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EVALUATING QUALITY IN FAMILY CHILD CARE:

A study of quality and child outcomes in All Our Kin

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Executive Summary

Family child care is one of the most common arrangements for young children from birth to age five and not yet in kindergarten in the United States (NSECE, 2016). In 2012, approximately one million providers, who were paid for child care in their homes, were regularly caring for three million children aged birth through five (NSECE, 2016). Many of these children were infants and toddlers, the vast majority of whom lived in poor or low-income families (NSECE, 2016).

Young children living in poverty, experiencing toxic stress, or being raised by parents with low levels of education are at risk for entering kindergarten not ready to learn. They are likely to be behind their peers, and often may not catch up by sixth grade, or even high school (Duncan & Magnuson, 2011; Heckman, 2008). High-quality child care can make a difference, improving children's cognitive and social-emotional developmental outcomes (Burchinal, Campbell, Byrant, Wasik, & Ramey; 1997; Burchinal, Roberts, Nabors, & Bryant, 1996; NICHD, 2006; The Cost and Quality Team, 1995).

All Our Kin (AOK) aims to improve outcomes for children, families, and child care providers. AOK's primary goals are to improve the quality of family child care, to help family child care providers become economically self-sufficient, and to enhance the outcomes for children in family child care settings. A nationally-recognized model, AOK uses a "high touch" approach to create a continuum of services that extends from helping family, friend and neighbor caregivers become licensed and providing support for newly licensed providers to enhancing professional development and education for experienced family child care providers. The centerpiece of AOK's model is its family child care network, which offers a range of services including intensive coaching, workshop series, Child Development Associate courses and scholarships, monthly network meetings, and an annual conference.

In 2014, AOK began a two-year study to examine the quality of care that its family child care network providers offered to children and the outcomes of children for whom they provided care. The first phase of the study focused on assessments of observed child care, using a quasi-experimental design with a sample of 28 AOK network members and a comparison group of 20 family child care providers who had no prior contact with AOK. Study measures included the Family Child Care Environment Rating Scale-Revised (FCCERS-R: Harms, Cryer & Clifford, 2007), an observation measure of the global quality of the environment, and the Parenting Interactions with Children Checklist of Observations Linked to Outcomes (PICCOLO*:* Roggman, Cook, Innocenti, Norman, & Christiansen, 2013), an observation measure of adult-child interactions.

The Phase One results found that AOK family child care network providers had significantly higher quality than the comparison group child care providers (Porter & Reiman, 2015). The AOK providers' FCCERS-R global child care quality was close to "good," compared to the almost "minimal" global quality of the comparison group providers. AOK providers also had significantly higher scores on the PICCOLO than the comparison group providers. On both measures, effect sizes were large. The findings suggested that the AOK model has significant potential for improving family child care quality.

This report presents the results of the Phase Two study, which was conducted seven months after the Phase One data collection was completed. It sought to examine how children who were enrolled with AOK family child care network providers fared compared to the children who were enrolled with the comparison group providers. The child sample consisted of 90 children between the ages of two and five: 62 children who were enrolled with 23 of the AOK providers from the Phase One sample, and 28 children who were enrolled with 10 of the Phase One comparison group sample. The child assessment measures included three Woodcock-Johnson III Tests of Achievement (WJ III: Woodcock, McGrew, & Mather, 2001) and the Devereux Early Childhood Assessment (DECA: LeBuffe & Naglieri, 1999). The WJ III tests of Understanding Directions (receptive language and listening comprehension), Picture Vocabulary (expressive language) and Applied Problems (math reasoning and calculation) were used because they correspond most closely with AOK's focus on enhancing language and math skills. The choice of the DECA, a measure that assesses protective factors of attachment, self-regulation, and initiative was based on AOK's emphasis on social-emotional development. In addition, a paper and pencil survey was distributed to the children's parents to collect data on family and child characteristics that may be related to child outcomes.

The study findings indicate that AOK children performed significantly better than the comparison group children on the two language assessments and that the AOK children's scores for math skills were higher than those for the comparison group children. In addition, significant percentages of AOK children had scores higher than the national norms on the language and math assessments. Close to 9 in 10 AOK children scored above the norm on the Picture Vocabulary test, approximately 8 in 10 on Understanding Directions, and almost 7 in 10 on Applied Problems. By comparison, only 6 in 10 of the comparison group children scored above the norm on the Picture Vocabulary and Applied Problems test, and 4 in 10 on Understanding Directions, and none of these results were significant.

The AOK children also had significantly higher scores on the DECA protective factors than the non-AOK children. The proportion of AOK children with scores above national norms was significant: 40% were rated as "having strengths that should be supported," meaning that they demonstrated strong independence, an ability to manage their own behavior, and an ability to maintain positive relationships with other children and adults, compared to 16% on the national norm. No AOK children were rated as "having needs," (concerns that should be addressed) compared to the 16% national norm. In contrast, approximately 20% of the comparison group children were rated as "having strengths that should be supported" and 8% were rated as "having needs," but these differences from the national norms were not significant.

The findings also show correlations between child outcomes and observed quality. FCCERS-R observed quality was significantly associated with the DECA social-emotional scores as well as scores on two WJ III language tests (Picture Vocabulary and Understanding Directions). There was no relationship between the PICCOLO observed quality and any of the child assessment results. Maternal education and household income were strongly correlated with all of the child assessments.

In a general linear model analysis, family and child characteristics emerged as predictors of child outcomes for expressive language (the WJ III Picture Vocabulary test) and social-emotional development (the DECA Total Protective Factors). AOK significantly predicted child receptive language (WJ III Understanding Directions). In a mixed model analysis, in which children were nested with providers, however, AOK was not a significant predictor of any child outcomes. Rather, maternal education was a significant predictor of expressive vocabulary, math skills, and social-emotional outcomes, and household income predicted social-emotional outcomes. In addition, both the FCCERS-R and the PICCOLO were positively associated with math skills in some of the models.

These findings are consistent with other research which shows the importance of both parental factors and child care quality on children's developmental outcomes. Some research indicates that children in higher income and better educated families tend to have stronger school readiness skills than those with poorer and less educated parents (Child Trends, 2015). A recent meta-analysis suggests that child care quality may explain the difference in child outcomes across child care settings, while family backgrounds may be associated with differences in child outcomes within settings (Bassok, Fitzpartrick, Greenberg, & Loeb, 2016).

Combined with the Phase One findings about AOK family child care quality, the study results, especially those related to children's performance compared to national norms, show that the AOK model has the potential to have a positive effect on children's outcomes. The findings point to the need for additional research that would have a stronger capacity to identify the relationship between the quality of care that AOK's family child care providers offer and the impact on children.

One option might be to focus on AOK providers specifically rather than comparing them to non-affiliated providers. Such studies could include a pre/post design to examine if AOK provider quality improves children's cognitive, language and social-emotional development or a longitudinal study that would follow a cohort of AOK children over time, from enrollment to kindergarten entry. Another option might be a matched control design of AOK providers and non-AOK providers or a randomized control trial. Irrespective of the choice of design, the research will contribute to a better understanding of the effectiveness of family child care networks in enhancing provider quality and positive child and family outcomes.

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1. Introduction

It is well accepted that the first three years of life are crucially important for children's healthy development, because a significant proportion of brain development occurs during this period (Shonkoff & Phillips, 2000). Children's experiences during the early years have an enormous effect on this process. The environment in which children live—particularly the interactions they have with adults who surround them—plays an important role in their cognitive, language, social-emotional and physical outcomes.

Many children face risks that place this healthy development in jeopardy. The adults who are a major presence in their lives may not be able to provide the consistent nurturing care that very young children need. Parents may face difficult economic situations, depression, or substance abuse issues. Other stressors—violence in the home and the neighborhood—may be present as well. These toxic factors have serious consequences for school readiness, later school achievement and success in life (Center for the Developing Child, 2016).

Research points to other factors that can influence children's readiness for school. Children who grow up in poverty, with single mothers and parents with low levels of education are likely to start school well behind their higher-income peers (Duncan & Magnuson, 2011). Their vocabularies are smaller; they often cannot name colors or numbers; and they typically score lower on tests of learning and math (Heckman, 2008). This gap in achievement remains through high school (Duncan & Magnuson, 2011; Heckman, 2008).

High-quality early care and education (ECE) programs can make a difference in this trajectory. ECE programs with safe, stimulating environments, small adult-child ratios, and sensitive, responsive caregivers can contribute to children's positive cognitive and social-emotional outcomes (Burchinal, Campbell, Byrant, Wasik, & Ramey; 1997; Burchinal, Roberts, Nabors, & Bryant, 1996; NICHD, 2006; The Cost and Quality Team, 1995). Children who participate in ECE programs with these characteristics often do better at kindergarten entry than children who have not had these experiences.

