Preschool: twenty-five (n=25), Preschool in an Elementary School Site: one (n=1), and Other: eight (n=8). Within the category of Other existed five questionnaire responses that included two programs selected by the parent/guardian rather than a single selection of the program accessed the majority of the time in the year prior to Kindergarten entry; these five study participants were assigned by the researcher to the Other category, as doubtfulness was deemed the category of best fit. For purposes of statistical analysis, the frequency of the recoded trichotomy of programs was twenty-two (n=22) who accessed In-Home Care, thirteen (n=13) who accessed Head Start, and forty-seven (n=47) who accessed Other.

**Independent Variable: Race/Ethnicity**

The Oregon Department of Education matched each individual SSID number with the student's race/ethnicity in the following categories: American Indian/Alaskan Native (I) (n=0),

Asian (A) (n=0), Pacific Islander (P) (n=0), Black (B) (n=2), Hispanic (H) (n=13), White (W) (n=63), and Multi-Not Hispanic (M) (n=4). Due to unequal distribution of study participants in ODE's race/ethnicity categories, limited sample size, as well as a high prevalence of students categorized as White, a dichotomy was created by recoding all races/ethnicities other than White into one group titled Other and leaving White as its own group. Ultimately, the independent variable of race/ethnicity, as dichotomized in the categories of White (n=63) versus Other (n=19), was unequally distributed amongst the two groups.

### **Independent Variable: Socioeconomic Status**

The socioeconomic status of each study participant was coded by Oregon Department of Education as either Yes, Receiving Free or Reduced Lunch, or No, Not Receiving Free or Reduced lunch. The sample included one sole study participant (n=1) representing the No category for the independent variable of SES on both the dependent variables of the third-grade SBAC Mathematics and SBAC ELA outcomes. In sharp contrast, seventy-four students (n=74) represented the Yes category for the variable of SES as measured by Free and Reduced lunch status on both dependent variables of third grade SBAC Mathematics and ELA outcomes.

### **Summary of Demographic Characteristics**

The frequency and percent of each independent variable, Pre-K program type, race/ethnicity, and socioeconomic status, are highlighted in Table 2. Each independent variables occurs initially with its primary categories at the inception of this study, as well as the re-coded categories for the independent variables of Pre-K program type and race/ethnicity.

Table 2

*Demographic Characteristics by Program Type, Race/Ethnicity, and SES*

Independent Variables		Frequency	Percent
<b>Program Type</b>			
In-Home Care	(Relative)	17	20.7%
In-Home Care	(Non-Relative)	5	6.1%
Head Start		13	15.9%
Child Care Center		13	15.9%
Private Preschool		25	30.5%
Preschool in an		1	1.2%
Other		8	9.8%
<b>Race/Ethnicity</b>			
American		0	0%
Asian (A)		0	0%
Pacific Islander		0	0%
Black (B)		2	2.4%
Hispanic (H)		13	15.9%
White (W)		63	76.8%
Multi-Not		4	4.9%
<b>SES</b>			
Free/Reduced		81	98.8%
Free/Reduced		1	1.2%
<i>Recoded Independent Variables</i>			
<b>Program Type</b>			
In-Home Care		22	26.8%
Head Start		13	15.9%
Other		47	57.3%
<b>Race/Ethnicity</b>			
White		63	76.8%
Other		19	23.2 %

**Dependent Variable: SBAC Mathematics Outcomes**

The third-grade SBAC Mathematics scores were reported by ODE in two dimensions of score measurement, including a numerical scaled score measured on a continuous scale ranging from roughly 2,000 to 3,000, and an achievement level ranging from one to four. The Smarter

Balanced Assessment Consortium (2017) consider students to be on track and college and career ready based upon their ability to achieve a Level of 3 or 4 on the standardized assessment.

The SBAC Mathematics scores for all study participants included a minimum score of 2255 (Level 1) and a maximum of 2581 (Level 4) for a scaled score range of 326 points and an achievement range of 3 levels. The mean SBAC Mathematics score was higher for students who accessed In-Home Care ( $2445.55 \pm 39.501$ ), as compared to students who accessed Head Start ( $2411.82 \pm 33.337$ ) or Other ( $2437.18 \pm 75.074$ ) in the year prior to Kindergarten. The minimum SBAC Mathematics score for In-Home Care ( $2384 \pm 39.501$ ) was also higher than the scores of the other two categories ( $2354 \pm 33.337$ ) and ( $2255 \pm 75.074$ ), Head Start and Other, respectively. Students categorized as White had higher mean SBAC Mathematics scores ( $2445.0 \pm 61.335$ ) than students who were categorized as Other ( $2401.38 \pm 57.312$ ) in excess of 43.62 points.

Table 3

*SBAC Mathematics Score by Pre-K Program Type*

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
In-Home Care	20	2445.55	39.501	8.833	2427.06	2464.04	2384	2517
Head Start	11	2411.82	33.337	10.052	2389.42	2434.21	2354	2481
Other	44	2437.18	75.074	11.318	2414.36	2460.01	2255	2601
Total	75	2435.69	62.755	7.246	2421.25	2450.13	2255	2601

Table 4

*SBAC Mathematics Score by Race/Ethnicity*

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
White	59	2445.00	61.335	7.985	2429.02	2460.98	2314	2601
Other	16	2401.38	57.312	14.328	2370.84	2431.91	2255	2495



**Dependent Variable: SBAC ELA Outcomes**

The third-grade SBAC ELA scores are reported in the same manner as the SBAC Mathematics scores, including a numerical scale score that is then assigned to an achievement level of 1-4. However, the range of scores assigned to each level differs between the two SBAC tests (The Regents of the University of Southern California – Smarter Balanced Assessment Consortium, 2017).

The SBAC ELA scores for all study participants included a minimum score 2252 (Level 1) and a maximum of 2614 (Level 4) for a scaled score range of 362 points and an achievement range of three levels. The mean SBAC ELA score ( $2454.07 \pm 87.139$ ) was higher for students accessing the Pre-K program categorized as Other as compared to their peers who accessed In-home Care ( $2436.75 \pm 78.583$ ) and Head Start ( $2444.75 \pm 78.608$ ). The mean SBAC ELA score for Other ( $2454.07 \pm 87.139$ ) was 17.32 points higher than the mean In-Home Care score ( $2436.75 \pm 78.583$ ) and 9.32 points higher than the mean score of Head Start ( $2444.75 \pm 78.608$ ), thus pointing out a marginal difference between program types. More notably, students who were categorized as White had a mean SBAC ELA score ( $2456.80 \pm 84.991$ ), that was 36.05 points higher than students who were categorized as Other ( $2420.75 \pm 70.942$ ).

Table 5

*SBAC ELA Scores by Pre-K Program Type*

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
In-Home Care	20	2436.75	78.583	17.572	2399.97	2473.53	2252	2540
Head Start	12	2444.75	78.608	22.692	2394.80	2494.70	2331	2558
Other	45	2454.07	87.139	12.990	2427.89	2480.25	2252	2614
Total	77	2448.12	83.012	9.460	2429.28	2466.96	2252	2614

Table 6

*SBAC ELA Scores by Race/Ethnicity*

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
White	60	2456.80	84.991	11.065	2434.65	2478.95	2252	2614
Other	17	2420.75	70.942	17.735	2382.95	2458.55	2331	2543

Table 7

*Achievement Levels for Mean SBAC Scores by Pre-K Program Type and White vs. Other*

	SBAC Mathematics	SBAC ELA
<i>Pre-K Program Type</i>		
In-Home Care	Level 3	Level 3
Head Start	Level 2	Level 3
Other	Level 3	Level 3
<i>Race/Ethnicity</i>		
White	Level 3	Level 3
Other	Level 2	Level 2

## **Inferential Statistics**

### **Research Question 1**

*What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third grade SBAC mathematics score?*

#### **Pre-K Program Type Effects on SBAC Mathematics**

Participants were categorized into three Pre-K program types: In-Home Care: twenty-two (n=22), Head Start: thirteen (n=13), and Other: forty-seven (n=47). Though the sample size was small, data was normally distributed for each group, as assessed by Shapiro-Wilks Test of Normality ( $p > .05$ ) and supported by the visual inspection of the Histogram which displayed a normal distribution of the dependent variable, as corroborated by the Normal Q-Q Plots.

Table 8

*Tests of Normality Results for SBAC Mathematics by Pre-K Programs*

Third Grade SBAC Mathematics		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
	In-Home Care	0.125	20	.200*	0.952	20	0.402
	Head Start	0.111	11	.200*	0.977	11	0.948
	Other	0.091	44	.200*	0.976	44	0.486

A one-way ANOVA was used to examine SBAC Mathematics scores by a trichotomy of Pre-K program types to determine if SBAC Mathematics scores differed based upon access to Pre-K program type in the year prior to Kindergarten entry. However, the Levene's test statistic of homogeneity of variance revealed equality of group variances in SBAC mathematics scores was statistically significant ( $p=0.013$ ), and therefore homogeneity of group variance was not assumed. With the assumption of homogeneity of variance violated, a one-way Welch test in addition to a Brown-Forsythe test of robustness was employed.

SBAC Mathematics scores were not statistically significant between groups, Welch's  $F(2, 34.973) = 3.232, p = 0.052$  and Brown-Forsythe  $F(2, 68.603) = 3.232, p = 0.160$ . The mean SBAC Mathematics score increased from Head Start ( $2411.82 \pm 33.337$ ), to Other ( $2437.18 \pm 75.074$ ), to In-Home Care ( $2445.55 \pm 39.501$ ), in that order. But interestingly, Games-Howell post-hoc analysis revealed SBAC Mathematics scores between In-Home Care and Head Start were statistically significant ( $p = 0.048$ ). Significant post-hoc tests are highly unusual, accompanied by non-significant robust tests of equality of variances. But with only the Welch

statistic's p-value being so close to the cut-off threshold, it was plausible this was only an anomaly.

