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Examining Dosage: Comparisons of a High-Quality Program's Impact on Vocabulary and  
Social-Emotional Characteristics Between One- and Two-Year Cohorts.

by

J. Joshua Byrd

A THESIS

Presented to the Faculty of

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In Partial Fulfillment of Requirements

For the Degree of Master of Science

Major: Child, Youth, & Family Studies

Under the Supervision of Professor Helen Raikes

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EXAMINING DOSAGE: COMPARISONS OF A HIGH-QUALITY PROGRAM'S  
IMPACT ON VOCABULARY AND SOCIAL-EMOTIONAL CHARACTERISTICS  
BETWEEN ONE- AND TWO-YEAR COHORTS.

J. Joshua Byrd, M.S.

University of Nebraska, 2018

Adviser: Helen Raikes

This study investigated the effects of high-quality early childhood program dosage by measuring its associations with low-income children's vocabulary and social-emotional characteristics. The current study also examined the different patterns of annual change between monolingual English-speaking children and Spanish-speaking English Language Learners (ELLs) in two dimensions of language development. The purpose of this study was to explore program impact at two levels of dosage per measure, Group 1 (single year of program) and Group 2 (two or more years of program). Results revealed significant increases in fall-to-spring PPVT-IV scores for English-speaking children in Group 2, significant decreases in Spanish PLS-5 scores for 48-month-olds in Group 2, and significant increases in DECA Total Protective Factors scores for 48-month-olds in Group 2. Limitations of the current study, future directions, and implications for practice are also discussed

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## CHAPTER 1

### INTRODUCTION

High-quality early childhood education (ECE) programs are critical to the short- and long-term success of many children at risk for cognitive and social-emotional delays due to compounded risk factors (e.g., low income, experienced trauma, single-parent household) (Bierman et al., 2008; Gormley, Phillips, Newmark, Welti, & Adelstein, 2011; Schweinhart, 1993). Targeting development in language skills and the social-emotional domain, effective ECE programs use curricula that is language rich, encourages independence and engagement, and is facilitated by teachers who proactively assist children in problem solving (Love et al., 2005; Reynolds, Ou, & Topitzes, 2004). Many high-quality ECE programs provide support and services to families of attending children with the goal of promoting and reinforcing healthy home environments that facilitate learning and positive relationships (Love et al., 2005; Reynolds et al., 2002; Stein, Simon, & Britten, 2016). Previous studies have reported that when parents received support, children's language development improved and instances of externalizing behavior decreased (Brooks-Gunn & Markman, 2005; Love et al., 2005).

Previous studies (e.g., Love et al., 2003; Wen, Leow, Hahs-Vaughn, Korfmacher, & Marcus, 2011; Yazejian, Bryant, Freel, & Burchinal 2015) have suggested that increased time in care (i.e., program dosage) is associated with greater growth in cognitive and social-emotional domains. The current study aimed to examine if increased program dosage (i.e., time attending Educare) is associated with improved receptive language, comprehension language, and social-emotional outcomes as measured by fall

and spring assessments. This study also adds a Lincoln, Nebraska, sample to the growing body of Educare literature.

## **LITERATURE REVIEW**

Children with limited resources often face barriers that negatively affect school readiness, language abilities and life trajectories. Some of these barriers include poverty (Jiang, Granja, & Koball, 2017a), less exposure to language (Hart & Risley, 1995), and ECE environments that do not stimulate children in meaningful ways (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007). These issues will be reviewed to provide a foundation for the importance of low-resource children attending a high quality ECE program for an extended amount of time, the focus of this study.

Currently, over 11 million children three years and younger live in the United States. Of these children, 5.2 million live between 100% and 199% of the federal poverty threshold (FPT) (i.e., low-income families) and 2.6 million live below 100% of the FPT (i.e., poor families). While the number of infants born into low-income families has decreased from 49% in 2011 to 45% in 2015, the percentage of children under three in low-income families still exceeds that of adults (Jiang, Granja, & Koball, 2017a). According to Jiang et al. (2017), poverty affects 29% of Asian infants, 33% of white infants, 63% of Hispanic infants, 64% of American Indian infants, 69% of black infants, and 40% of infants of some other race born in the United States. This report also corresponds with previous studies (e.g., Larsen, 2004; Van Hook, Glick, and Bean, 1999) that suggest greater proportions of children of foreign-born parents depend on income assistance than do children of native-born parents.

A critical issue faced by young children in low-income families is the gap of achievement that exists between them and their more affluent peers. Poverty, family configuration, race, and cultures are associated with achievement gap before children enter kindergarten (Morrison, 2012), with poverty being the most influential factor in placing children more at-risk for developmental delays than being born into a single-parent household or to teenage parents (Sherman, 1997). In their landmark study, Hart and Risley (1995) observed 42 families in America for two and a half years whose socioeconomic status (SES) ranged from low-income to highly affluent with most (23) of the families classified as middle-or working-class. One major finding of the study was that families with the lowest SES experienced a great deal of isolation. Participants whose income was either too low or too high and did not qualify to live in public housing (where the close proximity of neighbors facilitated regular interfamily socialization despite not owning a car or telephone) were essentially remote in terms of social interactions. Moreover, parents of low-income parents were less likely to assist their children and grandchildren based predominately on disapproval of their lifestyle (Hart & Risley, 1995). These findings support Rankin and Quane's (2000) study that suggested residents of high-poverty neighborhoods are not typically involved with youth programs or organizations. Furthermore, the social networks of families in neighborhoods of high poverty contain more friends on public assistance and fewer friends who are college educated and gainfully employed. As children are often included in their parents' social lives and share acquaintances, a lack of social participation in activities outside of the less-stimulating home environments further widens the gap between impoverished children and their more affluent peers.

The most salient finding of Hart and Risley's (1995) study pertained to the amount of talking (i.e., average words per hour) used by parents in the presence of their children. On the higher end of parent-child interaction, a family with a higher SES was observed spending 42 to 55 minutes per hour interacting with their infant through toddlerhood as language acquisition increased. Conversely, the lowest amount of interaction per hour was recorded observing a low-SES family on welfare who spent seven to 20 minutes per hour interacting with their child as they progressed from speaking very few words to learning to talk. A further difference between families with high and low income was their daily activities. Children from upper-SES families typically spent their days with highly active parents who spent a great deal of time on the phone, going to the grocery store, performing household tasks, playing with puzzles, and had access to educational television. From birth to age four, the differences among families' talking habits and how they were influenced by how other risk factors (e.g., parent education, profession, SES) accumulated, highly differentiating children's abilities entering kindergarten. Hart and Risley (2003) estimated that a 30-million-word gap of exposure existed between children who heard the least amount of words per hour and their peers who heard the most; a difference of 616 vs. 2,153 words per hour. The researchers maintained that this quantification was based on their previous observations (i.e., Hart and Risley, 1995) and assumed the participants maintained a 14-hour waking day schedule. Should this estimation be double what the actual word gap is, Hart and Risley (2003) asserted, the best possible intervention could only prevent the children from falling further behind. Typically, parents who rarely stimulated their children by talking and including them in activities, had a lower level of education, were

impoverished, lacked resources, and had children with poorer language abilities (Vernon-Feagans et al., 2012).

With nearly eight million children living in poverty and the detrimental effects of compounded risk factors on language ability already observable in children as young as three years of age, early intervention to increase at-risk children's exposure to a stimulating language- and literacy-rich learning environment is critical to later success in school and life. The evidence of positive effects of preschool intervention is longstanding and greatly improve child trajectories (Cannon, Jacknowitz, & Karoly, 2012; Love et al., 2002). Loeb et al. (2007) reported that the type and duration of early childcare matters and that children who attended a high quality childhood program early reaped a greater academic benefit than those who attended later. Early childhood intervention typically includes a child-centered curriculum guided by children's interests, language-rich instruction that encourages taking the perspectives of others, and teachers who understand that the first four years of life is a critical period in which the groundwork for future development is created (Shonkoff & Meisels, 2000).

When evaluating the short- and long-term benefits of such a program to impoverished children, Schweinhart (1993) found that at age 27, participants who attended preschool had higher rates of home ownership, income, and education levels and fewer arrests and incidents of violence resulting in social service interventions than their peers who had not attended preschool. Schweinhart quantified these findings with a cost-benefit analysis and concluded that the estimated rate of return on investment in the preschool program was over seven dollars (in 1992 currency) for each dollar spent.

In summary, evidence of positive outcomes in terms of school readiness, language abilities, and life trajectories seems to support early exposure to abundant amounts of talking, listening, and engaging in conversation as critical measures to improve a child's likelihood of success. However, with 42% of children under five spending 35 hours per week in an early childcare setting (Capizzano, 2005), the success of those children is greatly affected by the quality of their ECE program in providing stimulating, language-rich environments.