1.1. Research on Early Childhood Quality

Many studies of ECE quality have focused on center-based care. The research on quality in family child care, in which a provider cares for a small number of children in her/his own home, is limited. A 2010 review of the literature on home-based child care (regulated family child care and family, friend and neighbor care) found only 14 studies that related to quality (Porter et al., 2010), 10 of which examined quality in family child care.[1]

Observational studies point to mixed results. Some found that the average quality of care is "minimal" to "good" (Administration for Children and Families, 2004; Loeb, Fuller, Kagan, & Carroll, 2004; Paulsell, Boller, Aikens, Kovac, & Del Grosso, 2008; Peisner-Feinberg, Bernier, Bryant, & Maxwell, 2000), while others found that it is "inadequate"

[1] Since 2010, a small number of studies have examined quality in home-based child care (Home-based Child Care Resource List: http://www.researchconnections.org/childcare/resources/30913).

(Elicker et al., 2005; Fuller & Kagan, 2000; Coley, Chase-Landsdale, & Li-Grining, 2001; Kontos, Howes, Shinn, & Galinsky, 1995). Still other studies found that providers were engaged with children, responsive and nurturing and the environments were safe and healthy (Layzer & Goodson, 2006; Fuller & Kagan, 2000, NICHD ECCRN, 2004).

There are also relatively few studies of initiatives to improve the quality of family child care. The home-based child care literature review identified 10 studies of quality improvement efforts for this population of child care providers (Porter et al., 2010). The designs of these studies varied: three were correlational, three, pre-post, and one, quasi-experimental. Only three studies used random control assignment, the gold standard for research because it shows causal impacts.

The findings pointed to the potential effectiveness of training workshops alone or in combination with other services such as technical assistance or lending libraries (Howes, Galinsky, & Kontos, 1998; Kansas Association of Child Care Resource and Referral Agencies Infant/Toddler Project, 2003; Norris, 2001; Peisner-Feinberg et al., 2000; Rusby, Smolkowski, Marquez, & Taylor, 2008); professional development through credit-bearing courses (Adams & Buell, 2002), and consultation (Bryant et al, 2009; Ramey & Ramey, 2008) or home visiting (McCabe & Cochran, 2008). Family child care networks with specially trained staff and that offered individual home visits to providers, training workshops at the network site, and frequent opportunities to meet and talk to network staff represented a promising approach for improving quality as well (Bromer, van Haitsma, Daley, & Modigliani, 2008).

1.2. Family Child Care Quality and Child Outcomes

An even smaller number of studies have examined the relationship between family child care quality and child outcomes. The NICHD study, for example, found that children in family child care homes that provided a great deal of stimulation performed better on cognitive, language and social-emotional assessments than children who were enrolled in homes that provided less stimulation (Clarke-Stewart, Vandell, Burchinal, O'Brien, & McCartney, 2002), and another study of child care in Indiana found that infants and toddlers and preschoolers in high-quality family child care had higher scores on cognitive, language and social-emotional assessments than children in lower quality care (Elicker et al., 2005). For the most part, these studies show a modest association between quality and child outcomes, largely because children's background characteristics (mother's educational level, for example) play a significant role in children's development (Burchinal, Kainz, & Cai, 2011).

Research that sought to examine whether quality improvement initiatives have an impact on child outcomes in family child care points to the challenges of achieving this objective. For example, a pre/post study of a six-month training series that aimed to improve provider sensitivity found a modest association with participation and infant attachment (Howes et al., 1998), and a quasi-experimental study of a home visiting program suggested a positive association with participation in the home visits and children's language and cognitive development as well as self-regulation (McCabe, 2007; McCabe & Cochran, 2008).

Findings from other studies of interventions underscore the difficulty of producing positive child outcomes. Again, if there is an association with child outcomes and participation, it is generally modest. One study of an initiative that used consultation as strategy, for example, found small to moderate associations with children's school readiness (Forry et al., 2013) and another study found decreases in children's problem behaviors when providers participated in workshops on behavior management practices (Rusby et al., 2008). These effects, however, faded after six months.

2. All Our Kin Evaluation

All Our Kin (AOK) is a nationally-recognized model for improving quality in family child care. Founded in 1999 in New Haven, Connecticut, AOK describes its approach as "high-touch," providing a continuum of services for family, friend and neighbor caregivers who seek to become licensed family child care providers. The centerpiece of AOK's model is its Family Child Care Network, which offers a variety of services including training workshops, intensive consultation, monthly networking meetings, Child Development Associate (CDA) credential coursework and scholarships, and an annual conference.

In 2014, AOK began a two-year evaluation that was intended to provide insights into its effectiveness. The study consisted of two phases: an examination of the quality of care that providers in its Family Child Care Network offered to children as well as provider characteristics that were associated with quality (Phase One); and an examination of the outcomes of children who were enrolled in these settings (Phase Two). In both phases, the study used a quasi-experimental design. The first phase compared a sample of AOK network providers and a comparison group of providers who were not affiliated with AOK. Using providers from the Phase One sample, the second phase examined selected outcomes of children. Phase One data were collected during the late fall of 2014 and early winter of 2015. Phase Two data were collected during the summer of 2015.

2.1. Phase One Methods and Measures

The Phase One sample consisted of 28 AOK providers and 20 comparison group providers. Eligibility for the AOK network providers included two criteria: between October 2012 and October 2014, (1) providers had to have had a minimum of seven intensive consultation visits from AOK educational consultants; and (2) providers had to have participated in a minimum of 15 AOK programs, with a minimum of 5 in 2014. The comparison group had to have had no prior contact with AOK (Porter & Reiman, 2015). The comparison group providers were recruited from Hartford, Waterbury, Danbury and New Britain. These four Connecticut communities share similar characteristics with New Haven, Stamford, Norwalk, and Bridgeport, the regions that AOK currently serves and from which the AOK providers were recruited.

The study used a paper and pencil survey, and two observational instruments—the Family Child Care Environment Rating Scale-Revised (FCCERS-R: Harms, Cryer & Clifford, 2007) and the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO*:* Roggman, Cook, Innocenti, Norman, & Christiansen, 2013). The survey included questions about the characteristics of the providers and their

programs, their motivation for providing care, their beliefs and attitudes, and their well-being.

The FCCERS-R (Harms et al., 2007), a commonly used instrument in child care quality research, measures the quality of the child care environment with 38 items in seven subscale areas, including space and furnishings, personal care routines, listening and talking, activities, interaction, program structure, and parents and provider (items related to the relationship between the parent and the provider). Each item is rated from 1 ("inadequate") to 7 ("excellent"). Subscale ratings are based on the average of three to eleven individual item ratings; all thirty-eight items are then averaged to produce a global quality rating.

The PICCOLO (Roggman et al., 2013), which is intended to be used in video-taped parent-child interactions, has been tested in live settings with family child care providers and center-based teachers (Norman & Christensen, 2013). It measures the quality of caregiver interactions with children ages 10 to 47 months with 29 items grouped into four subscales: affection, responsiveness, encouragement, and teaching. Each item is rated on a 3-point response scale with 0, "absent" (no behavior observed), 1, "barely" (brief or minor behavior), and 2, "definite" (strong or frequent behavior).

2.2. Phase One Results

The AOK providers and the comparison group providers had comparable characteristics. Almost all of the providers were women, the majority of whom were women of color. More than two-thirds had some college education or had completed an undergraduate college degree. Approximately half had some specialized coursework or a degree in early childhood, and close to half had obtained a CDA credential. Many providers had a great deal of experience providing child care. All of the providers offered full-time care to children, and most of them cared for children with a variety of age ranges.

Many of the providers in the sample were poor or low-income. A quarter had incomes below $25,000, close to the 2014 federal poverty level (DeNavas-Walt & Proctor, 2015), and another fifth had incomes between $25,000 and $35,000, significantly less than $53,700, the federal median income in 2014 (DeNavas-Walt & Proctor, 2015).

There were some differences between the AOK network providers and the comparison group. A higher proportion of AOK providers reported Latino ethnicity than the comparison group, and higher proportions of AOK providers had an associate's degree with a specialization in early childhood than the comparison group. The only significant difference, however, was the proportion of AOK providers with a CDA—59% compared to 24% of the comparison group. The difference is likely related to AOK's support for obtaining the CDA credential through coursework and scholarships.