Table 9

*Robust Tests of Equality of Means Results for SBAC Mathematics Scores by Pre-K Program*

*Type*

		Statistic <sup>a</sup>	df1	df2	Sig.
SBAC Mathematics	Welch	3.232	2	34.973	0.052
	Brown- Forsythe	1.879	2	68.603	0.160

a. Asymptotically F distributed

The Pre-K program type effects on SBAC Mathematics scores reveal the highest mean scores were attributed to students who accessed In-Home Care ( $2445.55 \pm 39.501$ ), and the lowest mean scores were attributed to students who accessed Head Start ( $2411.82 \pm 33.337$ ). The minimum score for each program type was 2384 (In-Home Care), 2354 (Head Start), and 2255 (Other). This reveals that in addition to having the highest overall mean score, the Pre-K program type In-Home Care had a 30-point higher minimum score than Head Start and a significant 129-point higher minimum score than the Pre-K program type Other.

**Race/Ethnicity Effects on SBAC Mathematics**

Participants were categorized as either White (n=59) or Other (n=16). Data was normally distributed for each group, as assessed by Shapiro-Wilks Test of Normality ( $p > .05$ ).

Table 10

*Tests of Normality Results for SBAC Mathematics by Race/Ethnicity*

		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Third Grade SBAC Mathematics	White	0.098	59	.200*	0.976	59	0.279
	Other	0.142	16	.200*	0.938	16	0.329

An independent t-test was utilized to determine if differences existed in mean SBAC Mathematics scores between the White students and the students from all Other categories of race/ethnicity. T-test results indicate a significant difference between mean scores for students who were White ( $2445.0 \pm 61.335$ ) and all Other students ( $2401.38 \pm 57.312$ );  $t(73)=2.557$ ,  $p=0.013$ .

Table 11

*T-Test for Equality of Means Results for SBAC Mathematics Scores by Race/Ethnicity*

	F	Sig.	t	df	Sig. (2- tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the	
								Lower	Upper
Equal Variance Assumed	0.246	0.622	2.557	73	0.013	43.625	17.062	9.621	77.629
Equal Variance Not Assumed			2.660	25.138	0.013	43.625	16.403	9.852	77.398

Visual inspection of the Boxplot portraying SBAC Mathematics scores between the categorical groups of White and Other reveals one significant outlier for each group, as recorded in Appendix D. Case number 20 in the Other category earned a score of 2255, which was 99 points below the lower quartile. Case number 31 in the White category earned a score of 2601, which was 20 points above the upper quartile.

The range for the Other category was 240 points, while the range for the White category was 287 points. The White students had a higher minimum score of 2314 as compared to the minimum score of the 2255 for the Other students. The maximum scores also differed between groups, with the White student maximum being 2601, and the Other student maximum being 2495.

### **Socioeconomic Status Effects on SBAC Mathematics**

Free and Reduced Lunch status was utilized as the proxy for determining a study participant's socioeconomic status. However, analysis of SBAC mathematics scores by this independent variable was troublesome, given that only one study participant was defined as not receiving Free or Reduced Lunch. This was problematic for any meaningful inferential statistical analysis, given that estimating the variance between groups – while essential – could not be established to compute mean-difference scores. Therefore, statistical analysis was not run for the independent variable of SES on the dependent variable of SBAC Mathematics.

### **Research Question 2**

*What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their third grade SBAC English Language Arts score?*

### Pre-K Program Type Effects on SBAC ELA

Participants were categorized into three Pre-K program types: In-Home Care: twenty (n=20), Head Start: twelve (n=12), and Other: forty-five (n=45). Data was normally distributed for each group, as assessed by Shapiro-Wilks Test of Normality ( $p > .05$ ).

Table 12

#### *Tests of Normality Results for SBAC ELA by Pre-K Programs*

Third Grade SBAC ELA Score	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
In-Home Care	0.126	20	.200*	0.931	20	0.160
Head Start	0.211	11	0.185	0.913	11	0.266
Other	0.097	44	.200*	0.966	44	0.214

The Levene's test statistic of homogeneity of variance revealed equality of group variances for SBAC ELA scores did not significantly differ statistically ( $p=0.183$ ), and therefore homogeneity of group variances was assumed. A one-way ANOVA was used to examine SBAC ELA scores by a trichotomy of Pre-K program types,  $F(2, 74)=0.307, p=0.736$ . SBAC means scores were not statistically significant between groups. This was further supported by Welch's  $F(2, 28.595)=0.315, p=0.732$ .



Table 13

*ANOVA Results for SBAC ELA by Pre-K Programs*

SBAC ELA Scores	Sum of	df	Mean	F	Sig.
Between	4313.148	2	2156.574	0.307	0.736
Within	519406.800	74	7019.011		
Total	523719.948	76			

Table 14

*Robust Tests of Equality of Means Results for SBAC ELA by Pre-K Programs*

		Statistic <sup>a</sup>	df1	df2	Sig.
SBAC ELA Score	Welch	0.315	2	28.595	0.732
	Brown-Forsythe	0.333	2	44.089	0.718

a. Asymptotically F distributed

**Race/Ethnicity Effects on SBAC ELA**

Participants were categorized as either White sixty (n=60) or Other seventeen (n=17).

Data was normally distributed for each group, as assessed by Shapiro-Wilks Test of Normality ( $p > .05$ ).

Table 15

*Tests of Normality Results for SBAC ELA by Race/Ethnicity*

White V. Other	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Other	0.159	16	.200*	0.922	16	0.181
White	0.109	59	0.077	0.956	59	0.033

An Independent T-Test was utilized to determine if differences existed in mean SBAC ELA scores between the students who were White and students from all Other race/ethnicity category. T-test results indicate a significant difference was not present between mean scores for students who were White (2456.80 ± 84.991) and all Other students (2420.75 ± 70.942); t(75)=1.344, p=0.183.

Table 16

*T-Test for Equality of Means Results for SBAC ELA Scores by Race/Ethnicity*

	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the	
								Lower	Upper
Equal Variance Assumed	1.092	0.299	1.344	75	0.183	30.497	22.688	-14.700	75.694
Equal Variance Not Assumed			1.501	30.805	0.143	30.497	20.314	-10.944	71.939

### **Socioeconomic Status Effects on SBAC ELA**

Free and Reduced Lunch status was utilized as the proxy for determining a study participant's socioeconomic status. However, analysis of SBAC ELA scores by this independent variable was troublesome, given that only one study participant was defined as not receiving Free or Reduced Lunch. This was problematic for any meaningful inferential statistical analysis, given that estimating the variance between groups – while essential – could not be established to compute mean-difference scores. Therefore, statistical analysis was not run for the independent variable of SES on the dependent variable of SBAC ELA.

### **Summary**

Analytics of the associations between the defined independent and dependent variables reveal fascinating findings. Pre-K program type had the most notable impact on SBAC Mathematics scores, with students accessing In-Home care perhaps surprisingly outperforming their peers who accessed Head Start and Other on this third-grade measure of academic achievement. In contrast, minimal variance existed between mean scores of Pre-K program types on the SBAC ELA measure of academic achievement. Analytics also indicate that students whose Race/Ethnicity was categorized as White outperformed students categorized as Other on both third-grade Mathematics and ELA standardized measures of academic achievement.

Without the ability to analyze the independent variable socioeconomic status and to ascertain its relationship with all defined variables, it is impossible to provide a definitive and holistic response to the respective research questions. However, while it cannot be determined if self-selection into preschool programming is related to SES, nor whether the variable SES is a greater predictor of academic achievement than Race/Ethnicity or preschool programming access, analysis of the two existing independent variables and their relationship to measures of

third-grade academic achievement provide additional information to early childhood education stakeholders in the state of Oregon.

## CHAPTER 5

### DISCUSSION AND CONCLUSION

The intent of this study was to examine the relationship between the three independent variables of Pre-K program type, race/ethnicity, socioeconomic status, and the dependent variables of third-grade academic achievement in math and English Language Arts. While the effects of race/ethnicity and socioeconomic status on third-grade achievement outcomes may be examined with ease by the Oregon Department of Education and stakeholders such as school district officials, a comprehensive data set does not exist for preschool attendance for Oregon's children. Enrollment in Kindergarten classrooms across the state is unpredictable year to year, as many children poised to enter Kindergarten are unaccounted for prior to enrollment, which in turn raises uncertainty regarding their access to early childhood programs. This study intended to bring to light the impact of this variable on third-grade academic achievement.

The ensuing discussion examines the differences between group means and make inferences about the potential impetus that influenced such outcomes. Additionally, themes of equity, quality, and preschool program funding are woven into the discussion. Since the data revealed certain groups within a defined variable outperformed other groups within the same variable, differences must be analyzed to ascertain the origin of such phenomenon.

#### **Discussion Pertaining to Findings: Pre-K Programs**

The independent variable of preschool program type had mild but noticeable effects on SBAC Mathematics and SBAC ELA outcomes between groups. The mean SBAC Mathematics score increased from Head Start ( $2411.82 \pm 33.337$ ) to Other ( $2437.18 \pm 75.074$ ) to In-Home Care ( $2445.55 \pm 39.501$ ), in that order, which revealed a 33.73-point range in mean scores between preschool program types. Similarly, the mean SBAC ELA scores increased from In-

Home Care ( $2436.75 \pm 78.583$ ) to Head Start ( $2444.75 \pm 78.608$ ) to Other ( $2454.07 \pm 87.139$ ) in that order, which revealed a 17.32-point range in mean SBAC ELA scores between preschool program types. The preschool type In-Home Care ( $2384 \pm 39.501$ ) had higher minimum SBAC mathematics scores than the other two categories Head Start ( $2354 \pm 33.337$ ) and Other ( $2255 \pm 75.074$ ), which shows that In-Home Care surpassed the other two programs in both mean score and minimum score on the mathematics assessment.