### **The Success of Early Childhood Education Programs**

Over the last 30 years, ECE programs have been a source of debate regarding federal funding, effectiveness, and the feasibility of scalability (i.e., successfully implementing a program model across a large population) (Currie, 2001). Several early childhood program models have been implemented over the course of decades and have shown success in increasing school readiness, homeownership, and cognitive abilities while reducing the rates of both juvenile and adult arrest, juvenile remedial services, and grade retention (Love et al., 1995; Reynolds et al., 2004; Reynolds, Temple, Robertson, & Mann, 2002; Schweinhart, 1993). In the following sections, some of the most well-known, established, and researched ECE programs will be reviewed.

**The Early Head Start Program.** The Early Head Start Program was created in 1995 to support low-income mothers and families with children three and under. The premise of the two-generation program is to provide family support services (e.g., health referrals, parent education, case worker) as well as direct services to the children in the most crucial stage of development (Love et al., 2005). Compared to other ECE programs,

Head Start typically serves more low-birthweight children, single-parent households with lower levels of education, and WIC recipients (Loeb, et al., 2007).

In addition to directly serving children in the program, Early Head Start aims to improve families' quality of life by encouraging healthy parent-child relationships and promoting autonomy. Importantly, Love et al. (2005) reported that the mixed-approach Early Head Start programs, providing both home- and center-based services, yielded greater impacts on children and families than was true for those in either just home-based or just center-based services. Children exhibited higher cognitive and language abilities and lower rates of aggressive behavior when they were enrolled in high quality two-generation programs. Findings seem to support the notion that when parents are supported and taught healthy practices (e.g., reading with their children, asking open-ended questions, reducing physical punishment), the home environment becomes more stable and stimulating, ushering positive changes at the family level (Brooks-Gunn & Markman, 2005).

An important aspect of high quality ECE programs is rigorous program evaluation. In a longitudinal study assessing the effectiveness of Early Head Start, Love, Chazan-Cohen, Raikes, and Brooks-Gunn (2013) randomized 3,001 low-income families with an expectant mother or infant under 12 months old into either a control group or a treatment group, of which 91% received Early Head Start services. The researchers collected data assessing the children's language abilities, cognition, health, and behavior concerns at ages one, two, three, and five. Concurrently, data were collected to document parents' mental health, employment, and parenting practices. Love and colleagues (2013) reported positive impacts across all child and parent domains. Two years after completing

the Early Head Start Program (at age five), the treatment group (i.e., the children who attended Early Head Start and their families) had more positive outcomes in language development, behavior, and parenting practices than those in the control group. Findings suggested that school achievement was not significantly different between the treatment and control groups.

**The Chicago Child-Parent Center.** Similar to Head Start, the Chicago Child-Parent Center (CPC) Program focuses on providing low-income families with comprehensive services aimed to improve education and socioeconomic trajectories (Reynolds et al., 2002). For 50 years, the CPC, funded by Title I of the Elementary and Secondary Education Act, has served 24 of the most impoverished neighborhoods in Chicago. The CPC program is a half-day program for three- to four-year-old children that solicits family involvement by requiring parents to spend one half-day per week involved in parenting workshops, volunteering as a classroom aide, or interacting with other parents (Conyers, Reynolds, & Ou, 2003).

Reynolds, Temple, Robertson, and Mann (2001) examined data from 989 low-income minority children born in Chicago in 1980 who attended CPC in 1985-1986. Compared to the 550 children of the same age in the nonrandomized comparison group who attended alternative early childhood programs, CPC attendees experienced fewer juvenile arrests (16.9% vs. 25.1%;  $p=.003$ ), fewer arrests for violent crimes (9.0% vs. 15.3%;  $p=.002$ ), and a lower rate of school dropout (46.7% vs. 55.0%;  $p=.047$ ) and had higher rates of high school completion (49.7% vs. 38.5%;  $p=.01$ ), and more years of completed education (10.6 vs. 10.2;  $p=.03$ ) (Reynolds et al., 2001). Evidence also indicates that participation in the CPC is associated with reduced need for subsequent

special education services after program completion. Conyers, Reynolds, and Ou (2003) examined data from 1,377 minority children in the Chicago Longitudinal Study and found that children who received the CPC intervention had significantly less special education placement (12.5%) than the comparison group (18.4%).

***The Abecedarian Project.*** The Abecedarian Project is another high quality early childhood intervention program known for its positive effects on children's IQ, early mathematic skills, and reading (Masse & Barnett, 2002). Created in 1972, the Abecedarian Project was an intense early intervention program targeting low-income children from infancy to five years of age. The program focused on language development, social-emotional attitudes, and provided families with medical and nutrition services. Participants in the Abecedarian program demonstrated early positive outcomes in math and reading abilities along with improved physical health compared to children who did not participate in the program (Campbell et al., 2001; Hill, Gormley, & Adelstein, 2012). Campbell et al. (2001) reported that the differences in cognitive gains between the two groups were attributed to the intensive early intervention that the Abecedarian program provided.

Campbell, Ramey, Pungello, Sparling, and Miller-Johnson (2002) conducted a long-term follow-up study that tracked 104 graduates of the Abecedarian program into adulthood. Abecedarian participants achieved significantly higher scores on academic and intelligence tests as adolescents, attended more years of total education, were more likely to attend a four-year college, and were less likely to become pregnant as a teenager compared to the preschool control group (Campbell et al., 2002). An additional study conducted by Masse and Barnett (2002) concluded that the benefits of higher education,

better employment, and improved health garnered by participants of the Abecedarian program created a positive return for the investments of public funds and improved social equity.

*Effective intervention with English-language learners.* School-age English-language learners (ELLs) who lack developmentally appropriate vocabulary abilities are less likely to perform well on language assessments and more likely to be diagnosed as learning disabled than their English-speaking peers (August, Carlo, Dressler, and Snow, 2005). Preschool-age ELLs had considerably lower Peabody Picture Vocabulary Test—Third Edition (PPVT-III; Dunn & Dunn, 2007) mean scores than their English-speaking peers ( $m=64.9$  vs.  $m=88.8$ ) (Zill et al., 2001). The success for ELLs is strongly dependent on the effectiveness and timing of early intervention. In a study measuring oral language skills and phonological awareness abilities, López and Greenfield (2004) presented results that supported strengthening ELLs' skills in their first language as an effective means of later English acquisition. These findings supported previous studies that suggested ELLs learned English more efficiently when taught vocabulary separately and in addition to their first language (August, Shanahan, & Escamilla, 2009; Slavin & Cheung, 2005).

Similarly, Raikes et al. (2017) reported that the Educare program was associated with increased English- and Spanish-language skills with their study examining longitudinal data from 1,961 ELLs who attended the Educare program between 2008 and 2016. The study evaluated program effectiveness in increasing English language skills in three types of classrooms: (1) classrooms conducted in English only, (2) English and limited Spanish, and (3) English and Spanish (equal differentiation). As per standards

established by the Educare Early Learning Network (ELN), Spanish receptive and expressive language skills were assessed using the Preschool Language Scale-Spanish Version (PLS-4; Zimmerman, Steiner, & Pond, 2002) and English receptive language skills were assessed using the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-IV; Dunn & Dunn, 2007). Raikes and colleagues presented evidence suggesting that, regardless of Spanish exposure through instruction, attending Educare accounted for significant increases in Spanish and English skills without impeding English acquisition. The researchers reported that ELLs in the ELN significantly exceeded norm English language growth expectations by about five points annually, providing evidence that high quality ECE programs reduce achievement gaps and improve developmental trajectories.

As parents are a child's first teachers, they are explicitly involved in the maturation and development of the child and their language abilities. Rodriguez et al. (2012) examined 1,034 EHS children's home literacy environments (HLEs) across three distinct age-based time points (i.e., 14, 24, and 36 months) and found that at three-years old, 27% of language and cognitive abilities were attributed to parental involvement (e.g., mother-child engagement, promotion of literacy, and availability of books in the home). Two-generation programs, such as EHS and CPC, work directly with parents to make home environments conducive to learning by promoting parent-child reading, immersion in exploratory activities, and providing books. Parents whose children attend Early Head Start read with their child more frequently (Aikens et al., 2010), typically resulting in better language and cognitive development at 24 and 36 months of age (Raikes et al., 2006). In summary, good quality early childhood programs increase language performance in ELLs by working with parents to be good models for language,

encourage parent-child bookreading, and create stimulating HLEs (Raikes et al., 2006; Rodriguez et al., 2012).

### **Language Outcomes of High Quality Early Childhood Intervention Programs**

As evidence suggests, the more language young children hear and conversations they engage in, the greater their language acquisition and vocabulary will be (Hart & Risley, 1995; Raikes et al., 2006). Language abilities are essential for school readiness and closing the developmental gap between low-income children and their more affluent peers is a primary goal of early childhood programs (Reynolds et al., 2002; Vernon-Feagans et al., 2012). At-risk children can demonstrate substantial improvements in language skills as a result of learning in text- and language-rich environments, (Barnett, 1995) that may increase with more time in care (Love et al., 2003).