The Phase One findings indicated that observed quality on both observational measures was statistically higher for the AOK providers than for the comparison group of providers. On the FCCERS-R, AOK providers had a mean global quality score of 4.39, close to "good" while the comparison group providers' global means were 2.86, close to "minimal." In addition, 64% of the AOK providers scored at 4 or higher compared to 5% of the comparison group providers, and 29% had scores of 5 or higher compared to 5% of the

comparison group. Analysis of the AOK providers with scores of 5 or above suggested that the scores were associated with higher participation rates overall, and participation in a broader range of AOK network activities.

The AOK providers had significantly higher scores on all of the FCCERS-R subscales compared to the comparison group of providers. For example, the FCCERS-R mean score for Interactions for AOK providers was 5.73 (between "good" and "excellent") compared to 4.26 (between "minimal" and "good") for the comparison group, and the mean score for Listening and Talking was 5.14 (above "good") for AOK providers and 3.12 ("minimal") for the comparison group of providers.

The AOK providers also had significantly higher scores on the PICCOLO than the comparison group:43.04 of a possible 58 compared to 33.05. The scores on the PICCOLO subscales for affection, encouragement and teaching were significantly higher for the AOK providers than the comparison group, but there was no significant difference in the responsiveness subscale.

Effect sizes calculated with Cohen's D were large (greater than 0.8) for both the FCCERS-R and the PICCOLO and for all of the FCCERS-R subscales. The largest effect sizes were for the FCCERS-R global score (1.56) and for the Activities subscale (1.54). The only effect sizes that did not qualify as "large" were the Responsiveness and Encouragement subscales of the PICCOLO.

Like some other studies (Forry et al., 2013; Raikes, Raikes, & Wilcox, 2005; Tout, Zaslow, & Berry, 2005), we found several provider characteristics that were related to quality. There was a significant correlation between provider education and observed quality. Provider intrinsic motivation and years intended to stay in the field were related to observed quality as well. We also found negative correlations with provider traditional beliefs (authoritarian views of child-rearing) and job demands such as working with challenging children and difficult relationships with parents and observed quality.

In addition, our research suggested that provider belief in her self-efficacy was associated with quality. This belief in the capacity and competence to make a difference was also correlated with intrinsic motivation for providing child care, the intention to stay in the field, and social supports.

3. The Phase Two Study: Quality and Child Outcomes

The Phase One findings demonstrated that AOK family child care providers offered higher quality care than providers who were not affiliated with AOK. The study results suggested that the AOK model, with its emphasis on relationship-based supports and a variety of components that align with providers' needs, has the potential to improve quality.

How do the AOK children in higher-quality settings fare compared to those in the lower quality settings with non-affiliated AOK providers? This was the primary question for Phase Two of the evaluation. With the Phase One sample of AOK and comparison group of

providers, we sought to examine child outcomes with four child assessments. In addition, we aimed to examine the relationship between the child outcomes and provider quality.

We used five measures in the Phase Two study. Four were child assessments: three different Woodcock-Johnson III Tests of Achievement (WJ III: Woodcock, McGrew, & Mather, 2001) to assess children's cognitive, language, and math skills, and the Devereux Early Childhood Assessment (DECA: LeBuffe & Naglieri, 1999) to assess children's social-emotional development. In addition, we used a paper and pencil survey with parents to identify family characteristics such as maternal education and income that research has shown are associated with positive child outcomes.

3.1. Methods

All of the Phase One AOK and non-AOK providers were eligible to participate in the Phase Two study. We sought to recruit two children from each provider for a total of 56 AOK children and 40 comparison children. Child eligibility consisted of three criteria: ages two to five years, at least nine months' duration in the provider's program, and no receipt of early intervention services such as Birth to Three, ECAT, or a Montessori program.

We mailed information packets to all of the Phase One providers. The packets included a flier about the study with an invitation to participate and information about the $50 gift card as a stipend for both the provider and the parent, a letter from the principal investigator explaining the study purpose, and an FAQ that described child eligibility. A week after the mailing, the study coordinator made follow-up calls to all of the providers.[2]

After the providers agreed to participate, the study coordinator mailed them packets of materials to give to their children's parents. In addition to the flier, the principal investigator's letter, and the FAQ, these packets included a brochure about AOK, the parent survey, and a consent form for child participation to be completed by the primary caregiver. Follow-up calls were made to obtain the informed consent forms and the completed parent surveys.

In total, 28 AOK providers and 20 comparison group providers were invited to participate in the study. Three AOK providers declined as a result of lack of interest, and an additional two did not have eligible children. Five of the comparison group of providers declined to participate. In addition, two did not have eligible children, two did not respond to scheduling requests, and one could not be contacted.

The final sample consisted of 33 providers: 23 AOK providers and 10 comparison group providers. In total, there were 90 children in the sample: 62 children with AOK providers and 28 children with comparison group of providers.[3]

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[2] All Our Kin providers also received a letter from executive director, Jessica Sager, thanking them for their participation in Phase One and explaining the importance of Phase Two.

[3] Initially, providers were asked to identify three eligible children for the child sample pool for a total of 144 children, 84 AOK children and 60 comparison group children. The number of children in the final sample was lower than anticipated for several reasons: parent's refusal, children's exit from the program, and summer vacations. Because the response rates were low, we tested all of the eligible children.

3.2. Measures

Four child assessments were used in the study. These assessments consisted of three tests from the Woodcock-Johnson III Tests of Achievement (WJ III) —Test 4: Understanding Directions, Test 10: Applied Problems, and Test 14: Picture Vocabulary (Woodcock, et al., 2001). The other assessment was the Devereux Early Childhood Assessment (DECA: LeBuffe & Naglieri, 1999), which was completed by the providers. An additional measure was the parent survey, which was used to collect demographic data on the children and their families.

Woodcock Johnson III Tests of Achievement. We selected the WJ III Tests of Achievements as child assessments for the study for several reasons. First, it is available in both English and Spanish (Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005). [4] Second, it is reliable and valid with children as young as 24 months. Third, each test can be completed in approximately 10 minutes, which minimizes the burden on the child. The WJ III was used in Early Head Start research (Kisker et al., 2011).

The three WJ III tests that we chose correspond most closely to AOK's focus on enhancing providers' support for literacy and math skills. WJ III Test 4, Understanding Directions, assesses children's oral language, specifically receptive language and listening comprehension. WJ III Test 14, Picture Vocabulary, assesses expressive language, and WJ III Test 10, Applied Problems, assesses math reasoning and calculation. The Applied Problems and the Picture Vocabulary tests both use a floor (basal score) and a ceiling, although the procedures differ—for example, solving a simple math problem or identifying an object. The Understanding Directions test does not have basal and ceiling scores, because points are based on the number of items in the picture that the child identifies correctly. On all of the tests, the number of correct items is reported as a raw score, which is then transformed into standard scores that account for age. The average standard score in the normal distribution is 100, which means that 50 percent of the children are expected to score higher than 100.

DECA. The Devereux Early Childhood Assessment (DECA: LeBuffe & Naglieri, 1999), which was used in the Early Head Start Evaluation (Kisker et al., 2011), is intended to measure social-emotional development in children from the age of 18 months through five years old. It aims to identify the frequency of children's protective factors on the assumption that children with positive attachment relationships, strong self-regulation, and initiative have a greater capacity for resilience, especially in situations that place them at risk. The measure is part of a larger effort, the DECA program, which aims to enhance resilience for young children through strengthening early childhood programs' capacity to enhance protective factors.

The DECA is a questionnaire that is administered to parents, teachers or child care providers. Respondents can complete the questionnaire independently; typically, it takes 10

[4] While the Woodcock Johnson IV had been published at the time of testing, the updated Spanish version was not yet available. Therefore, we used the Woodcock Johnson III for consistency across languages.

minutes. The questionnaire asks respondents to indicate how often the child exhibited a variety of behaviors in the past four weeks on a five-point Likert scale ranging from "never" to "very frequently." In our study, the family child care providers were the respondents.

In this study, we used two versions of the DECA: the Infant/Toddler for children under 36 months, which has 36 items, and the DECA P2 for children between 36 and 71 months, which has 38 items. Both instruments are available in Spanish. Each groups individual items into the three protective factors of attachment/relationships, self-regulation and initiative. Scores on these items are summed for a total protective factor score. The DECA P2 also includes a separate score for 11 items that relate to behavioral problems. We used only the Total Protective Factors in the study because the developers indicated that the scores across both age groups were comparable.

Total protective factor items are reported in three scoring ranges: need or concerns that should be addressed, under 40; typical, 41-59; and strengths that should be supported, 60 or above. Because scores are normally distributed with a standard deviation of 10, sixteen percent of children are expected to be in the "need" range, 68% in the "typical" range, and another 16% are expected to be in the "strength" range.