This study revealed that the largest mean SBAC mathematics scores were attributed to students whose preschool program type took place at an In-Home setting. Factors were present in this learning environment that related to higher mean SBAC mathematics scores. The Common Core State Standards associated with this standardized assessment point to more rigorous academic demands placed on a child that correlate to later success in the K-12 system, as well as help develop the skills to make the child college-and-career ready. In addition to the threads of equity and access, programmatic quality must be examined. Are the higher mean scores attributed to the students who accessed In-Home Care indicative of a learning environment that was developmentally appropriate and rich with high-quality learning experiences that prepared the children for academic success in the early elementary years? What did the In-Home Care programs do differently to produce superior mean scores? Differences in mean scores raise additional questions aimed at uncovering the factors that have produced the visible outcomes in the data. Programmatic quality must be examined as a factor in the apparent differences between group means in mathematics scores. The state's efforts must continue to support the development of high-quality ECE programming opportunities in all preschool settings across the state.

With little pre-existing research on preschool programs occurring in the home setting, it is difficult to provide an explanation for this outcome. In-Home Care in this study was comprised

of children who were in the care of a relative or in the care of a non-relative the majority of the time in the year prior to Kindergarten entry. One must consider why this program is selected by parents, as it may provide insight into the children who experience this preschool setting.

Multiple surveys were received in which the parent who selected 'In-Home Care with a Relative' had handwritten a note alongside the selection stating the child had been with the mother. Do families who choose to keep their child in their care do so because they believe they have the ability to offer superior care and learning experiences for their child? Conversely, it might be considered that the family is limited by financial constraints and lacks the means to pay for access to an alternate program. It may also be possible that programs for which the child qualifies or programs of preference do not have the capacity to serve all eligible or interested children and their families. For families that choose In-Home Care with a Non-Relative, perhaps they are drawn to the experience or reputation of the in-home provider. The individual providing the preschool setting largely impacts the quality of the experience. Thus, in the face of the superior mathematics outcomes, one must be equally as curious about the provider as the experiences taking place in the setting, as it is presumed that teaching early mathematics concepts requires intentional effort.

Head Start had the highest minimum SBAC ELA score (2331) of the three Pre-K Program types. The minimum SBAC ELA scores for In-Home Care and Other were the same (2252). This finding points to comparatively similar outcomes for third-grade English Language Arts outcomes between preschool program types, thus suggesting that all types of preschool programs offered to students in the sample were appropriately teaching foundational literacy skills. While Head Start kept pace with the other two programs in third-grade literacy outcomes, this was not the case with the mathematics outcomes, as Head Start students earned the lowest

mean mathematics scores between preschool program types. This may be indicative of a strong early literacy program that closes the gap between impoverished children accessing Head Start and their peers, but it may signal a need to strengthen the established mathematics curriculum model.

**Discussion Pertaining to Findings: Race/Ethnicity:**

Students who were White surpassed their peers in all Other categories of race/ethnicity on both the mathematics and English Language Arts standardized measures of academic achievement. The mean SBAC Mathematics score for the White students was higher than the mean SBAC Mathematics score for the Other students by 43.62 points. The mean SBAC ELA score for the White students was 36.05 points higher than the scores for Other students. Additionally, the highest English Language Arts score earned by a student in the Other category was 71 points less than the highest score earned by a White student. This perhaps uncomfortable revelation urgently invokes the need for further examination of this outcome and its ramifications, as previous studies support this finding, thus bringing to light the potential for systemic constructs within Oregon's K-12 system that create advantages for White students and disadvantages for those of other race/ethnicity categories. Within the Other (n=17) category for SBAC ELA, Hispanic students represented the majority. One must consider if the outcome is related to a native language other than English. Although the SBAC offers both embedded and non-embedded designated supports that would in theory support a student whose native language is other than English, consideration must be given to the effectiveness of such supports in ensuring equitable access to the assessment content.



### **Investing in Equity and Social Justice**

Although data analysis of socioeconomic status was not possible in this study, it is understood that providing preschool to impoverished children is a form of social justice, as academic achievement correlates with upward social mobility, and developmental stimulation is needed for academic success. “Lower academic achievement disproportionately affects racial and ethnic minorities” (Herman-Smith, 2012, p. 65). While the debate of offering targeted versus universal preschool continues, Finn, (2012) urges states to allocate the funds to the children most in need which in some states would equate to \$50,000 per child prior to Kindergarten entry, which stands in contrast to Adelstein et al. (2015) who expound the benefits of preschool for all children.

### **Considerations for Policymakers, Practitioners, and ECE Stakeholders**

An obstacle facing Kindergarten teachers is that the children who enter their Kindergarten classroom have diverse backgrounds and varying exposure to educational and socialization opportunities in their home life (Cox, Pianta, & Rimm-Kaufman, 2000). An inherent assumption made by the researcher when designing the study was such that preschool program selection was in part a function of demographic variables, such as race/ethnicity and socioeconomic status. Therefore, an initial concern was raised regarding equity of access to preschool programming across all tiers of socioeconomic status and categories of race/ethnicity. Although this study was not a study of programmatic quality, nor did this study delve into the demographic variables of the children accessing each program, the design of the study was intended to initiate a conversation about differences in third-grade achievement that were related to broad categories of preschool programs. Data analysis pointed to differences between the type of preschool program children attended in the year prior to Kindergarten entry and their scores

on the third-grade standardized assessments in the mathematics and English Language Arts. Consideration must then be given to limitations in access to all existing preschool programs, as such early learning experiences are shown to correlate to academic achievement four years later.

Early childhood education programs have been dependent upon the political climate of the time, thus leaving programs vulnerable to shifting degrees of support at varying points in history. The instability of funding across fiscal years, coupled with shifting political priorities have resulted in reduced programmatic quality or loss of access for children in need of a preschool program in order to be better prepared for school success. This begs the question, does the state have the legitimacy to act in offering preschool programming to all of Oregon's children? On the other hand, is it the state's responsibility to prepare all young children for entry into the K-12 system by ensuring they have had exposure to a high-quality preschool learning environment? A review of legislation points to many Early Childhood Education political champions across history. Though in the face of such champions, there remains an opposing presence to adopt legislation supporting the expansion of ECE programming. A polarity of beliefs exists which are held by those tasked with proposing, passing, and enacting legislation for the betterment of our youngest citizens. To highlight the shifting political support of state-funded Pre-K initiatives, states spent \$446 million on such programs in 2008 and \$5 billion in 2009 (Husted & Barnett, 2011). Yet in 2010-2011, even with state-funded preschool enrollment on the rise, 26 of 39 states cut funding for ECE programming, thus negatively impacting per-child funding, while also putting program quality at risk.

Oregon policymakers must make a decision about the importance of access to high-quality preschool programming for children in the state, as committing to offering such access universally would be a costly undertaking. However, consideration should be given to the

potential benefits and return to Oregonians through this initial investment. The Children's Institute (2015) advocates for high-quality early learning programming in Oregon in order to support Kindergarten readiness for preschool-aged children and subsequently to promote reading proficiency at third-grade, as well as to increase Oregon's high school graduation rates. With approximately one-third of Oregon's third-grade students not meeting proficiency standards for literacy, The Children's Institute (2015) advocates for increased access to high-quality early learning programs, noting that reading proficiently at third-grade increases the likelihood of graduation four-fold.

For children who do not meet the established standards at third grade, a possibility exists that they will continue to struggle to succeed in the K-12 academic system, which suggests that it may be more cost-effective to intervene at an earlier age rather than try to remediate downstream. The cost and financial benefit to society of investing in high-quality preschool has been analyzed extensively with the return to the public being \$7.16 for every dollar invested (Lewis, 1993). Alternatively, the Council for Educational Research and Development estimates a cost of \$200,000 to the public for the child who does not succeed as an adult (Lewis, 1993). A study of Tulsa's Universal Pre-K program used a regression-discontinuity design to determine future earnings of the children in the program. For each one percentile increase in Kindergarten test scores, adult earnings increased by \$1,502 (Bartik, Gormley, & Adelstein, 2012). Thus, the early investment in educating our nation's youngest children may be costly to implement, but the benefits to society are increased adult productivity that result in sustained and long-term returns (Doyle et al., 2009; Temple & Reynolds, 2005). State policymakers and governors are tasked with identifying and funding priorities established by constituents. While a free, public K-12

education is deemed a right for all children, individual states have determined if the same is true for a preschool education.

State-funded Pre-K represents the largest early childhood education program not funded by the federal government. Instead it is controlled and funded by each individual state, thus varying tremendously from state to state (Clothier & Poppe, 2007). In its 2013 *State Preschool Yearbook*, it is noted that ten states do not fund preschool programs, while 20 states only provide access to 1 in 10 children at age 4. Nationwide, only 30% of four-year olds are served by state-funded preschool (Barnett & Carolan, 2013). Policymakers in Oregon will continue to make decisions with respect to their convictions about how best to serve their constituents. The needs of the youngest of our citizens about to embark upon their K-12 education are deserving of the earnest attention of the governing leaders of our state.

2015-2016 was the first year of full-day Kindergarten implementation in the state of Oregon, which was years behind other states. Additionally, states such as Oklahoma have pioneered Universal Pre-K and found it beneficial to all children. Oregon has shown a tentative interest in increasing access to preschool programs for children with identified risk factors through initiatives such as Preschool Promise but is nowhere near funding and implementing a universal model that serves all children.