Love et al. (2003) examined Communicative Development Inventories (CDI) and PPVT-III scores, which measured language development at 24 months and 36 months, respectively, of participants in the Early Head Start program evaluation and reported that the quality of Early Head Start centers was positively associated with children's language and cognitive development. Love et al. (2003) also reported that children who attended Early Head Start scored significantly higher on language assessments than their peers who did not attend the program. Consistent with findings by Zill et al. (2001), Love et al. (2003) reported fall-to-spring PPVT-III scores of typical children attending Head Start increased by more than non-attendees. Aikens et al. (2010) reviewed data on classroom structural and material quality from 135 Head Start classrooms containing 2,501 children using the Early Childhood Environmental Rating Scale-Revised (ECERS-R; Cryer, Harms, & Riley, 2003), and instructional and emotional support aspects, using the

Classroom Assessment Scoring System (CLASS; La Paro, Pianta, Stuhlman, & Hamre, 2002). The researchers reported that as classroom quality scores increased (i.e., a higher ECERS-R Teachers and Interactions score), the corresponding PPVT-IV scores also increased. Using the same data as Aikens et al. (2010), Hindman and Wasik (2013) reported that children who entered Head Start with poorer vocabulary made greater gains when they received high quality instruction compared to children who entered the program with greater vocabulary skills.

**Language outcomes of interventions for ELLs.** Citing research using the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Laosa and Ainsworth (2007) proposed that when ELLs attended high-quality preschool, they benefited from gains in cognitive development more so than their non-Hispanic White or African-American peers with similar socioeconomic characteristics. Farver, Lonigan, and Eppe (2009) reported that using dialogic reading and large group activities to learn and use vocabulary and teacher-directed small group activities focusing on phonological awareness, ELLs increased oral language skills, print knowledge, and phonological awareness more than the control group who did not participate in the intervention. In summary, high-quality early childhood education programs promote ELLs to (a) learn more when attending than they would through maturation; (b) learn more at home by providing parents with instructional support; and (c) significantly improve pre-literacy and oral skills (Farver, Lonigan, & Eppe, 2009; Gormley, 2008; Raikes et al., 2006).

### **Social-Emotional Outcomes**

Social-emotional intelligence is comprised of intra- and interpersonal abilities such as being able to form and maintain healthy relationships with peers and adults, and

self-regulation (Gormley et al., 2011; National Scientific Council on the Developing Child, 2005) and is an important predictor in later school success (Romano, Babchishin, Pagani, & Kohen). Low-income children who have compounded risk factors (e.g., long-term poverty, single-parent household, experienced trauma) are more likely to be affected by poor interpersonal relationships, anxiety, and delinquency in adolescence (Gormley et al., 2011). Early Head Start, Head Start, and CPC predominantly serve low-income children and studies of child outcomes—especially follow-up studies that find little to no residual effects—are mixed (Magnuson, Ruhm, & Waldfogel, 2007; Reynolds, 1989). The *Goldilocks* hypothesis is the prevailing notion that suggests children who benefit most from ECE programs come from families with either too few or too many risk factors (Miller, Farkas, Vandell, & Duncan, 2014).

Despite mixed findings, there is a growing body of evidence that suggests high-quality early childhood classrooms and positive child-teacher relationships can moderate the effects of poverty and adversity (Gormley et al., 2011; Mashburn et al., 2008). The Head Start Research-based, Developmentally Informed (REDI) program is a relatively new, more extensive model of intervention designed to promote social-emotional competencies and language development with the premise that language and social-emotional abilities are developmentally interdependent. Essentially, by supporting both domains simultaneously, early childhood teachers could comprehensively address school-readiness concerns (Bierman et al., 2008). In a one-year, randomized study in which 356 four-year-old children who were assigned to either a REDI classroom or a typical Head Start classroom, Bierman and colleagues completed multi-domain assessments to identify any significant differences in language and social-emotional outcomes between the two

groups. The researchers reported that children in the REDI program who were specifically instructed in problem-solving dialogue with teachers modeling positive social behavior demonstrated statistically significant gains in emotional understanding and social problem-solving skills.

ECE programs that directly promote prosocial behavior and effective problem solving skills can improve children's social-emotional outcomes. Moore et al. (2015) examined a population of at-risk children in a public preschool program (adhering to Head Start guidelines) over the course of their one- to two-year enrollment. One hundred fifty-one children entered at age three and 188 entered at age four ( $N=339$ ). Approximately 75% of children enrolled at age three attended the program for two years. Supporting similar evidence presented by Wen et al. (2011), the researchers found that children who attended the program for two years exhibited faster social-emotional growth and had significantly higher emotional intelligence than their peers who attended one year or their propensity-matched cohort. In contrast to previous studies that suggest higher associations of negative child outcomes and non-parental childcare (Gupta & Simonsen, 2010; Loeb et al., 2007), Moore and colleagues found that early childhood programs that explicitly address social-emotional expectations and behaviors can facilitate positive social-emotional outcomes.

High quality ECE programs also increase social-emotional competence in children with varying family configurations and income levels. Cooper and Lanza (2014) conducted latent class analyses examining data from the Head Start Impact Study (three-year-old cohort,  $N=2,449$ ) to examine the effectiveness of the Head Start program in terms of social-emotional and cognitive growth. The researchers established subgroups of

participants based on caregiver and home environment characteristics (e.g., family configuration, income level, presence of depression symptoms) to identify how attending two years of the Head Start program affected cognitive and social-emotional skills. Children were only classified into single subgroups and social-emotional outcomes were both positive and significant across several subgroups. Cooper and Lanza observed significant increases in social skills and positive approaches to learning and fewer behavioral problems at the end of kindergarten for low-income children from single-parent households who qualified for Food Stamps. In more than one subgroup, Head Start had a significant positive effect on parent-child relationships at the end of kindergarten.

**ELLs' social-emotional outcomes.** Children who attend high-quality early childhood programs are typically exposed to nurturing teachers who model positive social practices. ELLs are a particularly vulnerable population, even among Early Head Start and Head Start cohorts, due to differences in language from their peers. Social-emotional skills and language development are intertwined; the ability to communicate with peers assists in emotional regulation and social-emotional awareness facilitates positive relationships between peers and adults (Bierman et al., 2008). Typically, children enrolled in ECE programs improve their impulse control and social skills, and reduce the frequencies of problematic behavior (Aikens et al., 2010), but few studies have been conducted to assess the translatability of these social-emotional outcomes to ELLs.

One such study, conducted by Schmitt and colleagues (2015), used group comparisons between ELLs who attended Head Start and a control group that did not to evaluate self-regulation intervention effects. The researchers found that ELLs who attended the intervention demonstrated better self-regulation and overall academic

achievement throughout the preschool year. Furthermore, subsequent gains in math skills were proposed an additional benefit of the intervention and further supported the role of self-regulation in school readiness (Schmitt et al., 2015).

High quality ECE programs may differentially affect ELLs' social-emotional outcomes compared to their monolingual English-speaking classmates. Ansari and Winsler (2014) examined a large cohort of low-income Latino ( $n=7,045$ ) and Black children ( $n=6,700$ ) enrolled in either High/Scope or Montessori curricula to measure school readiness in terms of social-emotional and behavior skills, and preacademic skills. It is worth noting that both curricula are considered high quality in terms of appropriateness of school readiness preparation but some differences in outcomes did emerge. The Devereux Early Childhood Assessment (DECA; LeBuffe & Naglieri, 1999) was used by parents and teachers to assess the children's total-protective factors and behavioral concerns that illustrate social-emotional health. According to teachers' DECA assessments, Latino children demonstrated greater gains in social skills than their Black peers, regardless of curriculum. Parent-reported DECA results aligned with teacher reports that again suggested Latino children's social-emotional competences improved while simultaneously decreasing behavioral concerns, regardless of curriculum. The researchers concluded that Latino children who entered the programs at greater risk than their non-Latino peers in social-emotional competences, made the greatest improvements over the year.

### **Outcomes of Interventions in Other Realms**

School success is important and, arguably, one of the most considered aspects of early intervention (Welsh, Nix, Blair, Bierman, & Nelson, 2010), but there are other

realms to consider such as quality of life, good citizenry, later-life trajectories and even survival rates. Ludwig and Miller (2007) with attribution to Head Start health screenings, reported child mortality rates (ages 5-9) were greatly reduced, meaning the Head Start intervention compensated for excess risk, with the outcome that mortality rates for low-income children were more aligned with their affluent peers. Food insecurity is another area of concern for many impoverished families. There is a general consensus, supported by research, that children who do not get enough food experience adverse health outcomes (Alaimo, Olson, Frongillo, & Briefel, 2001). Commonly, half- and full-day early childhood programs such as Early Head Start and Head Start provide children with meals that follow USDA guidelines for what constitutes healthy foods. These programs provide children who are otherwise food-insecure with necessary nutrition during the most critical period in their life (Blake-Lamb et al., 2016).