Parent Survey. We developed a parent survey to collect data about demographic characteristics that might relate to child outcomes. The survey was intended to be completed by the primary family caregiver, that is, the person who spent the most time with the child, and it was available in English and Spanish. Questions focused on the child's demographics (gender, age, nationality, race/ethnicity, language); the parent's demographics (age, nationality, race/ethnicity, language, employment status, education, and marital status); family characteristics (income, number of adults and children in the home); and the duration of the child's enrollment in the provider's program. (Please see Appendix A for the parent survey.)

3.3. Data Collection

In early summer, 2015, AOK trained five independent assessors to complete the WJ III tests. Assessors scheduled their own appointments with providers, primarily in the morning when children were most alert. The assessments were conducted in a quiet corner of the providers' homes in compliance with state regulations, which require that the provider can see and hear the children at all times. Because some of the children were very young (two-year-old toddlers, for example), the assessors initially engaged the children in play to help them become comfortable with the testing. The assessors also took breaks between tests to re-engage the children if they became distracted. Assessors gave children positive reinforcement for completing the tests without differentiating between correct and incorrect answers.

Data were collected from the parents about the child's primary language, whether the child was actively learning another language, and, if so, for how long. AOK collected data on the language each provider spoke to the children in his/her care. Children were divided into four groups: Monolingual English-Speaker, Monolingual Spanish-Speaker, Dual-Language Learner (DLL) with Spanish as primary, and DLL with English as primary. Children were

determined to be DLL if their provider spoke a different language than the child's primary language and if the parent indicated that the child was learning a different language.

All three WJ III tests were administered to DLL children in their primary language. The Picture Vocabulary test was also administered in their secondary language, because incorrect answers in an alternative language could not be counted.

4. Analysis

We used several types of analyses in the study. They included chi-square analyses and t-tests, general linear models, correlations, and mixed models. Chi-square analyses were used to examine differences between the AOK and the comparison group children's demographic characteristics on categorical variables (for example, race/ethnicity, income level). Because so many variables included exact cell counts of less than 5, two-sided exact tests of significance were used instead of asymptotic tests of significance. T-tests were used to assess differences in demographic continuous variables (for example, children's age, time with provider).

For the WJ III tests, we separated children by primary language. Monolingual English- and Spanish-speaking children were grouped together as were DLLs. Because the number of children with Spanish as their primary language was small (8 AOK children and 1 non-AOK child), multivariate tests were only run for English-speaking children. For Test 14, Picture Vocabulary test, scores for DLLs were obtained in their second language, but these scores were kept separate and are not referenced below except where specified.

We used correlations for continuous and ordinal demographic variables that might be associated with child outcomes. Pearson correlations were used for continuous variables, and Spearman's Rho was used when ordinal variables were present. ANOVAs were used to calculate differences in child outcomes based on race/ethnicity, parent marital status, parent employment status, and gender.

To calculate differences between the AOK and comparison group children's outcomes in comparison to national norms, we used Chi-square tests and one-sample t-tests. One-sample t-tests were used for the WJ III assessments to determine whether the percentage of AOK children was significantly different from the national norm, and two-sample t-tests were run to determine if the percentages of AOK children and comparison children who met this benchmark were significantly different from one another. The same calculations were then run comparing the AOK and the comparison group children's scores to the 75% of children expected to score above 90, which is the lower bound for "average" scores. Chi-square tests were used to compare AOK and comparison group children's DECA test results to the DECA national norm.

For the bivariate analysis of outcomes, T-tests were used to calculate whether there were significant differences between AOK and comparison group children on each of the assessments. AOK was a dichotomous variable stating whether or not a child was enrolled in with an AOK provider. Following these tests, demographic variables were added to general linear models to determine whether other variables such as child or family characteristics

would predict child outcomes. Cohen's D, which explains the size of the variance between two means, was used to compute effect size (Dunst et al., 2004).

For the multivariate analysis, we created mixed models, first, with AOK as the only predictor variable, and then with a variety of child, parent, and provider variables. In the second model, we dropped child's race/ethnicity because the race/ethnicity variable explained very little variance and prevented the models from converging. We added child's household income because it substantially improved the model. Gender and child age consistently did not improve the model fit and were therefore dropped. Parent age trivially improved the model fit and it was therefore omitted. Additionally, the effect of AOK was not moderated by child age, months with provider, or hours per week, so these interactions were omitted. We also ran mixed models with or without provider quality scores on the FCCERS and the PICCOLO.

5. Results

The primary goal of the Phase Two study was to examine the differences in selected child outcomes between children who were enrolled with AOK network providers and children who were enrolled with the comparison group providers. In addition, we sought to understand the role, if any, that AOK played in these outcomes. This section presents our findings. First, we report on results of the WJIII and DECA child assessments. Then, we report on the variables that were associated with these child outcomes.

5.1. The Sample

Children who were Latino or Hispanic represented the largest proportion of our sample, accounting for 39% (Table 1). Children who were White represented the second largest proportion of the sample (31%), followed by those who were Black (22%). Nearly two thirds of the children (66%) were monolingual English-speakers and another 10%, monolingual Spanish-speakers. A total of 23% of the children were dual language learners (DLL) in English or Spanish. There were almost equal proportions of girls and boys (54% to 46%). On average, the children were slightly over age three (Table 2). They spent an average of approximately 40 hours a week with their providers, and, on average, had been with the same provider for approximately two years.

Nearly half (49%) of the children were living with two married parents, and 43% were living with single parents (Table1). The parents reported high levels of education: more than half (53%) had a college or graduate degree, and almost all (93%) reported being employed. The majority (57%) reported incomes of $35,000 or higher, with 38% reporting incomes of $65,000 or higher.

There were significant differences ($p<.05$) between the AOK and comparison group sample on four variables: race/ethnicity, child language, household income, and maternal education (Table 1). Higher proportions of the AOK child sample were reported as Latino (47%) than the comparison group sample (21%), and the proportion of AOK sample children who were reported as White (34%) was higher than that for the comparison group (25%) as well. The proportion of comparison group children reported as Black (16%) was

higher than the AOK sample children (16%); the proportion of comparison group children reported as Multi-racial (18%) was also higher than that for the AOK child sample (3%). In addition, the proportion of AOK monolingual Spanish-speaking children (15%) was significantly higher than that for the comparison group children (0%), and the proportion of AOK monolingual English-speaking children (57%) was significantly lower than that for the comparison group children (86%). The proportion of AOK children with household incomes above $35,000 (46%) was also significantly higher than that of comparison group children (22%). In addition, significantly higher proportions of AOK children also had parents with a bachelor's degree or post-graduate education than the comparison group children: 50% compared to 21%.

Differences approached significance ($p<.10$) in parent marital status (Table 1) and parent age (Table 2). There were no significant differences in child gender, time with provider, child age, hours per week, months with provider, or the number of years the family had used the provider (Table 2). Because only six children had parents who were not employed, there were not meaningful differences in employment status between the AOK and the comparison group.

Table 1: AOK and Comparison Group Children's Categorical Demographic Characteristics

Child Characteristics	Total	AOK	Comparison	p-value
Language	**n=89**	**n=61**	**n=28**	**.038***
Monolingual English	66%	57%	86%	
Monolingual Spanish	10%	15%	0%	
DLL English Primary	19%	23%	11%	
DLL Spanish Primary	4%	5%	4%	
Household Income	**n=86**	**n=59**	**n=27**	**.006****
Less than $15,000	14%	15%	11%	
$15,001-$25,000	13%	8%	22%	
$25,001-$35,000	15%	7%	33%	
$35,001-$50,000	10%	12%	7%	
$50,001-$65,000	9%	12%	4%	
Over $65,000	38%	46%	22%	
Maternal Education	**n=90**	**n=62**	**n=28**	**.007****
8th grade or below	9%	11%	4%	
Some high school	9%	10%	7%	
High School Diploma/GED	9%	8%	11%	
Some College	20%	11%	39%	
Associate's Degree	12%	10%	18%	
Bachelor's Degree	12%	11%	14%	
Master's Degree or Above	29%	39%	7%	
Parent Marital Status	**n=88**	**n=60**	**n=28**	.057
Married	49%	52%	43%	
Civil Union/Dom. Part.	8%	12%	0%	
Single	36%	33%	43%	
Divorced	7%	3%	14%	
Child Race/Ethnicity	**n=90**	**n=62**	**n=28**	**.005****
White	31%	34%	25%	
Black or African-American	22%	16%	36%	
Hispanic/Latino of Any Race	39%	47%	21%	
Multi-Racial or Other	8%	3%	18%	
Gender	**n=90**	**n=62**	**n=28**	.364
Male	46%	42%	54%	
Female	54%	58%	46%	
Time with Provider	**n=90**	**n=62**	**n=28**	1.000
Under 20 hours/week	10%	10%	11%	
At/Over 20 hours/week	90%	90%	89%	
Parent Employment Status	**n=89**	**n=61**	**n=28**	.661
Not Employed	7%	8%	4%	
Employed	93%	92%	96%	