In a survey gathering responses from ninety-one of Oregon's one hundred eighty-eight school districts, results determined that 3,425 children in Oregon are accessing district-developed and funded preschools, 60% of which rely upon district financial allocation in part to create and sustain programming (Canell-Corider & Merrill, 2015). Due to restrictions in access to the preschools embedded within local school sites in the state of Oregon, programs are not equally representative of the population of children who will become first-year Kindergarten students.

**Limitations**

While the study's intent at conceptualization was to inform Oregon policymakers and Early Childhood Education stakeholders within the state concerning the relationship between Pre-K program type, Race/Ethnicity, SES and third-grade measures of academic achievement, this proved to be a lofty goal with respect to the limited quantity of confirmed study participants. Having only a single school district in Oregon choose to voluntarily participate in the study definitively hampered any possibility of generalizability to other districts with similar demographics in the state of Oregon. The study had considerable potential to provide a comprehensive examination of the relationship between the defined independent and dependent variables, but this was subject to the willingness of school districts to participate and deploy the questionnaire to ascertain a particular variable not collected by the Oregon Department of Education. If this data was collected statewide at the inception of the Kindergarten year, possibly on the Kindergarten Assessment administered in the early weeks of the school year, meaningful analysis regarding the relationship between Pre-K program type and third-grade measures of academic achievement would be possible. Alas, this study at best raises the question of the potential for differences in third-grade achievement outcomes associated with Pre-K program participation. Additionally, had all Superintendents of districts invited to participate in the study assented to the request, the possibility of a larger sample size would have made richer analysis viable, and at a minimum, could have provided valuable insight into one particular region within the state of Oregon.

The participating school district, as previously stated, is comprised of a total of six elementary schools. This study had access to two of the six elementary school sites, which made generalizability within the district improbable. Had all six elementary school sites participated,

the likelihood of a larger sample size would have been expected, which would have provided additional depth and richness of data analysis that was simply not possible with the actual sample size.

Potentially related to the sample size was the presence of unequal representation between the variables for Pre-K program type, as well as race/ethnicity. White students were overrepresented in the sample, which was indicative of the community's demographics, as were students who accessed the Other category of Pre-K program type. Had there been a larger representation of each Pre-K program type, as well as for the race/ethnicity categories from ODE, a need to collapse the categories into trichotomies and dichotomies respectfully, would not have been rendered necessary. A more diverse population to draw upon for the sample would lend itself to more meaningful analysis of variance in SBAC outcomes.

The proxy for socioeconomic status proved troubling for sake of sound analysis, as a singular student was identified as not receiving free or reduced lunch. Confidence in this proxy was shaken, due to the fact that all elementary students in the participating school district have access to free and reduced lunch based upon a grant received by the district on the basis of Title One status of multiple elementary school sites within the district. One could not be certain that this proxy accurately represented the socioeconomic status of each study participant, thus eliminating the potential for meaningful data analysis of this independent variable in relation to the research questions. Therefore, outcomes in this study that may have been attributed to poverty are concealed.

The Pre-K program Preschool in an Elementary School site is a relatively new phenomenon in Oregon. This was apparent by the singular student out of eighty-two potential

study participants having experienced this type of program. It is simply not possible to deduce meaningful conclusions of a category within one representative from an independent variable.

Additionally, the Smarter Balanced Assessment Consortium exams might be considered to be in their infancy. As curriculum has been overhauled to prepare students to meet the Common Core State Standards and in turn perform at grade-level on the SBAC exams, it is possible that not enough time has elapsed for students in this sample size to perform to the increasingly rigorous established grade-level standards. Furthermore, with the test in its infancy, it would be difficult to tell if it was biased, which could potentially explain differences in group performance.

This study was limited by the number of independent variables requested. Additional variables would possibly explain away conclusions drawn, or perhaps raise additional questions to pursue. For example, students did not have to identify if they are served by an Individualized Education Plan, receive 504 accommodations, or are identified as Talented and Gifted, which may greatly affect performance on such standardized assessments. Perhaps these independent variables would bring enlightenment to outliers in the data, or perhaps contend with other variables for supremacy in the observed outcomes of the study. Additional variables would have provided further illumination to the overarching questions.

The instrument used to collect data included two categories (Child-care Center and Private Preschool) that were difficult to distinguish from one another. It is possible that either the description of these programs, or potentially other preschool programs listed, were misrepresented by the researcher, or perhaps misunderstood by the parent/guardian. The questionnaire required recollection of an event from years prior, as well as for the parent/guardian to make a determination of which defined program best described the experience

their child had in the year prior to Kindergarten. Questionnaire data results were limited to those who voluntarily chose to complete and submit their information. Since not all students on the classroom roster had the questionnaire and signed consent form returned, their information was not included in the study, which limited the findings. This may have been an outcome of the imposed time constraint, as the deadline to return the study materials to the classroom teacher fell within a ten-day timeframe. It may also speak to the level of parental involvement or may be indicative of other factors, such as circumstances surrounding poverty, inability to read and understand the directions and consent form without assistance, levels of stress within the home environment, or potentially a lack of interest or desire to provide this information about their child. Additionally, the possibility remains that the study materials were not received by the parent/guardian, as receipt was reliant upon the child's delivery between the home and school.

Finally, the original statistical test to be executed was deemed inconceivable based upon the resultant sample size. Thus, analytics that predicted third-grade achievement outcomes on SBAC by the defined independent variables, including access to Pre-K program type, were not statistically feasible using a multiple regression approach. Group differences were then pursued from a general linear ANOVA model. The smaller sample size and change in analytics perhaps generated unforeseen limitations to the study's statistical ability to detect true differences.

### **Suggestions for Future Research**

The avenues are plentiful for future studies in Oregon that examine the relationship between preschool programming and academic achievement. Preschool Promise outcomes provide an avenue for study to determine if the state-funded programs are effectively preparing the children for Kindergarten. Districts that have preschool programs offered through their elementary school site provide another lens of study, as is the case with Earl Boyle's Elementary



School in the David Douglas School District in Oregon. The Early Works initiative at Earl Boyles Elementary School provides a model sought and studied by the federal government as one in five sites in the nation sustaining achievement outcomes from preschool through third grade (Murphy, 2015). This particular Early Works Initiative demonstration site is a pioneer in the state of Oregon for its work on P-3 Alignment and provides a model for early adopters seeking to bridge systems and improve educational outcomes for children (Murphy, 2015; Thomas, 2016).

Work can be done regarding the relationship or predictiveness of preschool programming types and the scores earned on the Kindergarten Assessment given in Oregon. The correlation between outcomes on the Kindergarten Assessment and the SBAC test of achievement can be studied to determine if initial levels of school readiness affect academic achievement in the early elementary grades. Programmatic quality can be studied to determine which programs produce a holistic Kindergarten readiness outcome. Each individual program type, in particular, In-Home Care, ought to be investigated for measures of quality, as well to investigate how mathematic instruction occurs in these settings. Investigating the methods and frequency of professional development for ECE providers would prove insightful. Qualitative studies can be completed to determine who is not participating in the QRIS, and why they have chosen not to do so. An alternate qualitative study might examine who self-selects into which preschool program type and their rationale for doing so.

A study examining the transition efforts between an ECE provider and a feeder elementary school would add breadth to this crucial conversation that is paramount to achieving the goal of aligning the two systems to better support the children they serve. In order to increase coherence between children's early learning programming opportunities and Oregon's K-12

public school system, the Children' Institute conducted interviews with educational leaders around the state who led the charge in aligning the two systems (Thomas, 2016). Emerging themes brought forth by researchers, Early Childhood program providers, K-12 representatives, and community-based stakeholders highlight a need to bridge these various stakeholders in order to develop shared, vertical professional development that ensures developmentally-appropriate practices are employed, to establish standards of quality, enhance family engagement efforts, and create opportunities for common planning and conversations between stakeholders in both systems (Thomas, 2016). Preschool targets for learning outcomes may not be in alignment with the skills necessary for success in today's Kindergarten classroom (Lewis, 1993). "Descriptions of Kindergarten curricula point to explicit goals for literacy, numeracy, and socialization that are not formally stated goals of the preschool classrooms" (Cox et al., 2000, p. 150). ECE programming and K-12 public schools are called to move beyond operating as isolated systems and to strive towards partnership if seamless educational programming for children is to be achieved. "The Kindergarten Partnership and Innovation Fund created the first opportunity in Oregon's history to intentionally invest innovative and promising models for birth-to-third-grade alignment in sixteen school communities across the state" (Thomas, 2016, p. 2).

To support the effort of P-3 Alignment, it is the researcher's recommendation that a question be added to the Kindergarten Assessment requiring parents/guardians to select from a predetermined menu of preschool programming types that their child participated in the majority of the time in the year prior to Kindergarten. Collecting this unknown variable would allow the state of Oregon to examine the short term and long term effects of individual preschool program types, as well as who has access to which programs. In this case, data would be collected for all of Oregon children, supporting a more meaningful analysis in order to establish the relationship

between preschool programming selection, race/ethnicity, socioeconomic status, achievement outcomes, graduation rates, and any other number of variables held by ODE. This comprehensive data set would augment the state of Oregon's efforts to ensure that quality preschool programming is accessible for all children by highlighting existing discrepancies between categorical variables and developing actionable steps towards the realization of equity for all of Oregon's youngest learners.