Cost-benefit analyses find that the federal dollars used to fund high quality early childhood programs are substantially less than the costs of imprisonment, rehabilitation, and costs of damages resulting from crime (Barnett, 1998; Masse & Barnett, 2002; Schweinhart, 1993). As 45% of the 10.5 million children under six who live in the United States are low-income, the potential for positive societal impacts is vast (Jiang, Granja, & Koball, 2017b). According to Mass and Barnett (2002), participants who attended the Abecedarian Project benefited in higher educational attainment, less welfare use and criminal behavior, more pro-social behavior, and stable careers that resulted in increased lifetime earnings. Extending beyond the children who received direct interventions, the researchers also reported that teenage mothers of children in preschool were more likely to have been autonomous, to have graduated high school, to have continued their

education, and to have jobs that were considered *skilled*. Love et al. (2002) reported similar results in the Early Head Start Research and Evaluation Project; parents of children in Early Head Start were more autonomous, attained more education, and improved their parenting.

Schweinhart (2003) found similar long-term benefits among participants who attended the Perry Preschool Project (i.e., another high-quality ECE program similar to Head Start and the Abecedarian Project). The study reported that the graduation rate of program participants was significantly higher than non-participants' (71% vs. 54%) and notably, 27-year-old females who attended the program had the largest gap of difference in high school graduation rate compared to the non-program group (84% vs. 35%). Socio-economic differences at age 27 persisted; program participants reported higher rates of homeownership and owning a second car compared to the non-participants (36% vs. 13% and 30% vs. 13%, respectively). In summary, in addition to positive language and social-emotional outcomes, at-risk children who attend high-quality ECE programs typically benefit in terms of better health outcomes, education attainment, higher income, and more assets than similarly vulnerable children who do not attend such programs.

### **Effects of Dosage**

The study of ECE program dosage (i.e., how long a child attends an intervention) is underrepresented in the current body of literature pertaining to the effectiveness of early childhood programs. Empirical research reviewed for this paper considers programs targeting ELLs and monolingual English-speaking children. Weissberg, Kumpfer, and Seligman (2003) asserted that many programs aimed to improve life trajectories of high-risk children are not of sufficient dosage to have lasting effects. Using data from the

Chicago Longitudinal Study, Arteaga and colleagues (2014) examined outcomes in adulthood related to academic achievement, criminal activity, and abuse between one- and two-year participants in the CPC. The researchers reported findings that supported increased dosage as a means to improve child outcomes. Compared to one-year attendees, children in the two-year group typically were (a) less likely to experience grade retention before high school, (b) less likely to abuse or neglect their own children, (c) and four percent less likely to have a felony arrest by age 24. Concurring with these results, Reynolds, Temple, Ou., Arteaga, and White (2011) suggested increased time in high quality ECE was associated with improved school readiness and overall well-being.

Hill, Brooks-Gunn, and Waldfogel (2003) studied the treatment effects of different dosage groups of two- and three-year-olds who were premature, low-birth-weight infants attending the Infant Health and Development intervention program. Two dosage groups were compared: high-dosage (>400 days of attendance) and low-dosage (>350 days of attendance). Scores on the Wechsler Intelligence Scale for Children Full and Verbal scales for children who attended were compared. Hill and colleagues reported that children who received more intense intervention (i.e., had higher attendance) scored substantially higher on cognitive assessments, which supports the proposition that, along with quality, the effectiveness of ECE interventions may be highly dependent on intensity and children's participation. To most effectively improve school and life trajectories for high-risk, underprivileged children, it is necessary that ECE programs are high quality, begin in the earliest life stages, and continue until kindergarten (Love & Brooks-Gunn, 2010).

Greater time in Head Start has also been associated with increased cognitive abilities, positive health outcomes, and less behavioral problems (Frisvold & Lumeng, 2011; Lee, 2011; Love et al., 2003). Children who entered Head Start at age three and stayed for two years had higher academic outcomes than peers enrolled at an older age with less time in the program (Lee, 2011). Similarly, Wen et al. (2012) reported that children who attended Head Start for two years exhibited significantly better social and academic skills and scored higher on the PPVT-III, Woodcock-Johnson Reading Skills, and Woodcock-Johnson Math Reasoning Skills (Woodcock, Mather, & McGrew, 2001) than children who attended a single year of Head Start. Wen and colleagues' findings provided evidence that increased dosage was associated with improved school readiness and kindergarten academic performance.

Educare, an ECE program similar to EHS, has supported its attendees—including ELLs who comprise one-third of enrolled children—in having vocabulary and social-emotional skills significantly surpassing that of low-income children not attending Educare (Stein et al., 2016). ELLs who entered the Educare network at two years of age scored close to age-normed monolingual English-speaking peers on the PPVT-IV (91.9 vs. 100) after two years attending the program, suggesting that children who received more dosage exhibited greater increases in cognitive abilities and prosocial behavior (Stein et al., 2016). Yazejian, Bryant, Freel, and Burchinal (2015) used data from 5037 participants across 12 Educare sites and examined the effects of dosage (i.e., age of entry and time in care) on language abilities and social outcomes. Age of entry and time in care were both positively associated with receptive language outcomes and social-emotional scale scores improved with duration of care.

## **Background of Educare**

Educare is a high-quality early childhood program that serves children ages six weeks to five years from low-income families utilizing full-day, full-year services (Stein et al., 2016). Founded in 2001 by the Ounce of Prevention Fund in collaboration with the Irving Harris Foundation and expanded in 2003 with aid from the Buffet Early Childhood Fund, the Educare network is a nationwide program that seeks to narrow the achievement gap between low-income and affluent children that is evident before kindergarten (Morrison, 2012). Educare predominantly serves children from minority backgrounds with many families reporting food and housing insecurities, unstable income, and high levels of stress (Stein et al., 2016).

### **How the Educare program addresses the needs of its children and families.**

The Educare classroom is a literacy-rich environment with low child-to-teacher ratios that celebrates diversity and promotes prosocial behavior. A core feature of the Educare program is highly qualified staff. Lead Teachers are required to have a Bachelor's degree in ECE and are supported by Master Teachers holding advanced degrees in ECE while Assistant Teachers are required to have an Associate degree in ECE or a related field. Ongoing professional development is implemented monthly across all levels of the staff. Educare utilizes the Creative Curriculum (Dodge, Rudick, & Berke, 2006) to stimulate children's intrinsic eagerness to learn by offering rich learning experiences focused on children's interests and their willingness to reflect on what they learn. Educare teachers model respect and healthy practices and encourage children to take their peers' perspective. In addition to direct services, Educare provides on-site family support to encourage healthy child-parent relationships and to establish a parent-school partnership.

Each family is assigned a Family Engagement Specialist who provides additional family resources and offers support to parents by providing individualized planning to meet the specific needs of individuals.

### **Current Study**

The purpose of the current study is to examine the effectiveness of the Educare approach in improving receptive language, comprehension language, and social-emotional skills increases with dosage. Similar to a previous study (Yazejian et al., 2015), the current study will examine children's receptive language skills and social-emotional attributes in relation to their entering and exiting of the program and between dosage cohorts. This study also serves in adding a Lincoln, Nebraska sample to the current body of Educare research.

### **Study Context**

Between October 2015, and November 2016, Nebraska admitted over 1,400 refugees (Krogstad & Radford, 2017). As the capitol of Nebraska, Lincoln, is a resettlement community, the Educare program welcomed children from a variety of cultural backgrounds. Outside of metropolitan areas, Lincoln has one of the highest rates of poverty, affecting between 20 and 30% of children under five years of age (Daily et al., 2017). In previous discussions, Educare teachers indicated that the emotional toll that working with low-resource children with compounded risk factors weighed heavily on their decision to stay at or leave Educare. Lincoln is an important study setting as the child population is of distinct and diverse ethnic and socioeconomic backgrounds.

## Research Questions and Hypotheses

### Research Question 1

Does attending the Educare program affect children's language skills as measured by fall to spring growth in a single year?

**Hypothesis 1.** The attendance in the Educare program will be associated with higher language skills when comparing fall to spring scores for two language assessments in a single year regardless of age.

### Research Question 2

For children who have been in Educare for more than one year, does attending the Educare program affect children's language skills by fall to spring growth in a single year?

**Hypothesis 2.** Increased dosage of the Educare program will be associated with higher language skills when comparing fall to spring scores for two language assessments in a single year, regardless of age.

### Research Question 3

Does attending Educare affect children's language development differentially for ELLs and non-ELLs?

**Hypothesis 3.** ELLs' language scores will increase more from fall to spring than non-ELLs in both dosage groups, regardless of age.

### Research Question 4

Does attending the Educare program affect one-year dosage children's social-emotional characteristics as measured by fall to spring growth in a single year?

**Hypothesis 4:** The Educare program will be associated with improved social-emotional characteristics when comparing fall to spring scores in a single year regardless of age.

**Research Question 5**

Does a higher dose of Educare attendance improve children's social-emotional development from fall to spring in a single year?

**Hypothesis 5.** Increased dosage of the Educare program will be associated with improved social-emotional characteristics when comparing fall to spring scores of single-year participants and multiple-year participants regardless of age, with greater gains favoring multiple-year participants.