** $p < .01$
* $p<.05$

Table 2: AOK and Comparison Group Children's Continuous Demographic Characteristics

	AOK			Comparison			p-value
	Mean	SD	N	Mean	SD	N	
Child Age (in months)	40.6	11.9	62	39.4	11.9	28	.652
Parent Age (in years)	34.5	5.9	60	31.9	7.7	25	.093
Hours per Week	41.5	25.9	58	41.6	18.3	28	.987
Months with Provider	25.5	12.6	54	23.2	12.9	25	.457
Years Family Has Used Provider	3.4	2.6	28	3.5	4.1	17	.855

*** p < .01*
** p<.05*

5.2. Child Outcomes

While demographic data are available for the 90 children in the sample, we do not have full child assessment data for all of the children. There were incomplete data on the DECA for seven children, and, as a result, the analysis included 83 children (58 AOK children and 25 comparison group children). A total of 12 children were not included in the WJ III assessments: seven were too shy to complete the test, lacked the ability to point to the pictures, or spoke neither English nor Spanish, and five were tested in a language (Spanish or English) other than that reported by the parent. (Please see Appendix B for the test results that include these five children.)

In addition, six AOK children and five comparison group children were not scored on the English version of the WJ III Applied Problems test because the scoring program did not allow for scoring children under 32 months who answered fewer than two questions correctly.[5] This floor effect also slightly limited the sample size for the WJ III Understanding Directions assessment, in which two 25-month-old children from the comparison group who answered 0 questions correctly could not receive scores.

On the three English WJ III assessments, AOK children had higher scores than the comparison group, and there were statistically significant differences on Understanding Directions and Picture Vocabulary (Table 3). AOK children also had significantly higher scores on the DECA Total Protective Factors than the comparison group. These statistically significant differences were moderate, with Cohen's D values ranging from .51 for the DECA Total Protective Factors to .67 for Understanding Directions.[6]

[5] A floor effect means that there was not enough data about this population in the original norming sample used by the developers to calculate a standard score for these children

[6] Cohen's D effect sizes indicate that .2 or below is small, .5 is moderate, and .8 or above is large (Cohen, 1988).

All Our Kin children performed better on the WJ III Applied Problems test than the comparison group, but the difference was not statistically significant (Table 3). Because there was only one Spanish-speaking child in the comparison group, no conclusions could be drawn from the three Spanish WJ III tests.

The only assessment on which the comparison group children performed significantly better than the AOK children was the DECA Behavioral Concerns subscale, and the effect size was moderate. This was not a central focus of the study.[7]

Table 3: AOK and Comparison Group Children's Outcomes

	Child Outcomes							
	AOK			Comparison				
	Mean	SD	N	Mean	SD	N	Cohen's D	Sig
Woodcock Johnson								
Understanding Directions	107.1	12.7	43	99.1	10.8	25	.67	**.010***
Applied Problems	106.4	16.4	37	103.5	13.5	22	.18	.498
Picture Vocabulary	113.9	9.7	45	107.9	11.7	27	.58	**.021***
Comprehensión de Indicaciones	70.9	22.4	8	80.0	NA	1	-.41	.712
Problemas Aplicados	90.6	15.9	8	99.0	NA	1	-.52	.634
Vocabulario Sobre Dibujos	89.5	18.7	8	79	NA	1	.56	.613
DECA								
Total Protective Factors	56.9	9.1	58	52.3	9.0	25	.51	**.035***
Behavioral Concerns	53.4	7.6	38	49.0	8.2	13	.56	.086

*** p < .01*
** p<.05*

[7] This finding may be interpreted as All Our Kin children performing worse or All Our Kin providers more astutely noticing problematic behaviors. Because this subscale was only available for older children and not a central focus of the study, additional tests were not performed with this variable.

5.3. Relationship of Sample Scores to Test National Norms

On all three WJ III tests, AOK children had significantly higher scores than the test national norms (Table 4). Approximately 79% of the AOK children scored above the norm on Understanding Directions, 68% on Applied Problems, and 89% on Picture Vocabulary. While the comparison group children also had scores that were higher than the national norms on two tests, Applied Problems and Picture Vocabulary, these results were not significant.

Table 4: WJ III AOK Children and Comparison Children with National Norms

	Understanding Directions	Applied Problems	Picture Vocabulary
AOK	79%** (*p=.000*)	68%* (*p=.031*)	89%** (*p=.000*)
Comparison	40% (*p=.327*)	64% (*p=.208*)	67% (*p=.083*)
National Norm	50%	50%	50%

*** p < .01*
** p<.05*

Figure 1: WJ III Understanding Directions AOK Children and Comparison Group Children with National Norms

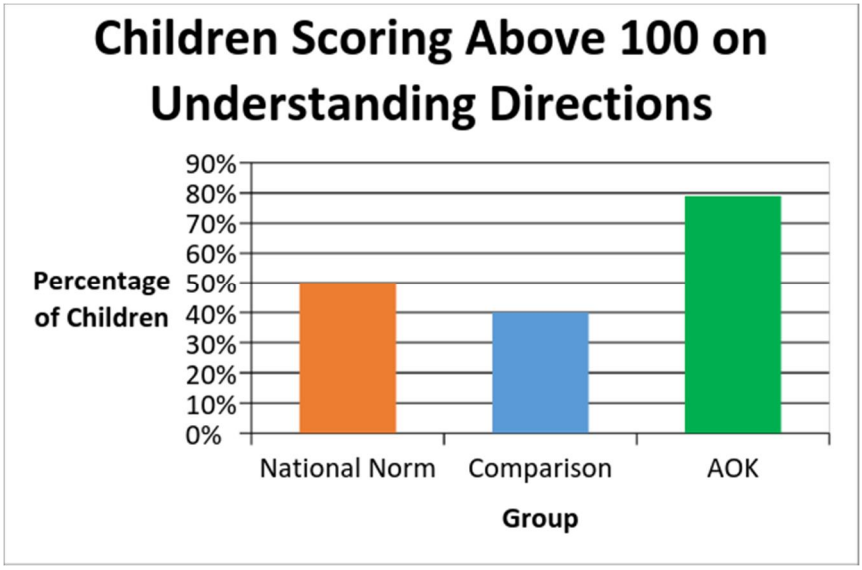


Figure 2: WJ III Applied Problems AOK Children and Comparison Group Children with National Norms

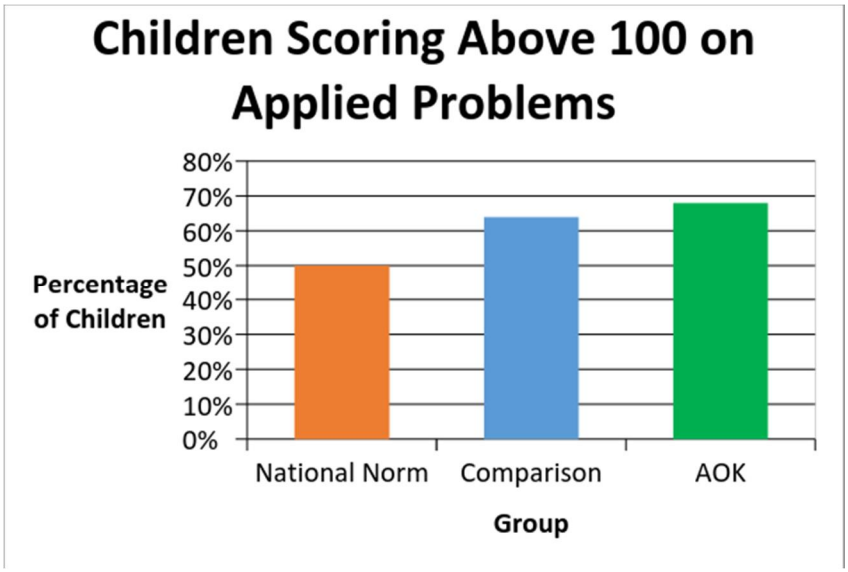
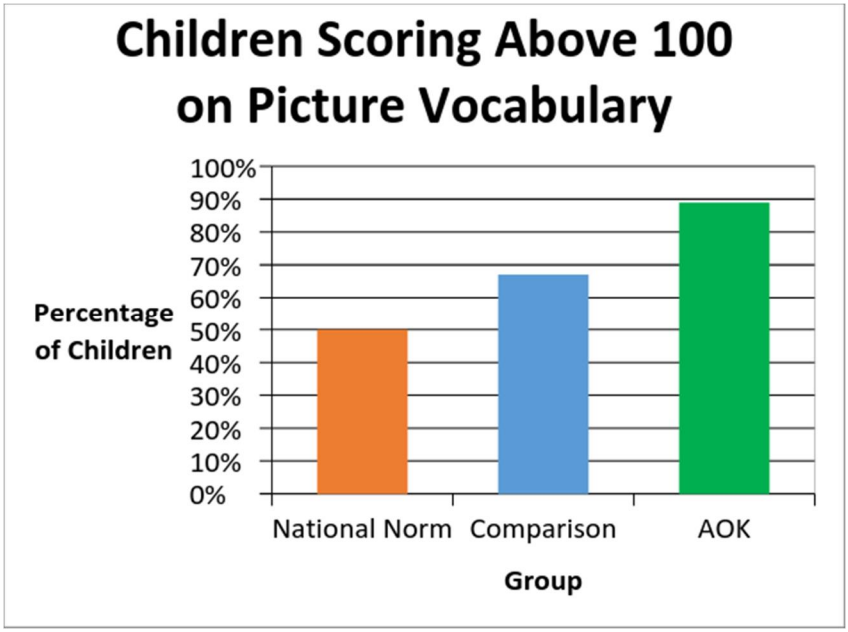