### **Conclusion**

Access to high-quality preschool programming for all children in Oregon is necessitated by the move to full-day Kindergarten, in addition to the increased academic rigor of the curriculum models found in the public K-12 school system. ECE stakeholders recognize the importance of the foundational year in school, and more work must be done to eliminate an achievement gap between children upon Kindergarten entry and to ensure children have the social-emotional and academic skills needed to thrive and meet grade-level standards year after year. This gap is readily apparent within the first six weeks of school when the Kindergarten Assessment is administered. Stakeholders must align their efforts to increase the quality of preschool program practices, as well as create a smoother transition for children into the public-school system.

This study has provided a snapshot of a small sample of students in Oregon's public school system and brought to light differences in academic achievement amongst students in the same grade level learning side-by-side with one another in a shared learning environment. Though there are innumerable reasons why differences in achievement may occur, stakeholders must be courageous in acknowledging the differences that are present and articulate a resounding declaration to seek equity for all students in every grade at every school, regardless of preschool

program type, race/ethnicity, socioeconomic status or any other variable that categorically separates children from one another. This study is but a small representation of the research that is needed specific to the youngest learners transitioning into full-day Kindergarten in Oregon's public K-12 school system.

Through analysis of the relationship between the defined variables, I propose that the location, name, and perhaps model of the preschool program is secondary to the quality of the learning environment and quality of the opportunities for social-emotional and academic development and enrichment. As Oregon continues to invest in state-funded preschool programming, all existing programs should be considered for their potential to provide a rich, quality learning experience for the children who are served. Without exception, each child in Oregon is deserving of a solid foundation that supports a successful transition into the public-school system, as well as to experience sustained academic success.

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**APPENDICES**



**APPENDIX A: IRB DOCUMENTATION**

**EXHIBIT A: IRB PROPOSAL**

Date submitted: 6/7/17

Date received: \_\_\_\_\_

**GEORGE FOX UNIVERSITY**

**Human Subjects Research Committee**

**PROTECTION OF HUMAN SUBJECTS INITIAL REVIEW QUESTIONNAIRE**

**[Note: Dissertation, or other formal research proposal, need not be submitted with this form. However, relevant section(s) may need to be attached in some cases, in addition to filling out this form completely, but only when it is not possible to answer these questions adequately in this format. Do not submit a proposal in lieu of filling out this form.]**

Title of Proposed Research: Determining the Relationship Between Pre-K Programs and third Grade Academic Achievement Outcomes

Principal Researcher(s): Maria K. Drennen

Degree Program: Doctor of Education

Rank/Academic Standing: Final Term

Other Responsible Parties: Dr. Dane Joseph, Dissertation Chair

**(\*\*Please include identifying information on page 6 also.)**

(1) Characteristics of Subjects (including age range, status, how obtained, etc)

Subjects are male and female students in fourth grade general education classrooms in participating elementary school sites in a specified public school district (McMinnville) in the state of Oregon in the 2016-17 school year. All students meeting this criterion will be offered the opportunity for voluntary participation as a subject. Subjects will solely be identified based upon their assigned SSID number provided upon entry into the public school system in the state of

Oregon. Access to potential subjects will be obtained through permission from the Superintendent of the school district, as well as the voluntary participation of school sites by the building administrator. Each fourth grade classroom teacher in participating elementary school sites within the district will distribute study materials (Informed Consent and the Questionnaire) to all students enrolled on the class roster. Participation by the students' parents/guardians will be voluntary.

(2) Describe Any Risks to the Subjects (physical, psychological, social, economic, or discomfort/ inconvenience):

There are none to minimal risks involved for study participants. Psychological stress involved in filling out the questionnaire is no greater than that experienced by filling out voluntary questionnaires or surveys.

(3) Are the risks to subjects minimized (i) by using procedures which are consistent with sound research design and which do not unnecessarily expose subjects to risk, and (ii) whenever appropriate, by using procedures already being performed on the subjects for diagnostic or treatment purposes? Yes/No

**Degree of risk:**

(4) Briefly describe the objectives, methods and procedures used:

The research design will be a multi-method quantitative study involving the use of questionnaire and secondary data aimed at determining the relationship between several independent variables, (race/ethnicity, socioeconomic status, and preschool program type), and the dependent variables of student third Grade Achievement, which will be measured by the Smarter Balanced Assessment Consortium Mathematics and English Language Arts standardized achievement tests.

A secondary data set for the identified population will be sought from the Oregon Department of Education. With the exception of utilizing student identification numbers assigned to each student upon entry in Oregon public schools, this data set will include the de-identified assessment scores from the Smarter Balanced ELA and Mathematics Assessment Consortium. A questionnaire (English and Spanish) will also be deployed to parents/guardians of all potential study participants in the identified school sites in the McMinnville School District in McMinnville, Oregon.

The locally developed questionnaire will hone in on the educational opportunities via established provider (ie Pre-K program type) afforded each study participant in the year prior to entry into Oregon's public school system at the Kindergarten grade-level. Questionnaires will be labeled solely with each individual student's SSID number and dispersed and collected by the fourth Grade classroom teacher via the weekly communication folder sent home to all families one time per week. Subjects with completed questionnaire data will be matched to the secondary post-hoc data sets provided by the Oregon Department of Education based upon each subject's SSID number. Demographic variables will add additional opportunities for analysis of relationships between identified variables. Demographic variables requested in the secondary data set will include race/ethnicity, (Hispanic/Latino, American Indian/Alaskan Native, Asian, African American, White, Native Hawaiian or Other Pacific Islander), and socioeconomic status, which will be operationalized by Free and Reduced Lunch status.

Several multiple regression models will be employed to examine the predictiveness of Pre-K programming type and defined demographic variables of race/ethnicity and socioeconomic status on SBAC ELA and Mathematics outcomes.

(5) Briefly describe any instruments used in the study (**attach a copy of each**).

The locally developed questionnaire will pose a singular question: "In the calendar year prior to your child's first day in Kindergarten, please select the option that best describes the preschool program type he/she attended the majority of the time (9 months or more):

- 1.) Relative In-Home Care
- 2.) Non-Relative In-Home Care
- 3.) Head Start
- 4.) Independent/Commercial/ or Non-Profit Childcare Care Centers
- 5.) Private Preschool
- 6.) Preschool provided in an elementary school
- 7.) Other

Please see Appendix A and B for the Questionnaire in English and Spanish.

- (6) How does the research plan make adequate provision for monitoring the data collected so as to insure the safety, privacy and confidentiality of subjects?

The researcher will not interact directly with the subjects nor their parents/guardians as an additional safeguard to the identity of the subject. The questionnaires will be deployed and collected via the classroom teacher who will act as an intermediary, and subjects will be identified solely by their uniquely assigned SSID number provided upon entry into the public school system in Oregon and recorded by Oregon Department of Education. Demographic information (socioeconomic status and race/ethnicity) will be requested from ODE for each SSID number, while the identity of the subject remains de-identified to the researcher. SSID numbers will be securely stored for the duration of the research and will be accessed solely by the researcher and the assigned dissertation chair for analysis purposes. Paper copies of the questionnaire will be stored in a locked file cabinet in the researcher's office and kept for a minimum of 5 years per IRB rules. Only the researcher will have access to the paper copies of the questionnaires.

- (7) Briefly describe the benefits that may be reasonably expected from the proposed study, both to the subject and to the advancement of scientific knowledge – are the risks to subjects reasonable in relation to anticipated benefits?

This purpose of this study is to provide Oregon educational policymakers with statistical data regarding third Grade achievement outcomes based upon a child's access to educational programming opportunities in the year prior to Kindergarten. This information will highlight which programs are most effective at preparing children for academic success and sustaining those gains through third grade. Oregon has shown an interest in funding increased access to preschool programming through such initiatives as Preschool Promise but is nowhere near full implementation of a Universal Preschool program for all 4-year-old-children. This research aims to fill this gap in state-specific research needed to drive Early Childhood Education policy forward and provide a solid foundation for all children to be successful in Kindergarten and beyond.

- (8) Where some or all of the subjects are likely to be vulnerable to coercion or undue influence (such as children, persons with acute or severe physical or mental illness, or persons who are economically or educationally

disadvantaged), what appropriate additional safeguards are included in the study to protect the rights and welfare of these individuals?

Preschool Programming information regarding children participants will be supplied on a voluntary basis by the child's parent or guardian. Thus, this study will seek both consent and assent from potential participants.

(9) Does the research place participants "at risk?" Yes/No If so, describe the procedures employed for obtaining informed consent (*in every case, attach copy of informed consent form; if none, explain*).

**COMMITTEE REVIEW**

HSRC Member Signature	Recommend Approval	Conditional Approval	Not Recommended
Chair _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments (continue on back if necessary, use asterisk to identify):

Title: Determining the Relationship Between Pre-K Programs and third Grade Academic Achievement Outcomes

Principal Researcher(s): Maria K. Drennen

Date application completed: 6/7/17

**(The researcher needs to complete the above information on this page)**

**COMMITTEE FINDING:**

- (1) The proposed research makes adequate provision for safeguarding the health and dignity of the subjects and is therefore approved.
- (2) Due to the assessment of risk being questionable or being subject to change, the research must be periodically reviewed by the **HSRC** on a \_\_\_\_\_ basis throughout the course of the research or until otherwise notified. This requires resubmission of this form, with updated information, for each periodic review.
- (3) The proposed research evidences some unnecessary risk to participants and therefore must be revised to remedy the following specific area(s) on non-compliance:
- (4) The proposed research contains serious and potentially damaging risks to subjects and is therefore not approved.