## Chapter 2

### METHODS

#### Study Design and Procedure

The current study examined language and social-emotional assessment scores attained by children who entered the Educare program at age three or four and attended the program for one or two years since Educare Lincoln's inception in 2013. Parents of participants signed consent forms prior to program enrollment that permitted their child's assessment scores to be aggregated at the Frank Porter Graham Child Development Institute (FPG), University of North Carolina, and later accessed for analyses. Consent was obtained by FES's who explained that each child's assessment data would be used to track individual, classroom, and program progress. Data were collected for purposes of fall to spring Educare evaluation and were utilized in secondary analyses for the current study. Assessments were completed in the fall and spring of each year in attendance.

#### Participants

Participants included 229 three- and four-year-old prekindergarten children divided into two separate cohorts based upon time in care. The single-year cohort (Group 1) consisted of 128 children and was comprised of 75 (59%) males and 53 (41%) females (mean age= 56.89 months;  $SD=6.86$ ). The two-year cohort (Group 2) consisted of 101 children and was comprised of 57 (56%) males and 44 (44%) females (mean age= 56.34 months;  $SD = 7.10$ ). The total sample included 132 (57.64%) males and 97 (42.36) females. Mean ages at enrollment were 47.34 months ( $SD = 13.12$ ) for Group 1 and 38.76 months ( $SD = 12.02$ ) for Group 2. Children who failed to meet cohort inclusion criteria (i.e., enrolled less than two semesters) were excluded from analyses. The

demographic information for the entire sample is provided in Table 1. Ethnic groups represented in the sample included African American ( $N = 62$ ), White/Hispanic/Latino ( $N = 51$ ), White, Non-Hispanic/Non-Latino ( $N = 75$ ), Mixed ( $n = 29$ ), and Other/Unspecified ( $N = 12$ ). The most represented ethnic group was White/Non-Hispanic/Non-Latino, comprising approximately 33% of the sample.

Participants were enrolled in the Educare program, a full-day, full-year early childhood program that serves low-income children ages six weeks to five years who predominantly come from minority backgrounds and whose families reported high levels of stress and very few resources (Stein et al., 2016). Preschool Educare classrooms maintained low staff-child ratios (3:18) which allowed for stronger teacher-child attachment relationships, frequent one-on-one interactions, and less stress in the classroom, which contributed to a positive learning climate. Daily activities focused on child interests and took place inside and outside. Educare preschool classrooms were evaluated for quality of environment in the fall and spring of each year using the ECERS-R and Version 3 (ECERS-3; Harms, Clifford, & Cryer, 2014). Quality of teacher-child interactions were assessed in the fall and spring of each year using the Classroom Assessment Scoring System-Pre-K (CLASS-Pre-K; La Paro, Pianta, Stuhlman, & Hamre, 2002).

Educare classrooms were literacy-rich with a variety of diverse and appropriate books made available every day, large-print and multilingual labels on furniture and materials, and teachers who rephrased and extended child sentences and thoughts to promote language and prosocial skills through scaffolding and stimulation. Each classroom maintained a variety of stimulating materials (e.g., fine-motor manipulatives,

blocks and cars, dramatic play areas, sand and water tables) that were available most of each day. Childcare routines were implemented with the goal of promoting child autonomy.

## **Measures**

### **Language assessments were completed by graduate research assistants.**

PPVT-IV and Preschool Language Scales-Fifth Edition (PLS-5; Zimmerman, Steiner, & Pond, 2011) assessments were completed by graduate research assistants who tested by FPG as reliable in implementing the measures. Scores from each assessment were entered into the FPG database immediately following administration. DECA Preschool Version 2 (DECA-P2) (LeBuffe & Naglieri, 1999) forms were completed by the participants' respective teachers and scored by graduate research assistants. Each scored DECA-P2 form was reviewed for accuracy by a peer graduate research assistant before it was entered into the FPG database.

**Receptive language skills.** The PPVT-IV was used to assess children's English receptive language skills during the fall and spring of each year in attendance. Researchers assessed each child's receptive language vocabulary by calling out a word while presenting a series of pictures and asking him or her to point to the picture that best represented the word. The PPVT-IV was developed to assess receptive language skills in children as young as 2.5 years old and had internal consistency reliability coefficients of  $\alpha=.95$  to  $.97$  for two to six-year-olds. Test-retest reliabilities were also strong ( $\alpha=.91$  to  $.94$ ) (Dunn & Dunn, 2007). The ELN selected the PPVT-IV to assess monolingual English-speaking children and ELLs due to the fact that the combination of language assessment measures (i.e., the PPVT-IV and Spanish PLS-5) provided a depiction of the

children's language skills in both English and Spanish (Raikes et al., 2017). This is a normalized standard score with a mean of 100 and a standard deviation of 15.

**Auditory comprehension language skills.** Children were assessed on auditory comprehension language skills during the fall and spring of each year in attendance. Monolingual English-speaking children were assessed using the PLS-5 and Spanish-speaking ELLs were assessed using the Spanish PLS-5 (Zimmerman, Steiner, & Pond, 2011). Researchers assessed each child's auditory comprehension skills by providing specific descriptive details and asking the child to point to the picture that most accurately depicted those details (e.g., Can you show me the small black dog? Can you show me the large brown dog?). The PLS-5 was developed to assess auditory comprehension language skills in children ages three to seven years 11 months. Test-retest reliabilities were  $\alpha=.97$  to  $.98$  and the internal consistency reliability coefficient was  $\alpha=.97$  (Zimmerman, Steiner, & Pond, 2011). The T scores were used in comparison analyses for this measure to standardize and compare assessment scores.

**Social-emotional characteristics.** Children's social-emotional characteristics were assessed using the DECA-P2 during the fall and spring of each year in attendance. The DECA-P2 was developed to assess children's behavioral risks and protective factors (i.e., attachment, self-control, initiative) in order to (a) estimate a child's overall social-emotional strengths and needs; (b) generate classroom profiles in order to promote a healthy learning climate; and (c) identify children in need of behavioral intervention before serious behavioral disorders form (Brinkman, Wigent, Tomac, Pham, & Carlson, 2007; LeBuffe & Naglieri, 1999). Prior to completing the assessment, teachers who were familiar with the students were instructed to reflect on the child's behavior during the

previous four weeks leading up to the DECA-P2 completion. The DECA-P2 utilizes scale scores for Initiative, Self-Regulation, and Attachment/Relationships that sum to create the Total Protective Factors (TPF) score. T-score means are 49.9, 50.0, and 49.9 with standard deviations of 9.9, 10.0, and 9.9, respectively. Behavioral Concerns is the final item on the assessment with a mean t-score of 50.0 and a standard deviation of 9.9. (LeBuffe, & Naglieri, 1999). The T scores were used in comparison analyses for this measure to standardize and compare assessment scores.

**Demographic information.** During the fall of program enrollment, parents completed a questionnaire as part of their interview with the Educare Family Engagement Specialist. The questionnaire included demographic information, such as child's ethnicity, gender, age, and primary spoken language, and responses were entered into the FPG database.

**Analysis plan.** All analyses were performed using the Statistical Package for the Social Sciences, Version 24 (SPSS) software. Prior to initial analyses, a new variable was created—*time code*—to categorize participants by program dosage and to sort them into the appropriate cohort (i.e., 0-1 year = Group 1; more than 1 year = Group 2). The data set was constructed based on expected child age at the onset of a school year, assessment, and semester (i.e., fall or spring). The current study used assessment scores attained one year preceding entering pre-kindergarten (i.e., children who were typically 36 months at the beginning of the school year) and pre-kindergarten year scores (i.e., children who were typically 48 months at the beginning of the school year). Paired samples t-tests were used to analyze children who had no missing assessment scores in order to calculate change scores for matched participants in both dosage groups. Secondary analyses were

conducted to determine whether fall-to-spring change scores within each dosage group differed between ages using paired samples t-tests analyzing 36- and 48-month-olds separately in their respective cohort.

## Chapter 3

### RESULTS

#### Analyses

Descriptive statistics were calculated for each assessment variable (see Tables 2-5). Descriptive increases were observed across most assessments for children who attended one year of Educare (i.e., Group 1) and children who attended more than one year of Educare (i.e., Group 2), though only two were significant.

#### **Research Question 1: Does attending the Educare program affect children's language skills as measured by fall to spring growth in a single year?**

*Overall.* For the entire sample, PPVT-IV scores did not significantly increase from fall to spring. Considering each group separately, monolingual English-speaking children's PPVT-IV scores increased but did not change significantly from fall to spring in a single year,  $t(56) = 1.736$ ,  $p = .088$ , although there was a trend effect. Spanish-speaking ELLs' PPVT-IV scores increased, but not significantly,  $t(12) = .095$ ,  $p = .926$ . PLS-5 scores did not change significantly from fall to spring in a single year,  $t(23) = 1.458$ ,  $p = .158$ . Spanish PLS-5 change scores could not be computed because there were no valid pairs.