Figure 3: WJ III Picture Vocabulary AOK Children and Comparison Group Children with National Norms



The WJ III national norms indicate that 75% of children should score above 90, which can be considered the lower cutoff for average. All of the AOK children scores were significantly higher than this level on all three tests: 100% scored above this level on the Picture Vocabulary test, and the vast majority on Understanding Directions and Applied Problems (88% and 86% respectively) (Table 5). The only test on which the comparison group children performed significantly better than "average" was the Picture Vocabulary test (Table 5).

Table 5: WJ III AOK Children and Comparison Children Above 90%

	Understanding Directions	Applied Problems	Picture Vocabulary
AOK	88%* (*p=.010*)	86% (*p=.051*)	100%** (*p=.000*)
Comparison	84% (*p=.241*)	82% (*p=.427*)	96%** (*p=.000*)
National Norm	75%	75%	75%

*** p < .01*
** p<.05*

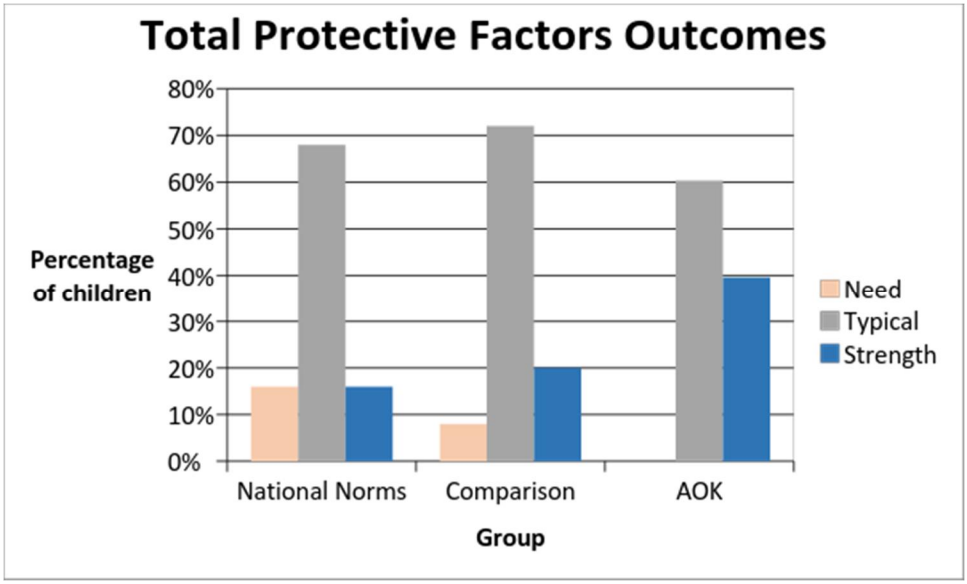
On the DECA Total Protective Factors, the percentage of AOK children who were rated as having "strengths that should be supported" was higher than the national norm, and the percentage of children with scores in the need range was lower than the national norm. A chi-square test showed that this difference in the distribution was statistically significant (*p=.000*) (Table 6). There was no significant difference for the comparison group children.

Table 6: DECA Total Protective Factors AOK and Comparison Group Children and National Norms

	Needs	Typical	Strength	P-value
All Our Kin	0%	60%	40%	.000**
Comparison	8%	72%	20%	.520
National Norm	16%	68%	16%	NA

*** p < .01*
** p<.05*

Figure 4: DECA Total Protective Factors AOK Children and Comparison Group Children with National Norms



5.4. Demographics Associated with Child Outcomes

Both household income and maternal education were strongly correlated with all measures of child outcomes (Table 7). There was also a significant correlation with parent age and the WJ III Picture Vocabulary test. Child age was negatively correlated with Picture Vocabulary.[8]

Table 7: Correlations Between Child Outcomes & Demographic Characteristics for English-Speakers (Spanish-speakers included in appendix)

	1	2	3	4	5	6	7	8
1. Picture Vocabulary	1							
2. Total Protective Factors	.224	1						
3. Understanding Directions	**.339****	.177	1					
4. Applied Problems	**.507****	.164	**.436****	1				
5. Household income	**.488****	**.334****	**.385****	**.378****	1			
6. Maternal Education	**.494****	**.351****	**.356****	**.499****	**.767****	1		
7. Parent Age	**.310***	.172	.127	.110	**.490****	**.405****	1	
8. Child Age	**-.293***	.173	.023	-.039	-.174	-.210	.082	1

** $p < .01$
* $p < .05$

Tables 8.1, 8.2, 8.3, and 8.4 show the associations between child race/ethnicity, parent marital status, child gender, and parent employment status with child outcomes. Child race/ethnicity was the only significant variable. It was related to all three WJ III assessment scores (Table 8.1, Table 8.2, Table 8.3), but it was not associated with the DECA scores (Table 8.4). There were no significant relationships between parent marital status, parent employment,[9] or child gender on any of the assessments, although parent marital status approached significance for the DECA Total Protective Factors (Table 8.4). [10]

[8] The following guidelines were used for effect size in these correlations: .1 indicates a small effect size, .3 indicates a medium effect size, and .5 indicates a large effect size

[9] Only 6 children had parents who were not employed.

[10] The eta-squared (η^2) is used as a measure of effect size, where .01 indicates a small effect, .06 indicates a medium effect, and .14 indicates a large effect.

Table 8.1: ANOVAS Analysis of Categorical Variables and Child Outcomes: WJ III Picture Vocabulary

Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=.934, η^2=.006
Married	112.46	12.30	37	
Civil Union/Dom. Part.	109.33	6.66	3	
Single	111.00	9.81	27	
Divorced	112.25	7.63	4	
Child Race/Ethnicity				**p=.002**, η^2=.192**
White	116.84	9.09	25	
Black or African-American	104.78	11.57	18	
Hispanic/Latino of Any Race	110.50	10.21	22	
Multi-Racial or Other	114.29	6.92	7	
Child Gender				p=.986, η^2=.000
Female	111.66	10.26	41	
Male	111.61	11.73	31	
Parent Employed				p=.309, η^2=.015
Yes	111.96	10.76	68	
No	106.25	12.39	4	

*** p < .01*
** p<.05*

Table 8.2: ANOVAS Analysis of Categorical Variables and Child Outcomes: WJ III Understanding Directions

Child Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=.402, d^2=.045
Married	106.91	11.72	34	
Civil Union/Dom. Part.	99.00	13.08	3	
Single	101.96	13.89	26	
Divorced	102.50	9.54	4	
Child Race/Ethnicity				p=.069, d^2=.104
White	109.36	11.06	25	
Black or African-American	100.88	12.73	17	
Hispanic/Latino of Any Race	102.05	11.26	20	
Multi-Racial or Other	99.00	17.75	6	
Child Gender				p=.509, d^2=.007
Female	103.33	13.67	40	
Male	105.39	10.99	28	
Parent Employed				p=.124, d^2=.036
Yes	104.77	12.59	64	
No	94.75	9.22	4	

*** p < .01*

** p<.05*

Table 8.3: ANOVAS Analysis of Categorical Variables and Child Outcomes: WJ III Applied Problems