\_\_\_\_\_  
Chair or designated member

\_\_\_\_\_  
Date

**IRB DOCUMENTATION**

**EXHIBIT B: IRB GUARDIAN INFORMED CONSENT**

**Informed Consent**

**RESEARCH SUBJECT INFORMED CONSENT FORM**

Prospective Research Subject: Read this consent form carefully and ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

<b>Project Information</b>	
Project Title: Determining the Relationship between Preschool Programs and third Grade Academic Achievement Outcomes	Project Number:
Site IRB Number:	Sponsor: NA
Principal Investigator: Maria K. Drennen	Organization: George Fox University
Location: Grants Pass, OR	Phone: 971-241-7700
Other Investigators:	Organization:
Location	Phone:

**1. PURPOSE OF THIS RESEARCH STUDY**

*You are being asked to participate in a research study designed to determine if a relationship exists between your child's preschool program he/she attended in the year before Kindergarten and his/her scores on the achievement tests given to Oregon students in third Grade.*

**2. PROCEDURES**

*You will be asked to read the statement on the questionnaire and check the box that best describes the preschool program that your son/daughter attended in the year before Kindergarten. Your son/daughter will record their school ID number on the questionnaire. I will use this school ID number when I ask the Oregon Department of Education for your child's Math and Language Arts scores on the state achievement tests he/she took in third Grade. I will not know the identity of your child or your family, but I will also ask Oregon Department of Education for your child's race/ethnicity and your family's socioeconomic status, which will be measured by whether or not your child receives Free or Reduced Lunch.*

**3. POSSIBLE RISKS OR DISCOMFORT**

*There are no risks for discomfort beyond choosing a response on the questionnaire.*

- 4. OWNERSHIP AND DOCUMENTATION OF SPECIMENS** *Your child's school ID number will be securely stored during the research process. A professor at George Fox University will help me analyze information obtained through your response on the questionnaire and the information I receive from the Oregon Department of Education about your child's third Grade achievement scores, race/ethnicity, and socioeconomic status. This professor will have NO access to your family or child's personal information beyond the variables requested as stated. After analyzing and reporting my findings, your child's questionnaire information, school ID number, and Oregon Department of Education's information about your child will remain securely stored until it may be confidentially shredded. IRB and research laws and regulations dictate that this data be kept a minimum of 5 years before it may be shredded. It will remain in a locked filing cabinet in my office until this time period has passed.*

**5. POSSIBLE BENEFITS**

*This study will help policymakers and government officials in our state have a greater understanding of how attending preschool programs before Kindergarten affects a child's academic success in the early elementary grades.*

**6. FINANCIAL CONSIDERATIONS**

*For returning the completed questionnaire with his/her school ID number, along with this signed consent form, your child will receive a snack reward given by his/her teacher costing up to \$1.00.*

**7. AVAILABLE TREATMENT ALTERNATIVES**



*Not applicable to this study.*

## **8. AVAILABLE MEDICAL TREATMENT FOR ADVERSE EXPERIENCES**

*This study involves minimal risks to those who choose to provide an answer to the questionnaire.*

## **9. CONFIDENTIALITY**

*Your child's identity in this study will be treated as confidential. Information about your child will be analyzed and communicated solely by your child's school ID number, thus keeping your child's name anonymous. The results of the study may be published for scientific purposes but will not give your child's name or include any identifiable references to your child.*

*However, any records or data obtained as a result of your participation in this study may be inspected by the sponsor, by any relevant governmental agency (Oregon Department of Education), by the George Fox University Institutional Review Board, or by the persons conducting this study, provided that such inspectors are legally obligated to protect any identifiable information from public disclosure, except where disclosure is otherwise required by law or a court of competent jurisdiction. These records will be kept private in so far as permitted by law.*

## **10. TERMINATION OF RESEARCH STUDY**

*You are free to choose whether or not your child participates in this study. If you choose to not participate, please do not return the voluntary questionnaire.*

*At any point in the research process up to the point of publication of results, you reserve the right to withdraw your child's data from the study.*

## **11. AVAILABLE SOURCES OF INFORMATION**

*Any further questions you have about this study will be answered by the Principal Investigator:*

Name: Maria Drennen

Phone Number: 971-241-7700

Email: [mariadrennen@gmail.com](mailto:mariadrennen@gmail.com)

Faculty Advisor: Dane Joseph

Email: [djoseph@georgefox.edu](mailto:djoseph@georgefox.edu)

## **12. AUTHORIZATION**

AN EXAMINATION OF PRE-K PROGRAMMING AND ACADEMIC ACHIEVEMENT 105

*I have read and understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this form. I voluntarily choose to participate, but I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study. I further understand that nothing in this consent form is intended to replace any applicable Federal, state, or local laws.*

Participant's SSID# \_\_\_\_\_

Participant's GUARDIAN Initials: \_\_\_\_\_

Date:

Principal Investigator Signature:

**IRB DOCUMENTATION**

**EXHIBIT C: PARENT/GUARDIAN QUESTIONNAIRE (ENGLISH/SPANISH)**

Student SSID # \_\_\_\_\_

**NOTE: Please read through all options before making a selection.**

*In the calendar year prior to your child's first day in Kindergarten, please select the option that best describes the preschool program type he/she attended the **majority** of the time (approximately 9 months or more):*

**In-Home Care with a Relative** (*Mom/Dad/Grandma/Grandpa/Aunt/Uncle/Sibling, etc.*)

**In-Home Care with a NON-Relative** (*A childcare provider offering daycare/preschool in their home who is NOT related to your family.*)

**Head Start**

**Independent/Commercial/or Non-Profit Childcare Center** (*A combination of child care and learning opportunities YMCA, On Campus Kids, Critter Campus Preschool and Childcare, Little Sprouts Preschool, etc.*)

**Private Preschool** (*Educational focus with a specific approach to teaching. Faith Based Preschool, Montessori, Waldorf, Reggio-Emilia, HighScope, etc*)

**Preschool Provided in an Elementary School**

**OTHER** \_\_\_\_\_

# SSID del Estudiante \_\_\_\_\_

NOTA: Por favor lea todas las opciones completamente antes de hacer su elección.

En el calendario del año antes de que su hijo comenzara el Kindergarten, por favor seleccione la opción que mejor describa el programa pre-escolar al cual el/ella asistieron la mayor parte del tiempo (9 meses ó más):

\_\_\_\_\_ Cuidado en casa con un familiar (Mamá/Papá/Abuela/Abuelo/Tía/Tío/Hermano, etc.)

\_\_\_\_\_ Cuidado en casa con una persona que NO es de la familia (Niñera que proveyera cuidado Pre-escolar que NO esta relacionada a su familia).

\_\_\_\_\_ Ayuda Temprana

\_\_\_\_\_ Independiente/Comercial/ ó Centro de Cuidado de Niños (Una combinación de cuidado de Niños y oportunidades de aprendizaje. Ejemplos: Care for Kids, Discovery Zone, ABC Daycare, Bear Hugs, Linfield Pre-K, YMCA, etc).

\_\_\_\_\_ Pre-escolar Privado (Enfoque Educativo con una forma específica a enseñar. Base Cristiana, Montessori, Waldorf, Reggio-Emilia, HighScope, etc).

\_\_\_\_\_ Pre-Escolar Proveído en la Escuela Elemental

\_\_\_\_\_ OTRO \_\_\_\_\_

**IRB DOCUMENTATION**

**EXHIBIT D: IRB APPROVAL LETTER**



**GEORGE FOX**  
UNIVERSITY

College of Education

414 N. Meridian St., V 124, Newberg, OR 97132

503.538.8383 | Fax 503.554.2868 | [soe.georgefox.edu](http://soe.georgefox.edu)

June 10, 2017

Ms. Maria Drennen

Ed.D. Candidate

George Fox University

Dear Ms. Drennen,

This letter is to inform you that as a representative of the GFU Institutional Review Board I have reviewed your proposal for research investigation entitled “Determining the Relationship between Pre-K Programs and third Grade Academic Achievement Outcomes.” The proposed study meets all ethical requirements for research with human participants. The proposal is approved.

Best wishes as you complete your research investigation.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry Huffman".

Terry Huffman, Ph.D.

Professor of Education

**APPENDIX B: RESEARCH AGREEMENT/DATA USE AGREEMENT (ODE)**

**DATA USE AGREEMENT**

**RESEARCH PROJECT CONFIDENTIALITY AGREEMENT**

This Agreement shall be submitted with Data Use Proposal/Request. If this Data Use Agreement is related to contract work, this Agreement and the Data Use Proposal/Request shall be incorporated into the contract.

WHEREAS, Oregon Department of Education (ODE) has collected certain data containing confidential & personally-identifiable information and ODE requires this confidentiality to be protected; and

WHEREAS, Oregon Department of Education is willing to make these data available for research and analysis purposes to improve instruction in public elementary and secondary schools, but only if the data are used and protected in accordance with the terms stated in this Agreement.

NOW, THEREFORE, it is hereby agreed between Maria K. Drennen, hereinafter referred to as the "Data User" and ODE:

**I. INFORMATION SUBJECT TO THIS AGREEMENT**

- A.** All data containing personally-identifiable information collected by or on behalf of ODE provided to the Data User and all information derived from those data, and all data resulting from merges, matches, or other uses of the data provided by ODE with other data are subject to this Agreement and are referred to herein as the Subject Data. The Subject Data under this Agreement may be provided in various forms included but not limited to written or printed documents, computer tapes, diskettes, CD-ROMs, or encrypted files.
- B.** The Data User may use the Subject Data only for the purposes stated in the Research Proposal and resulting contract.

**II. INDIVIDUALS WHO MAY HAVE ACCESS TO SUBJECT DATA**

Data User agrees to limit and restrict access to the Subject Data to the following three categories of individuals:

1. The Project Leaders in charge of the day-to-day operations of the research and who are the research liaisons with ODE.
2. The Professional/Technical staff in charge of the research under this Agreement.
3. Support staff including secretaries, typist, computer technicians, etc., only to the degree necessary to support the research.