*Separate analyses of 36-month and 48-month-olds' fall-to-spring change.* PPVT-IV scores for children who entered the program at 36 months ( $n=5$ ) decreased but did not change significantly from fall to spring,  $t(4) = .379$ ,  $p = .724$ . PPVT-IV scores for children who entered the program at 48 months increased, but did not change significantly from fall to spring,  $t(45) = 1.208$ ,  $p = .233$ . PPVT-IV scores for Spanish-speaking ELLs who entered the program at 36 months could not be computed because

there were no valid pairs. PPVT-IV scores for Spanish-speaking ELLs who entered the program at 48 months increased, but did not change significantly from fall to spring,  $t(18) = 1.071$ ,  $p = .298$ . PLS-5 scores for English-speaking children who entered the program at 36 months increased, but did not change significantly from fall to spring,  $t(1) = 4.00$ ,  $p = .156$ . PLS-5 scores for English-speaking children who entered the program at 48 months increased, but did not change significantly from fall to spring,  $t(19) = .890$ ,  $p = .385$ . (See Tables 4 & 5).

**Research Question 2: For children who have been in Educare for more than one year, does attending the Educare program affect children’s language skills by fall to spring growth in a single year?**

*Overall.* PPVT-IV scores for monolingual English-speaking children increased significantly from fall to spring during the second year of attendance,  $t(103) = 2.907$ ,  $p < .005$ . PPVT-IV scores for Spanish-speaking ELLs increased, but did not change significantly from fall to spring,  $t(29) = 1.862$ ,  $p = .073$ , although there was a trend effect. PLS-5 scores for English-speaking children increased, but did not change significantly from fall to spring during the second year of attendance,  $t(67) = .049$ ,  $p = .961$ . Spanish PLS-5 scores decreased, but did not change significantly from fall to spring during the second year of attendance,  $t(4) = 2.658$ ,  $p = .057$ , though these scores were negatively trending. It is important to note that the ELL sample size for this measure was extremely small ( $n=5$ ).

*Separate analyses of 36-month and 48-month-olds’ fall-to-spring change scores.* PPVT-IV scores for children who entered their second year of the program at 36 months increased, but did not change significantly from fall to spring,  $t(47) = .956$ ,  $p = .344$ .

PPVT-IV scores for children who entered their second year of the program at 48 months increased but did not change significantly,  $t(47) = 1.433$ ,  $p = .158$ . PPVT-IV scores for Spanish-speaking ELLs who entered their second year of the program at 36 months increased, but did not change significantly from fall to spring,  $t(15) = 1.086$ ,  $p = .295$ . PPVT-IV scores for Spanish-speaking ELLs who entered their second year of the program at 48 months did not change significantly,  $t(13) = 1.817$ ,  $p = .092$ , although there was a trend effect. PLS-5 scores for English-speaking children who entered their second year in the program at 36 months increased, but did not change significantly from fall to spring,  $t(17) = 1.314$ ,  $p = .206$ . PLS-5 scores for English-speaking children who entered their second year of the program at 48 months decreased, but did not change significantly from fall to spring,  $t(49) = .781$ ,  $p = .439$ . Spanish PLS-5 scores for children who entered their second year of the program at 36 months decreased, but did not significantly change from fall to spring,  $t(2) = 1.964$ ,  $p = .188$ . Spanish PLS-5 fall-to-spring change scores for children who entered their second year of the program at 48 months significantly decreased,  $t(1) = 27.00$ ,  $p < .05$ , however the sample size was extremely small and may not represent generalizable growth for Spanish-speaking ELLs in the Educare program. (See Tables 4 & 5).

**Research Question 3: Does attending Educare affect children’s language development differentially for ELLs and non-ELLs?**

ELL sample sizes were so small and ELL/English-speaking numbers were so imbalanced that statistical analyses were inappropriate. By visually observing mean differences derived using paired samples of assessment scores between both dosage

groups, I found descriptive differences in fall-to-spring patterns of change. (See Tables 2-5).

*Overall differences in PPVT-IV scores.* Group 1 Spanish-speaking ELLs' PPVT-IV fall scores ( $M = 93.00$ ,  $SD = 9.68$ ) and spring scores ( $M = 96.85$ ,  $SD = 8.81$ ) demonstrated more than three points of growth while Group 1 monolingual English-speaking children's PPVT-IV fall scores ( $M = 97.19$ ,  $SD = 15.40$ ) and spring scores ( $M = 98.74$ ,  $SD = 13.26$ ) demonstrated slightly more than one point of growth. Group 2 Spanish-speaking ELLs' PPVT-IV fall scores ( $M = 88.30$ ,  $SD = 12.39$ ) and spring scores ( $M = 91.97$ ,  $SD = 14.44$ ) demonstrated more than three points of growth while Group 2 monolingual English-speaking children's PPVT-IV fall scores ( $M = 100.00$ ,  $SD = 15.75$ ) and spring scores ( $M = 101.61$ ,  $SD = 14.65$ ) demonstrated slightly more than one point of growth.

*Separate analyses of 36-month and 48-month-olds' fall-to-spring PPVT-IV change scores.* There were too few 36-month-old ELL PPVT-IV scores to compare in Group 1. Group 2 36-month-old ELL PPVT-IV fall scores ( $M = 86.50$ ,  $SD = 13.69$ ) and spring scores ( $M = 90.06$ ,  $SD = 17.23$ ) demonstrated more than three points of difference while Group 2 36-month-old monolingual English-speaking children's PPVT-IV fall scores ( $M = 99.13$ ,  $SD = 16.56$ ) and spring scores ( $M = 100.69$ ,  $SD = 15.83$ ) demonstrated less than two points of difference. Group 1 48-month-old ELL PPVT-IV fall scores ( $M = 94.26$ ,  $SD = 13.37$ ) and spring scores ( $M = 97.58$ ,  $SD = 13.53$ ) demonstrated more than three points of difference while Group 1 48-month-old monolingual English-speaking children's PPVT-IV fall scores ( $M = 96.57$ ,  $SD = 15.02$ ) and spring scores ( $M = 98.37$ ,  $SD = 11.38$ ) demonstrated less than two points of difference. Group 2 48-month-old ELL

PPVT-IV fall scores ( $M = 90.36$ ,  $SD = 10.86$ ) and spring scores ( $M = 94.14$ ,  $SD = 10.63$ ) yielded over three points of difference while Group 2 48-month-old monolingual English-speaking children's PPVT-IV fall scores ( $M = 100.88$ ,  $SD = 15.02$ ) and spring scores ( $M = 102.54$ ,  $SD = 13.46$ ) demonstrated more than one point of difference.

*Overall differences in PLS scores.* Group 1 Spanish PLS-5 fall scores ( $M = 93.67$ ,  $SD = 11.02$ ) and spring scores ( $M = 94.67$ ,  $SD = 12.06$ ) demonstrated a one-point increase while monolingual English-speaking children's PLS-5 fall scores ( $M = 96.96$ ,  $SD = 14.97$ ) and spring scores ( $M = 94.38$ ,  $SD = 14.55$ ) demonstrated more than 2 points of decrease. Group 2 Spanish PLS-5 fall scores ( $M = 93.40$ ,  $SD = 8.44$ ) and spring scores ( $M = 86.20$ ,  $SD = 10.16$ ) demonstrated more than a seven-point decrease while Group 2 monolingual English-speaking children's PLS-5 fall scores ( $M = 96.13$ ,  $SD = 15.18$ ) and spring scores ( $M = 96.54$ ,  $SD = 13.25$ ) demonstrated less than one point of growth.

*Separate analyses of 36-month and 48-month-olds' fall-to-spring PLS change scores.* There were no available paired Spanish PLS-5 scores for 36-month-old children in either dosage group. Group 1 48-month-old Spanish PLS-5 fall scores ( $M = 90.33$ ,  $SD = 10.03$ ) and spring scores ( $M = 94.67$ ,  $SD = 12.06$ ) demonstrated a difference greater than four points as did Group 1 monolingual English-speaking children's PLS-5 fall scores ( $M = 91.32$ ,  $SD = 14.01$ ) and spring scores ( $M = 95.50$ ,  $SD = 13.87$ ). Group 2 48-month-old Spanish PLS-5 fall scores ( $M = 93.00$ ,  $SD = 14.14$ ) and spring scores ( $M = 79.50$ ,  $SD = 13.44$ ) demonstrated a negative difference of over 13 points while Group 2 48-month-old monolingual English-speaking children's PLS-5 fall scores ( $M = 97.44$ ,  $SD = 14.98$ ) and spring scores ( $M = 96.38$ ,  $SD = 12.67$ ) demonstrated a slight decrease of one point.

**Research Question 4: Does attending the Educare program affect one-year dosage children's social-emotional characteristics as measured by fall to spring growth in a single year?**

*Overall.* Results from paired samples t-tests showed there were no significant differences between fall and spring assessment scores for either DECA-P2 dimension in Group 1. TPF increased, but scores did not change significantly from fall to spring in a single year,  $t(28) = 1.148$ ,  $p = .261$ . Behavioral Concerns scores increased, but did not change significantly from fall to spring in a single year,  $t(28) = 3.862$ ,  $p = .825$ .