Child Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=.151, η^2=.093
Married	107.89	17.36	28	
Civil Union/Dom. Part.	88.33	19.63	3	
Single	103.65	12.01	23	
Divorced	111.50	9.47	4	
Race/Ethnicity				**p=.013*, η^2=.176**
White	112.74	14.65	23	
Black or African-American	97.00	15.41	15	
Hispanic/Latino of Any Race	103.44	10.57	16	
Multi-Racial or Other	102.20	19.64	5	
Child Gender				p=.587, η^2=.005
Female	104.44	15.31	36	
Male	106.70	15.67	23	
Parent Employed				p=.772, η^2=.001
Yes	105.16	15.71	55	
No	107.50	10.41	4	

*** p < .01*
** p<.05*

Table 8.4: ANOVAS Analysis of Categorical Variables and Child Outcomes: DECA Total Protective Factors

Child Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=.062, ɖ²=.090
Married	57.03	9.49	39	
Civil Union/Dom. Part.	47.50	2.81	6	
Single	56.07	8.46	30	
Divorced	51.0	10.53	6	
Race-Ethnicity				p=.323 ɖ²=.043
White	57.26	9.48	27	
Black or African-American	52.30	9.45	20	
Hispanic/Latino of Any Race	56.17	8.52	29	
Multi-Racial or Other	55.43	10.58	7	
Gender				p=.767, ɖ²=.001
Female	55.27	8.17	48	
Male	55.89	10.69	35	
Parent Employed				p=.947, ɖ²= .000
Yes	55.51	9.06	78	
No	55.80	13.31	5	

** *p < .01*
* *p<.05*

5.5. Child Outcomes and Provider Quality

Provider FCCERS-R observed quality scores were significantly correlated with Picture Vocabulary, Understanding Directions, and DECA Total Protective Factors (Table 9). These correlations were strongest with the DECA Total Protective Factors, and more modest with the two WJ III assessments. The PICCOLO observed quality scores were not significantly related to any child outcomes.

Table 9: Correlations Between Child Outcomes and Provider Quality

	1	2	3	4	5	6
1. Picture Vocabulary	1					
2. Total Protective Factors	.224	1				
3. Understanding Directions	**.339****	.177	1			
4. Applied Problems	**.507****	.164	**.436****	1		
5. PICCOLO	.124	.065	.163	.180	1	
6. FCCERS-R	.226	**.322****	**.276***	.045	.223	1

** $p < .01$

* $p<.05$

5.6. Multivariate General Linear Models

To understand whether participation in the AOK Family Child Care Network predicted child outcomes, we created multivariate general linear models with variables for household income, maternal education, parent marital status, parent employment status and parent age as well as child gender, race/ethnicity, and age. AOK was a significant predictor of WJ III Understanding Directions (*p=.017*), and it was the only significant variable in the test of between-subject effects, meaning that none of the eight demographic variables predicted this child outcome.

Different results emerged for the other child assessments. Parent marital status significantly predicted Picture Vocabulary scores (*p=.023*) and DECA Total Protective Factors scores (*p=.022*). Child race/ethnicity (*p=.012*), and child age (*p=.040*) also predicted WJ III Picture Vocabulary scores. AOK did not predict the WJ III Picture Vocabulary, the Applied Problems scores, or the DECA Total Protective Factors scores.

5.7. Mixed Models

To further examine whether participation in the AOK Family Child Care Network predicted child outcomes, we created four mixed models in which the children's scores were nested with providers.[11] One model used AOK as the only fixed effect predictor variable. The second model included child's race/ethnicity, marital status and maternal education as well as FCCERS-R and PICCOLO scores. In the third mixed model, we removed child race/ethnicity and added the child's household income because the race/ethnicity variable explained very little variance and prevented the model from converging, while the child's household income substantially improved the model. Gender and child age consistently did not improve the model fit and were therefore omitted. Because parent age trivially improved the model fit, it, too, was omitted. Additionally, the effect of AOK was not moderated by child age, months with provider, or hours per week, so these variables were omitted. The fourth model included household income, marital status and education, but omitted the child care quality scores.

[11] Before we created the mixed models, we conducted baseline tests for provider-level differences on the outcome variables. These tests showed that mixed models were crucial for both the Total Protective Factors (p=.004) and Picture Vocabulary (p=.041) but not for Understanding Directions (p=.175) or Applied Problems (p=.302).

In all four mixed models, AOK did not significantly predict of any child outcomes, although it was a significant predictor of the WJ III Understanding Directions in the first model and approached significance for the WJ III Picture Vocabulary in the same model. Parental characteristics, however, predicted positive child outcomes on three tests—WJ III Picture Vocabulary, WJ III Applied Problems, and the DECA. Maternal education was a significant predictor of expressive vocabulary, math skills, and social-emotional outcomes. Household income also predicted social-emotional outcomes. In addition, child care quality was positively associated with math skills.

Understanding Directions. Understanding Directions was the only outcome for which All Our Kin fully maintained its significance in the first mixed model (*p=.033*). AOK was not a significant predictor of Understanding Directions scores in the second and third models (*p=.426*, *p=.313*), and it barely approached significance in the final model (*p=.099*). Neither the demographic variables nor the child care quality variables predicted these scores, suggesting that the lack of AOK significance may be related to the small sample size rather than any confounding demographic variable.

WJ III Picture Vocabulary. In all four mixed models, AOK did not significantly predict outcomes on the Picture Vocabulary test, although it approached significance in the first model (*p=.093*).[12] In the second model, maternal education strongly predicted Picture Vocabulary scores (*p=.005*). Parent marital status was a significant predictor of these test scores in both the third and the final models (*p=.035* and *p=.030* respectively), and it approached significance in the second model (*p=.097*). While All Our Kin's lack of significance in these models may be due to a lack of statistical power, it also appeared to lose significance due to confounding variables.

Applied Problems. The mixed models did not yield significant AOK results for the Applied Problems test.[13] Maternal education, however, significantly predicted Applied Problems scores in the second model (*p=.011*) and approached significance in the third model (*p=.062*). In addition, child care quality predicted these scores in the second and the third models. The PICCOLO was a significant predictor in both of these models (*p=.031* and *p=.020* respectively), and FCCERS-R predicted these outcomes in the third model (*p=.047*).

DECA. AOK was not a significant predictor in any of the models for the DECA[14]. The second mixed model showed only the FCCERS as predictive of child outcomes *(p=.014)*. The third mixed model showed that that both maternal education (*p=.035*) and child household income (*p=.021*) significantly predicted the DECA Total Protective Factors scores. The FCCERS-R approached significance (*p=.054)* in the third model, but the PICCOLO was not significantly related (*p=.522*) to these social emotional outcomes. In the

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[12] Picture Vocabulary and AOK: model 2 not significant (*p=.898*); model 3 not significant (*p=.725*), model 4 not significant (*p=.589*)

[13] Applied Problems and AOK: model 1 not significant (*p=.620*), model 2 not significant (*p=.720*), model 3 not significant (*p=.995*), model 4 not significant (*p=.724*)

[14] DECA and AOK: model 1 not significant (*p=.151*), model 2 not significant (*p=.646*), model 3 not significant (*p=.617*), model 4 not significant (*p=.198*)

final model, both maternal education and household income were significant predictors of the DECA Total Protective Factors scores ($p=.036$ and $p=.022$ respectively).

6. Limitations

There were several limitations to the study. One serious limitation was the small sample size, which compromised our capacity to find significant results. In addition, the very small number of Spanish-speaking children limited the ability to analyze their results in the multivariate and mixed models. It is also likely that there was selection bias in the provider and parent samples for both AOK and the comparison group, because providers and parents who perceived the children as doing well may have chosen to participate in the study. In addition, there may have been a bias issue in the DECA results, which may have been influenced by provider personal perceptions of children. The quasi-experimental study design represented another weakness, because the differences between the AOK and the comparison samples were not randomized

There were other limitations as well, primarily related to the measures. The floor effect for the WJ III Applied Problems test may have compromised the results, because the study sample was skewed towards younger children whose scores could not be included. In addition, the survey data responses may have been inaccurate for three questions. Many parents did not provide complete answers to the question about the number of children and adults in the household. The question about income may also have elicited misleading responses, since a large proportion of parents (38%) reported incomes at $65,000 or above, suggesting that there should have been more discreet income categories. In addition, many parents also skipped the question about how long the child had been learning a second language, thus changing the study's method of calculating language exposure.

7. Discussion

Phase One of our evaluation of quality in the AOK Family Child Care Network found positive results. The AOK providers had significantly higher observed quality on the FCCERS-R and the PICCOLO than the comparison group of providers who were not affiliated with AOK. Phase Two provided an opportunity for us to examine whether these differences in quality translated into differences in child outcomes related to school readiness.