### III. LIMITATIONS ON DISCLOSURE

- A. Data User shall not use or disclose the Subject Data for any purpose not expressly stated in the Research Proposal approved by ODE, unless the Data User has obtained written approval in advance from ODE Procurement Services.
- B. Data User may publish the result, analysis, or other information developed as a result of any research, based on the Subject Data made available under this Contract only in summary or aggregate form, ensuring the identities of individuals included in the Subject Data are not revealed.
- C. Data User must get prior written approval before releasing any documents - see paragraph IV.B.2, Administrative Requirements.

### IV. ADMINISTRATIVE REQUIREMENTS

- A. The research conducted under Contract shall be limited to, and consistent with, the purposes stated in the approved Research Proposal,
- B. Notice and training on confidentiality and nondisclosure.
  1. Data User shall notify and train each of its employees who will have access to the Subject Data of the strict confidentiality of such data, and shall require each of those employees to execute an Individual's Acknowledgement of Confidentiality Requirements.
  2. Data User shall maintain each executed Individual's Acknowledgement of Confidentiality Requirements at its facility and shall provide ODE Procurement Services a copy of each Individual's Acknowledgement of Confidentiality Requirements document signed by their research staff prior to Contract award. If Data User wants to add staff after Contract award, Data User must get written approval from ODE Procurement Services staff commencing work. Procurement Services shall work with Data Governance Committee to approve additional staff.
  3. Data User shall promptly notify ODE Procurement Services in writing when the access to the Subject Data by any individual is terminated, giving the date of the termination and the reason for the termination.

C. Publications made available to ODE.

1. . ODE Procurement Services must provide written approval prior to Data User releasing or publishing research documentation. Copies of each proposed publication or document containing or based upon the Subject Data shall be provided to ODE Procurement Services before the publication or document is finalized. ODE Procurement Services shall advise the Data User whether disclosure is authorized. In cases where specific districts or schools within a district are publicized in the research results the proposed publication or document will also be sent to the related district. ODE Procurement Services will include responses from affected districts in their decision to authorize disclosure.

1 . Data User shall provide ODE Procurement Services two (2) copies of each publication containing information based on the Subject Data or other data product based on the Subject Data made available through ODE. One copy shall be retained by ODE Procurement Services and one copy shall be provided to the Data Governance Committee.

D. Data User shall notify ODE Procurement Services immediately in writing upon receipt of any request or demand for disclosure of the Subject Data.

E. Data User shall notify ODE Procurement Services immediately in writing upon discovering any breach or suspected breach, of security, of any disclosure of Subject Data to an unauthorized party or agency.

### **CRITERIA FOR RELEASE OF CONFIDENTIAL INFORMATION**

Personally-identifiable student data held at Oregon Department of Education (ODE) will be

released for research purposes only after the following factors have been considered:

1. The degree to which the research may improve Oregon public elementary and secondary education;
2. The degree to which the research question(s) cannot be answered without the personally identifiable data;
3. The experience of the requesting Research Organization in performing similar research projects and to conduct the proposed research project
4. The capacity of the requesting Research Organization to keep the data secure; and
5. The availability of ODE staff to fulfill the data request for the research project and monitor the research activities.

Such data will not be released unless the data are requested by an organization that:

(a) has developed a Research Proposal approved by the Data Governance Committee,

(b) has completed an Individual's Acknowledgement of Confidentially Requirements for each staff member working on Contract,



(c) submitted required insurance certificates and (d) has an executed contract award with ODE.

## **SECURITY REQUIREMENTS**

### **A. Maintenance or, and access to, the Subject Data,**


1. Data shall be released to individuals Identified in accordance with paragraph II. ODE will annotate on Individual(s) form -Appendix C, Individuals Acknowledgement of Confidentiality Requirements, all data and equipment Issued to individual by ODE for control record. ODE will provide data for research as approved by Data Governance Committee. The Subject Data shall not be copied and an extract of the Subject Data shall not be made available to anyone without written approval from the Data Governance Committee. .
2. Data User shall maintain the Subject Data in an area which has access limited to authorized personnel only. Data User shall not permit removal of any Subject Data from the limited access area.
3. Data User shall NOT transmit any confidential data provided by ODE by email.
4. Data User shall ensure access to the subject date maintained in computer files or databases is controlled by password protection. Data User shall maintain all printouts, disks/CD's, or other physical products containing individually-identifiable information derived from Subject Data in locked cabinets, file drawers, or other secure locations when not in use,
5. Data User shall ensure all printouts, tabulations, and reports are edited for any possible disclosure of personally-identifiable Subject Data unless Data User has obtained prior written approval to allow authorized individual(s) to view data.
6. Data User shall establish procedure, to ensure the Subject Data cannot be extracted from computer file or database by unauthorized individual(s).
7. No personal computers are allowed on the ODE Network.
8. Retention of Subject Data.

In the event of termination or expiration of this Agreement Data User shall, unless otherwise authorized in writing;


- 1) Immediately cease the use of the ODE data which Data User holds or for which is responsible;
- 2) Within 10 days from date of Contact termination or expiration, destroy all ODE data which Data User holds or for which they are responsible by:
  - a. Shredding paper documents
  - b. Reformatting or cutting into multiple pieces the magnetic media inside diskette:
  - c. Breaking CD's into multiple pieces;
  - d. Deleting computer files and remove from, the recycle bin;
  - e. Deleting computer files on network servers;
  - f. Deleting confidential data in database servers; or
- 3) Returning all ODE data to ODE Helpdesk and;
- 4) Providing, at ODE request, a written statement you no longer hold any ODE data obtained during the term of the Contact.

DATA USER, BY EXECUTION OF THIS CONTRACT, HEREBY ACKNOWLEDGES DATA USER HAS READ THIS AGREEMENT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.

**Contractor**

B : Maria K. Drennen	Title: George Fox University Doctor of Education Candidate	Date: 8/23/17
printed Signature 	Email Address: <a href="mailto:mariadrennen@gmail.com">mariadrennen@gmail.com</a>	

**Contractor**

By: Dane Joseph	Title: Assistant Professor, George Fox University	Date: 8/23/17
Printed Signature 	Email Address: <a href="mailto:djoseph@gfu.edu">djoseph@gfu.edu</a> <i>djoseph@georgefox.e</i>	

**Oregon Department of Education**

Authorized

I Title: Procurement Officer

I Date:

Signature:

I Procurement Services

## APPENDIX C: COMMUNICATION WITH SCHOOL OFFICIALS

### EXHIBIT A: REQUEST FOR STUDY PARTICIPATION

(8/09/17)

Good afternoon Southern Oregon School District Superintendents,  
My name is Maria Drennen, and I am a Doctor of Education candidate at George Fox University in Newberg, OR. I have passed the proposal stage of my dissertation, in addition to having IRB approval to move forward with my study. I have recently moved to Medford, and my interest is in examining the relationship between Pre-K programming access and third Grade achievement outcomes as measured by SBAC Math and ELA scores. The title of my dissertation is, “*Determining the Relationship between Preschool Programs and third Grade Academic Achievement Outcomes.*”

Overview of the Study:

The research design will be a multi-method quantitative study involving the use of questionnaire and secondary data aimed at determining the relationship between several independent variables, (race/ethnicity, socioeconomic status, and preschool program type), and the dependent variables of student third Grade Achievement, which will be measured by the Smarter Balanced Assessment Consortium Mathematics and English Language Arts standardized achievement tests.

A secondary data set for the identified population will be sought from the Oregon Department of Education. With the exception of utilizing student identification numbers assigned to each student upon entry in Oregon public schools, this data set will include the de-identified assessment scores from the Smarter Balanced ELA and Mathematics Assessment Consortium. A questionnaire (English and Spanish) will also be deployed to parents/guardians of all potential study participants in the identified school sites in the X School District in X, Oregon. The locally developed questionnaire will hone in on the educational opportunities via established provider (i.e. Pre-K program type) afforded each study participant in the year prior to entry into Oregon’s public school system at the Kindergarten grade-level. Questionnaires will be labeled solely with each individual student’s SSID number and dispersed and collected by the fourth Grade classroom teacher. Subjects with completed questionnaire data will be matched to the secondary post-hoc data set provided by the Oregon Department of Education based upon each subject’s SSID number. Demographic variables will add additional opportunities for analysis of relationships between identified variables. Demographic variables requested in the secondary data set will include race/ethnicity, (Hispanic/Latino, American Indian/Alaskan Native, Asian, African American, White, Native Hawaiian or Other Pacific Islander), and socioeconomic status, which will be operationalized by Free and Reduced Lunch status.

Research Questions:

*What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their SBAC Mathematics test scores in third Grade?*

*What is the relationship between students' Pre-K program type, race/ethnicity, family SES, and their SBAC ELA test scores in third Grade?*

#### Significance of the Study:

This purpose of this study is to provide Oregon educational policymakers with statistical data regarding third grade achievement outcomes based upon a child's access to educational programming opportunities in the year prior to Kindergarten. This information will highlight which programs are most effective at preparing children for academic success and sustaining those gains through third grade, as well as identify who self-selects into which type of program. Oregon has shown an interest in funding increased access to preschool programming through such initiatives as Preschool Promise but is nowhere near full implementation of a Universal Preschool program for all 4-year-old-children. This research aims to fill this gap in state-specific research needed to drive Early Childhood Education policy forward and provide a solid foundation for all children to be successful in Kindergarten and beyond.