*Change in 36-month and 48-month-olds' fall-to-spring scores.* TPF scores for children who entered the program at 36 months increased, but did not change significantly from fall to spring for TPF,  $t(1) = 5.667$ ,  $p = .111$  while Behavioral Concerns decreased, but did not change significantly,  $t(1) = 1.286$ ,  $p = .421$ . Scores for children who entered the program at 48 months increased, but did not change significantly from fall to spring for TPF,  $t(26) = .804$ ,  $p = .429$ , or Behavioral Concerns,  $t(26) = .412$ ,  $p = .684$ .

**Research Question 5: Does a higher dose of Educare attendance improve children's social-emotional development from fall to spring in a single year?**

*Overall.* Results from paired samples t-tests showed there were no significant differences between fall and spring assessment scores for either DECA-P2 dimension in Group 2. TPF scores increased but did not change significantly from fall to spring during their additional year of attendance,  $t(83) = 1.732$ ,  $p = .087$ , although there was a trend effect. Behavioral Concerns scores increased, but did not change significantly from fall to spring during their additional year of attendance,  $t(83) = .083$ ,  $p = .934$ .

*Change in 36-month and 48-month-olds' fall-to-spring scores.* Findings from paired samples t-tests showed mixed results between fall and spring assessment scores for the DECA-P2 dimensions in Group 2 when 36- and 48-month-old children were analyzed separately. TPF scores for children who entered their second year of the program at 36 months increased, but did not significantly change from fall to spring,  $t(20) = 2.625$ ,  $p = .817$ . Behavioral Concerns scores for children who entered their second year of the program at 36 months increased, but did not significantly change from fall to spring,  $t(20) = 1.731$ ,  $p = .099$ , although there was a trend effect. TPF Scores for children who entered their second year of the program at 48 months increased significantly from fall to spring,  $t(62) = 2.087$ ,  $p < .05$ . Behavioral Concerns scores for children who entered their second year of the program at 48 months decreased, but was not significant,  $t(62) = 1.607$ ,  $p = .113$ .

### **Summary**

*Language assessments summary.* Monolingual English-speaking children's PPVT-IV scores increased in both dosage groups when analyzed together (i.e., all children in each group) and separately, (i.e. 36- and 48-month-old independently). Significant fall-to-spring PPVT-IV change-score increases were observed for Group 2 with a trend effect for Group 1. Small-sample ELL children's English PPVT-IV scores descriptively were observed to increase about 3 points a year, but only reached a trend effect for Group 2. Spanish PLS-5 fall-to-spring scores trended negatively for 36-month-old Spanish-speaking ELLs in Group 2, with the largest decreases in scores observed for 48-month-old children (decrease of 13.5 points from fall to spring), a difference that was significant but with an extremely small sample size.

*Social-emotional assessment summary.* DECA-P2 TPF scores reached a positive trend effect for children in Group 2 when analyzed together (i.e., all children in the group) with a significant increase demonstrated by 48-month-old children when analyzed separately (i.e. 36- and 48-month-old independently). Behavioral Concerns scores—which were hypothesized to decrease from fall-to-spring—reached a positive trend effect for 36-month-olds in Group 2.

## Chapter 4

### DISCUSSION

This study examined fall-to-spring receptive language, comprehension language and social-emotional skills change scores in a low-income population of 36- and 48-month-olds in one- and two-year-Educare attendance cohorts. The current study compared test scores from the PPVT-IV, PLS-5, Spanish PLS-5, and DECA-P2 assessments from fall to spring for both cohorts to quantify changes associated with program dosage. For the focus of clarity, this discussion will focus on significant changes and trending patterns of change. Nonsignificant findings will not be discussed except to the extent they augment significant or trending findings. Results lent themselves to discussion in the following manner: (a) language growth for monolingual English-speaking children, (b) progress in language for Spanish-speaking ELLs, and (c) change in social-emotional characteristics. Addressed research questions will be noted in parentheses.

#### **Language Growth for Monolingual English-Speaking Children (Research Questions One and Two)**

Analyses revealed that PPVT-IV change scores for monolingual English-speaking children in Group 1 (one year Educare enrollment) reached a positive trend effect. This is important to note as PPVT-IV change scores for Group 2 (two year Educare enrollment) significantly differed from fall to spring. These patterns of change suggest that language growth begins in year one and increasingly builds with dosage as evident by the higher spring scores for Group 2. Along the same lines, but not as great in magnitude as for previous studies, these findings support previous studies which reported significant

increases in receptive vocabulary associated with extended high-quality ECE program dosage (Wen et al., 2011) and positive associations between time in the Educare program and significant increases in language outcomes (Yazejian et al., 2015) consistent with Hypotheses 1 and 2. However, as significant increases were not achieved in both language measures for monolingual English-speaking children in both dosage groups, results only partially supported Hypotheses 1 and 2.

**Progress in language for Spanish-speaking ELLs (Research Questions one, two, and three).** Despite the fact that the Spanish-speaking ELL sample was small, there was still observed growth in receptive English language skills. Analyses revealed that PPVT-IV change scores for Spanish-speaking ELLs in Group 2 reached a positive trend effect. Descriptively, Spanish-speaking ELLs in both dosage groups increased their fall-to-spring PPVT-IV scores at a higher rate (i.e., three points of gain compared to one point) than their monolingual English-speaking peers consistent with Hypothesis 3. It appears that as Group 2 Spanish-speaking ELLs' fall and spring PPVT-IV scores are lower than their monolingual English-speaking peers' scores, it may be possible that they are learning English skills at greater rates because they have the largest deficit of English skills when entering the program. PPVT-IV change scores for Spanish-speaking ELLs—descriptively for three-year olds and a trend effect for 48-month-olds—further support Hypothesis 3 consistent with findings from previous studies (e.g., Laosa & Ainsworth, 2007; Raikes et al., 2017) reporting that ELL children grow in English (and here the growth was associated with two or more years of Educare) and ELLs who attended high-quality preschool demonstrated greater cognitive gains than non-Hispanic White or

African-American peers with similar backgrounds. However, small sample sizes precluded drawing definitive support of the hypotheses.

ELLs' PLS-5 results in Spanish were interesting because they decreased as English language skills increased. There was a negative trend effect for 36-month-olds in Group 2 and a significant decrease in scores for 48-month-olds in Group 2. In conjunction with positive trend effects observed in PPVT-IV scores, results suggest that as Spanish-speaking ELLs build English language skills, there is a possible loss or stagnation of first language abilities. During a review of these results with current Master Teachers and program administrators of Educare-Lincoln, it was reported that many families of ELLs stop speaking or otherwise using their first language in the home in hopes that their child(ren) will learn English more proficiently. This study did not assess language use in the home and it is possible that parents are reporting English as their primarily spoken language to achieve social desirability (i.e., parents may believe that reporting English use in the home as a sole means of verbal communication is more desirable to the program staff). On the other hand, some other studies have reported children's first language abilities to drop over time when English is increasing (e.g., Paradis, Emmerzael, & Duncan, 2010), so Educare will do well to be mindful of how they are supporting first language development. Generalization of these results is limited due to the smaller number of ELLs in the program.

*Change in social-emotional characteristics (Research Question five).* Overall, Group 2 exhibited a positive trend effect in TPF scores and 48-month-olds' TPF scores significantly increased. A positive trend was also observed in 36-month-olds' BC scores. These results—although positive for TPF growth—only provide partial support for

Hypotheses 4 or 5. It is possible that the transition from a toddler classroom—with eight children and three teachers—to a pre-kindergarten classroom—with 17 children and three teachers—impacts 36-month-olds in a way that increases behavioral problems. It may serve teachers well to more closely monitor 36-month-olds during this transition period as they move into a more populous classroom environment. These mixed results partially align with previous studies which presented evidence that suggested significantly increased prosocial behavior and decreased problematic behavior that corresponded with extended time in care (i.e., dosage) (Ansari & Winsler, 2014; Love et al., 2003; Wen et al., 2012; Yazejian et al., 2015). A component of the Educare program that may be crucial to a child's (and family's) success is family engagement. As a significant result and all trend effects were found in Group 2 scores, it is possible that it takes longer than one year to facilitate family-level change by way of providing family support and resources and building strong parent-program relationships.

### **Discussion Summary**

With positive overall results in PPVT-IV and TPF scores for children in both Group 1 and Group 2, it seems that Educare-Lincoln is positively facilitating aspects of English language and social-emotional growth for monolingual English-speaking children and Spanish-speaking ELLs. However, negative trends in PLS-5 scores and positive trends in BC scores indicate that there may be aspects of the program that need to be addressed to ensure best possible outcomes for children. Unstable early childcare facility staffing is a problem that affects many programs greatly, regardless of quality (Whitebook, Sakai, Gerber, & Howes, 2001). Research has shown that classroom quality is negatively affected by teacher turnover in the form of lower environmental rating

scales scores, increases in behavioral distress among the children attributed to the discontinuity of care, and disruption of instruction and routines (Cassidy, Lower, Kintner-Duffy, Hegde, & Shim, 2011). Therefore, staff turnover may be a reasonable explanation for non-significant differences across language and social-emotional measures between cohorts. It is also possible that over a prolonged period of stable staffing, current positive trends (e.g., PPVT-IV scores for ELLs, TPF scores for both dosage groups) may be more pronounced.