Across Oregon school districts, there is wide variability in regards to the availability of high quality preschool programs and access for 4-year-old children prior to Kindergarten entry. Thus, there is disparity in the educational experiences of children prior to entering into the state of Oregon's full day Kindergarten program, which perpetuates initial levels of educational stratification. With the Oregon Department of Education reporting in the 2016 Enrollment Summary Report that the number of Oregon children enrolled in full-day Kindergarten has risen from 4,625 in the 2003-04 school year to 17,609 in the 2014-15 school year, the state and individual districts are called to examine and respond to the needs of the youngest learners transitioning into Oregon's K-12 Public School System.

Previous studies in other states have examined both short term initial gains upon Kindergarten entry as a function of preschool status, as well as have examined the lasting impact of preschool programming on academic achievement. The state of Oklahoma has been a pioneer in the movement towards universally offered, voluntary, state-funded preschool and thus, the research inquiries and study designs in Oklahoma provide a model for replication for researchers studying similar phenomenon in Oregon.

#### Study Participation Timeline:

- 1.) Notify the researcher no later than August 31<sup>st</sup> of your district's desire to participate. Include the number of participating school sites and specify the number of fourth grade classes at each school site.
- 2.) The researcher will provide class sets of the Questionnaire (English and Spanish), in addition to the Informed Consent form for each child on the class roster. The students will record their SSID number on the study materials. The teachers' sole responsibility is

to hand out the study materials to each child on the roster and collect those that are returned in the month of September. Participation by their parent or guardian is **voluntary**.

- 3.) Study materials that are returned to the classroom teacher will be picked up by the researcher on September 29, 2017.
- 4.) Each teacher who hands out the study materials to every child on their class roster will be provided with a \$25 coffee card on September 29, 2017 regardless of how many responses are collected. Each student who returns the voluntary study materials to their classroom teacher will receive a snack incentive that will not exceed \$1.00.
- 5.) SSID numbers of study participants will be compiled and provided to ODE on October 1, 2017. Post-hoc data will be collected for each SSID number for the following variables: Race/Ethnicity, Socioeconomic Status, and third Grade SBAC ELA and Mathematics scores from the 2016-17 school year.
- 6.) *November 1 – December 15, 2017* – Data analysis will be completed via statistical software (LAERD), and Dissertation Chapters 4 (Results) and 5 (Discussion and Conclusion) will be completed by the researcher. Copies of the finalized dissertation will be sent to the Oregon Department of Education Procurement Department for review and request for approval to disburse to the participating school district(s) in Oregon, as well as to publish on George Fox University's library dissertation catalogue.

Please let me know if you'd like to schedule either a phone conference or a face-to-face meeting to answer any questions you may have. I have attached the one question questionnaire (Spanish translation included) and the consent form that would go home to families and be collected by the fourth grade teachers. Additionally, I have included the IRB approval letter from George Fox University. **Thank you for considering participating in a study that is specific to Oregon children and programs!**

I look forward to your response!

Sincerely,

Maria Drennen  
[mariadrennen@gmail.com](mailto:mariadrennen@gmail.com)  
[971-241-7700](tel:971-241-7700)

**COMMUNICATION WITH SCHOOL OFFICIALS**

**EXHIBIT B: COMMUNICATION WITH BUILDING PRINCIPALS**

(9/18/17)

Good morning!

Thank you for being willing to have your school participate in my research project. I believe the information that will be gathered from your fourth grade students will be beneficial to Oregon policymakers responsible for early childhood programming prior to Kindergarten entry.

I have kept the task for your teachers, students, and parents as simple and easy as possible. Tomorrow, I will drop off class sets of the study materials for each fourth grade teacher in your school. Please see the attached Parent Questionnaire, which consists solely of one question, as well as the Informed Consent form, which must be initialed by each parent.

Here is what I will ask of teachers:

- 1.) Pass out the study materials to each student on your class roster. Ensure they write down their SSID# at the top of the Questionnaire, as well as on the 2nd page of the Informed Consent. Both areas will be highlighted.
- 2.) Ask them to take the materials home to their parents/guardians.
- 3.) Participation is voluntary, but please collect all study materials turned in until September 29th. I will provide a snack reward for each student who returns their study material to be passed out at a time of your choosing.
- 4.) I will stop by both schools on the 29th at 3:00 to pick up the study materials that were returned. For your time, you will receive a \$25 coffee card (Dutch Bros or Starbucks).

If you or your fourth Grade Team has any clarifying questions, please don't hesitate to ask me.

Thank you for your support!

Maria Drennen

(9/19/17)

Thank you again for your willingness to have your school site included in my research! I have attached the document that I will include in the study materials for your fourth grade teachers.

Please feel free to share this with them, so they know in advance what to expect. Study materials will be dropped off no later than noon tomorrow at your school sites. The turn-around time is

quick, as I will need to collect the materials by next Friday the 29th. Let me know if you have any questions!

Thank you!!

Maria Drennen

(9/19/17)

Maria,

I just want to make sure we are prepared tomorrow. Do teachers need to put student ID numbers on the forms before they go out? Also, I guess I am not sure what the "study materials" include? Is this the document you shared with us, or is this something different?

(9/19/17)

I am hopeful that the students know their SSID #'s. If this is not the case, it will be more work for the teachers, which I didn't anticipate. Basically, the SSID #'s will keep their identity anonymous, and I will use the numbers to pull their SES, Race/Ethnicity and SBAC ELA and Math scores from ODE. ODE has already approved my study and is willing to provide the info requested for each SSID # that participates. It is imperative that I do not know who the students are, which is why I had the parents initial the consent form rather than sign and am using SSID numbers rather than student names.

In short, if the students do not know their SSID #'s, an adult (the teacher if need be) from the school would need to record the SSID# on both forms (the Questionnaire and Informed Consent). These two documents are what I am referring too when I say "study materials."

My print order at Staples will be complete today; I printed 30 per each fourth grade class at both elementary schools to ensure there will be enough. Each student will receive a stapled packet with a Questionnaire (1 question only) printed on Blue, and the Informed Consent on white. The students MUST NOT fill in the information for their parents.

I can explain it further when I drop off the materials before noon tomorrow. Because it is voluntary, the teachers will receive the \$25 regardless of if none of their students return the two documents. Obviously it helps my study be more meaningful to have more data to analyze though! :)

See you tomorrow!

Maria



## COMMUNICATION WITH SCHOOL OFFICIALS

### EXHIBIT C: GUIDELINES FOR CLASSROOM TEACHERS

Dear Fourth Grade Teams,

Thank you for your willingness to support my research! I believe this information is a critical for building awareness about the importance of access to high quality preschool programming for all of Oregon's children prior to Kindergarten entry.

Here is a class set of materials for the students in your class. The following is what I need from you. To show my gratitude for your assistance, I will bring a \$25 coffee card to your school for each fourth Grade Teacher next Friday, September 29th.

#### Instructions:

1. Hand out the study materials (Questionnaire and Guardian Consent) to each student on your roster.
2. Take 5 minutes in class to ensure the students have accurately recorded their SSID number on both the Questionnaire and on the Guardian Consent. I have highlighted both lines.
3. Participation is voluntary, but I ask that you please remind your class a few times over the next week and a half that if they are participating, they must turn in BOTH their Questionnaire and Guardian consent by next Friday September 29th. I cannot have one form without the other.
4. Students who return both items will receive the snack reward I have provided with your study materials.

Again, I will stop by your school next Friday the 29th between 3:00 and 4:00 to pick up the items returned from your students. Please have them delivered to the main office. I will then leave the \$25 coffee cards (Dutch Bros or Starbucks) to show my appreciation for your help. Let me know if you have any questions!

Sincerely,  
Maria Drennen  
[mariadrennen@gmail.com](mailto:mariadrennen@gmail.com)  
971-241-7700

**COMMUNICATION WITH SCHOOL OFFICIALS**

**EXHIBIT D: CLARIFICATION ON GUIDELINES**

(9/22/17)

Hi Maria,

We have all of your paperwork and are prepared to send home Monday with students. We do have one question. Did you check on the legality of sending SSID #s home with students in this manner? They are considered to be so secure when we are taking our Smarter Balanced assessments (the only time we use them) and it seems that we are putting them into children's hands to give to parents – knowing that some will get misplaced??? I guess it just feels so contrary to the concern placed on them by the state at testing time. Could you please provide a response before we send these home?

Thank you so much!

(9/23/17)

Hello team!

Thank you for expressing your concern. Please rest assured that this entire research project has both IRB approval, as well as approval from ODE. The research plan has to be laid out step by step prior to approval, and both organizations have approved this method of data collection.

There is not a way for the common individual to access information about a student or their family with this identification number without going through a school or ODE specifically. It is highly protected information, which is why I understand the basis for your concern.

Please rest assured that you have met your ethical duty by posing this question. It is important to the integrity of my research that the students remain anonymous to me in the role of the researcher. I can assure you that if it is difficult for a doctoral student who is also an educator to get any information tied to an SSID#, it is impossible for a common individual who might happen across the number as well.

Let me know if you have any further questions or concerns, and I will be happy to talk with you! Thank you for being willing to help in this research, as well as for being committed to protecting your students.

Maria Drennen

**COMMUNICATION WITH SCHOOL OFFICIALS**

**EXHIBIT E: REQUEST FOR SSID MATCHING**

(10/6/17)

I have been working with Brian Reeder from ODE to match the SSID numbers I provided last weekend to the variables I requested for my study. Please see his email below, as there were 6 that he could not match. I am trying to maintain the anonymity of the students, so I am hopeful you can send him the info he is requesting via the secure link provided below. I told him I would ask you to do so, in order to protect the students' identity from me in the role of the researcher. I have attached the 6 SSID numbers.

Let me know if this is possible!

(10/6/17)

Maria, we will see what we can do. They probably are district ID numbers.

**APPENDIX D: VISUAL EXAMINATION OF STATISTICAL ASSUMPTIONS**