### **Limitations and Future Directions**

This study contained several limitations that should be considered prior to planning further studies. First, the sample size in this study was small with unequal cohort sizes. Sample size for the ELL group was particularly small. With smaller sample sizes, the capability of demonstrating significance with the analyses was limited. Follow-up studies should use larger sample sizes with, optimally, equally-sized cohort groups. Larger groups could provide the power to facilitate additional analyses using various statistical models that this sample size could not support.

Second, this study used aggregate data collected at various time points from 2013 to 2016 and placed children into the two cohorts based on total time in care irrespective of year or program changes (e.g., director turnover, teacher turnover, changing assessors). A future study would benefit from a common beginning and end point and controlling for program changes.

Third, this study did not account for child attendance (i.e., the number possible days attended). It is possible that some of the children in the program were frequently absent and missed crucial teacher and peer interactions and hindered analyses from

supporting the hypotheses. Future studies should examine time in care based on actual days attended rather than only accounting for corresponding fall and spring assessments to determine dosage.

Fourth, the current study relied on Spanish PLS-5 and PPVT-IV results to track changes in language development for ELLs, but Spanish is not the only language spoken by this sample's families, excluding many children from this study. As Nebraska resettled more refugees per capita than any other state in 2016 and Lincoln becoming home to nearly half of them (Nohr, 2016), many Educare families speak Arabic, Kurdish, and African languages that previous assessments were not designed to measure. As cultural diversity continues to flourish, it may be necessary to explore alternative assessments and methods of assessing non-Hispanic ELLs which comprised a large number of Educare-Lincoln's ELL population.

### **Contributions of the Study**

With the greatest trends in change favoring children who attended the program for two years—both English language for English-speaking children and ELLs and TPF—results suggested that the amount of time in care played a critical role in the program's impact on development, which corresponds with findings supporting dosage's impact from previous studies (e.g., Frisvold & Lumeng, 2011; Lee, 2011; Loeb et al., 2007; Love et al., 2003). However, the Educare program may be associated with decreasing Spanish language skills in ELLs as suggested despite the concurrent increase in English assessment scores and decrease in Spanish assessment scores. Reporting varied results in fall-to-spring growth in both language and social-emotional dimensions in both dosage groups, this study provides evidence that the Educare program can support low-income

children in increasing English receptive language skills and promote resilience as evident by PPVT-IV and DECA-P2 change scores, respectively.

### **Implications for Practice**

Educare teachers and administration should continue to work closely with the LEP team to monitor language and social-emotional growth on individual and classroom levels, particularly 36-month-old classrooms where it seems the program is least effective. With each round of assessments, it is encouraged to review results that should influence teacher planning and practice. Research suggests that the ideal pathway to learning is by using differentiated instruction that is most appropriate for the targeted children. This developmentally appropriate practice involves assessing developmental capabilities and needs of children, tailoring activities around those areas, and scaffolding children to complete a task in a way that most relates to them (Copple & Bredekamp, 2009).

Another consideration for practice is to take stock in teacher and administration satisfaction both during and after employment. Whitebook et al. (2001) presented findings that suggested that teacher and director turnover contributed to center instability in programs of both high and low standards of quality. It is suggested that Educare examines annual turnover and provides exit interviews for outgoing teachers to qualitatively indicate reasons for turnover. As it is possible that the current study's sample—which captured three school years of children—was negatively affected by teacher and director turnover, it should be taken into account when reviewing annual child growth on a program level.

Along with considering staff satisfaction, it is also suggested that Educare teachers are continually provided with additional professional development and continued follow-up support from their assigned Master Teachers to ensure they are adequately trained to provide high-quality care to children with compounded risk factors. Sheridan and colleagues (2009) proposed that unsupported continuing education may not be enough to improve teacher efficacy, but rather transferring training to practice requires supportive efforts on the program's behalf.

As suggested by Spanish PLS-5 scores decreasing while English PPVT-IV increase with dosage, Spanish-speaking ELLs seem to be losing first language skills while concurrently building English language skills. It is suggested that Educare teachers and Family Engagement Specialists intensively work with families to encourage first language use in the home. Maintaining and increasing first language skills requires regular use and may be better facilitated with positive parental attitudes toward its development (Guardado, 2002).

While spending large portions of the day in a material-rich and exciting learning environment may provide opportunities for children to play, learn, and explore, it is necessary for optimal development that children are cared for and stimulated in a consistent manner by well trained teachers who connect with them. The Educare program operates to effectively support children and their families by providing language-rich environments and prosocial modelling and instruction in the classroom, and resource support (e.g., assistance finding a job for unemployed parents) in the home. Moving forward, the Educare and LEP teams should continue to strengthen their partnerships for the benefit of the children and their families, the staff, and the program.

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Table 1

*Participant Demographics*

	One-Year Dosage Group ( <i>n</i> = 128) <i>n</i> (%)	Two-Year Dosage Group ( <i>n</i> = 101) <i>n</i> (%)	Total ( <i>N</i> = 229) <i>N</i> (%)
African American	31 (24.20)	31 (30.70)	62 (27.07)
White/Hispanic/Latino	32 (25.00)	19 (18.81)	51 (22.27)
White/Non-Hispanic/ Non-Latino	42 (32.8)	33 (32.67)	75 (32.76)
Mixed	16 (12.5)	13 (12.87)	29 (12.66)
Other/Unspecified	7 (5.5)	5 (4.95)	12 (5.24)
Gender			
Male	75 (59)	57 (56)	132 (57.64)
Female	53 (41)	44 (44)	97 (42.36)

Table 2

*Group 1 Three-Year Old Paired Samples Changes in Fall to Spring Growth*

Measure Item	n	Fall	Spring	Mean Difference
		M (SD)	M (SD)	
Peabody Picture Vocabulary Test (PPVT-IV)	5	103.20 (14.96)	101.60 (20.12)	1.6
PPVT-IV (ELLs)	0	N/A	N/A	N/A
Preschool Language Scale (PLS-5 English)	2	101.50 (24.750)	109.50 (21.92)	8.00
PLS-5 Spanish	0	0	0	0
Devereaux Early Childhood Assessment (DECA-P2) Total Protective Factors (TPF)	2	33.50 (.707)	42.00 (1.41)	8.5
DECA-P2 Behavioral Concerns	2	61.00 (4.24)	56.50 (9.19)	4.5

Table 3

*Group 1 Four-Year Old Paired Samples Changes in Fall to Spring Growth*

Measure Item	n	Fall	Spring	Mean Difference
		M (SD)	M (SD)	
Peabody Picture Vocabulary Test (PPVT-IV)	46	96.57 (15.02)	98.37 (11.38)	1.80
PPVT-IV (ELLs)	19	94.26 (13.37)	97.58 (13.53)	3.32
Preschool Language Scale (PLS-5 English)	22	93.73 (14.05)	95.82 (14.36)	2.09
PLS-5 Spanish	3	93.67 (11.02)	94.67 (12.06)	1.00
Devereaux Early Childhood Assessment (DECA-P2) Total Protective Factors (TPF)	27	48.30 (7.67)	49.67 (9.17)	1.37
DECA-P2 Behavioral Concerns	27	51.81 (9.90)	52.56 (9.76)	0.75

Table 4

*Group 2 Three-Year Old Paired Samples Changes in Fall to Spring Growth*

Measure Item	n	Fall	Spring	Mean Difference
Peabody Picture Vocabulary Test (PPVT-IV)	48	99.13 (16.56)	100.69 (15.83)	1.56
PPVT-IV (ELLs)	16	86.50 (13.69)	90.06 (17.23)	3.56
Preschool Language Scale (PLS-5 English)	18	93.50 (14.37)	96.67 (14.28)	3.17
PLS-5 Spanish	3	93.67 (6.50)	90.67 (6.43)	3.00
Devereaux Early Childhood Assessment (DECA-P2) Total	21	45.52 (8.09)	45.86 (7.55)	0.34
Protective Factors (TPF)				
DECA-P2 Behavioral Concerns	21	52.90 (7.78)	56.48 (8.87)	3.58

Table 5

*Group 2 Four-Year Old Paired Samples Changes in Fall to Spring Growth*

Measure Item	n	Fall	Spring	Mean Difference
		M (SD)	M (SD)	
Peabody Picture Vocabulary Test (PPVT-IV)	48	100.88 (15.02)	102.54 (13.46)	1.66
PPVT-IV (ELLs)	14	90.36 (10.86)	94.14 (10.63)	3.78
Preschool Language Scale (PLS-5 English)	50	97.44 (14.98)	96.38 (12.67)	1.06
PLS-5 Spanish	2	93.00 (14.14)	79.50 (13.44)	13.50
Devereaux Early Childhood Assessment (DECA-P2) Total Protective Factors (TPF)	63	47.71(9.65)	49.57 (9.11)	1.86
DECA-P2 Behavioral Concerns	63	52.75 (9.15)	51.67 (10.69)	1.08