Some of our results are promising. On the two assessments of children's language abilities, the WJ III Understanding Directions and Picture Vocabulary tests, the AOK children performed significantly better than the comparison group of children. The AOK children's scores for math skills on the WJ III Applied Problems test were higher than those for the comparison group children as well. In addition, significant percentages of AOK children had scores higher than the national norms on the language and math assessments and the proportion of AOK children who scored above average on the language assessments was significant as well. By comparison, the comparison group did not perform significantly better than the national norm on any of the language and math assessments, and scored significantly above average on only one language test.

By themselves, these findings would suggest that children enrolled with AOK providers are faring better than children who are enrolled with providers who are not affiliated with AOK. Some of our other results point in this direction. For example, we found that observed quality in the FCCERS-R, which was significantly higher for AOK providers than the comparison group providers in the Phase One study, was related to three of the four assessments—the WJ III Picture Vocabulary and Understanding Directions tests and the DECA Total Protective Factors. In some of our mixed models, FCCERS-R and PICCOLO quality predicted math outcomes and FCCERS-R quality approached significance in predicting social-emotional quality.

When we introduced family and child factors into our models, however, we found that two family characteristics explained the differences in child outcomes, although AOK predicted scores on one of the child assessments. These findings are consistent with results from other studies, which show the importance of both parental factors and child care quality on children's developmental outcomes. A meta-analysis of 20 ECE studies of quality and 4 large-scale data sets, for example, found that early childhood quality was modestly associated with children's academic, language and social skills, despite family characteristics (Burchinal et al, 2009). A recent secondary analysis of the Early Childhood Longitudinal Study-B data of two- and four-year-old children in 9,000 child care settings, including family child care, however, concluded that family background factors such as income and education are associated with differences across settings, while quality serves as a mediator of children's outcomes (Bassok, Fitzpartrick, Greenberg, & Loeb, 2016).

It is possible that the characteristics of our sample may have affected AOK's influence on children's outcomes, because the sample included relatively large percentages of children whose mothers had high levels of education and whose families had moderate to high incomes. Research indicates that children in better educated and higher income families tend to have stronger school readiness skills than those with poorer and less educated parents (Child Trends, 2015).

The choice of measures may have affected the study result as well. In some of the mixed models, the FCCERS-R and the PICCOLO significantly predicted child outcomes (the FCCERS-R for Total Protective Factors and Applied Problems, and the PICCOLO for Applied Problems). When family characteristics were included, however, neither the FCCERS-R nor the PICCOLO significantly predicted any child outcomes. This finding suggests that these two measures of observed quality may not accurately detect specific child outcomes, which other studies have suggested as well (Burchinal et al., 2011; Tout et al., 2005).

8. Conclusion

Combined with the Phase One findings about AOK family child care quality, the study results, especially those related to children's performance compared to national norms, show that the AOK model has the potential to have an effect on children's outcomes. The findings point to the need for additional research that would have a stronger capacity to identify the relationship between the quality of care that AOK's family child care providers offer and the impact on children.

One future research option might be to focus on AOK providers specifically rather than comparing them to non-affiliated providers. Such studies could include a pre/post design to examine if AOK provider quality improves children's cognitive, language and social-emotional development or a longitudinal study that would follow a cohort of AOK children over time, from enrollment to kindergarten entry. Another option might be a matched control design of AOK providers and non-AOK providers or a randomized control trial. Irrespective of the choice of design, the research will contribute to a better understanding of the effectiveness of family child care networks in enhancing provider quality and positive child and family outcomes.

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Appendix A: Parent Survey

Parent/Guardian Survey

The person who spends the most time with the child (i.e. primary caregiver) should complete this form. Please return this form to your child's provider within three (3) days.

Please answer the following questions to the best of your ability. This information will be *completely anonymous and never shared in connection with your name or your child's name.*

1. Are you the child's **primary caregiver**? YES NO

2. **What is your relationship** to the child in the study? (ex. parent, grandparent, foster parent, step-parent, relative) _____

3. What is this child's **primary language**? _____

4. Is this child actively learning **another language**? YES NO

    a. If yes, what language(s)? _____

    b. If yes, **how long** has the child been learning each additional **language**?

    Language 1: ___ years, ___ months
    Language 2: ___years, ___ months

5. Which **days** does this child spend with their **child care provider**? (circle all that apply)

    M T W Th F Sat. Sun.

6. How many **hours per day** does this child spend with their **provider**?_____

7. **How long** has this child been **with his/her provider**? ____ years ____ months

8. Does this child have **older siblings?**
    YES NO

    a. If yes, have you used this provider for **other children in the past**?
    YES NO

    b. **For how many years** have you used this provider?
    _____

9. What is this child's **birth date**?_____

10. What is this child's **gender**?_____

11. Was this child **born in the United States**? YES NO

12. What is this **child's race/ethnicity?**
- Ĭ American Indian or Alaska Native
- Ĭ Asian
- Ĭ Black or African American
- Ĭ Hispanic, Latino, or Spanish origin
- Ĭ Native Hawaiian or Other Pacific Islander
- Ĭ White
- Ĭ Some other race/ethnicity, please specify:_____

13. Is this child receiving services from **Birth to Three or ECAT**? YES NO

14. What **language(s)** do you **speak to this child**?_____

The questions below are about you. Just like the rest of the survey, this information will remain anonymous and will not be shared outside of this study. If you have more than one child participating, you only need to complete questions 15-23 once.

15. Were you born in the United States? YES NO
16. In what **year** were you born?_____

17. Are you currently **employed**? YES NO
    a. If yes, do you work **full-time** (35 or more hours per week)? YES NO

18. What is **your race/ethnicity**? Mark one or more boxes.
- Ĭ American Indian or Alaska Native
- Ĭ Asian
- Ĭ Black or African American
- Ĭ Hispanic, Latino, or Spanish origin
- Ĭ Native Hawaiian or Other Pacific Islander
- Ĭ White
- Ĭ Some other race/ethnicity, please specify:_____

19. What is your **annual household income** from all sources before taxes?
This includes the wages earned by everyone who lives in your home.
- Ĭ Under $15,000 per year
- Ĭ $15,001 - $25,000
- Ĭ $25,001 - $35,000
- Ĭ $35,001 - $50,000
- Ĭ $50,001 to $65,000
- Ĭ Over $65,000

20. What is your **highest level of education**? (Please check one)
- Ĭ 8th grade or below

- Some High School
- High school diploma/GED; Date_____
- Some college
- Associate's Degree
- Bachelor's Degree
- Master's Degree or above

21. If you are not the child's mother, please indicate the **highest level of education of the child's mother** if you know it. (Please check one)

- 8th grade or below
- Some High School
- High school diploma/GED; Date_____
- Some college
- Associate's Degree
- Bachelor's Degree
- Master's Degree
- Unknown

22. What is your **marital status**?

- Married
- Single
- Divorced
- Widowed
- In a civil union or domestic partnership

23. How many **adults** (age 18 or older) live in your household? _____
24. **How many children** (age 17 and younger) live in your household? _____

Appendix B: Analysis with All Children

Analysis was completed using the dataset that included the 5 children who were tested in a language that deviated from the testing procedure. Differences are explained below.

1. Child Outcomes

The trend of All Our Kin children performing better than children in the comparison group was maintained or strengthened when five children who were tested in a language that deviated from the testing procedure were included. These outcomes were statistically significant on four measures: Total Protective Factors, Understanding Directions, Picture Vocabulary, and Vocabulario Sobre Dibujos.

Higher Performance

All Our Kin children performed significantly better on Total Protective Factors, Understanding Directions, Picture Vocabulary, and Vocabulario Sobre Dibujos.

All Our Kin children also performed better on the test of Applied Problems, but the effect size of .18 indicated that the result was trivial and also was not statistically significant ($p=.498$).

Insufficient Data

Because there was only one Spanish-speaking child in the comparison group who completed Comprehensión de Indicaciones and Problemas Aplicados, no conclusions could be drawn from those two tests.

Table A.1: Comparison of AOK and non-AOK Children's Outcomes including All Children

Child Outcomes							
	AOK			Comparison			
	Mean	SD	N	Mean	SD	N	Sig
Woodcock Johnson							
Understanding Directions	106.4	13.1	45	99.1	10.8	25	**0.019***
Applied Problems	106.2	16.1	39	103.6	13.6	22	0.519
Picture Vocabulary	113.9	9.7	45	107.9	11.7	27	**0.021***
Comprehensión de Indicaciones	76.2	25.2	10	80.0	NA	1	0.889
Problemas Aplicados	98.4	13.3	10	99.0	NA	1	0.967
Vocabulario Sobre Dibujos	81.9	17.7	13	51.3	22.5	3	**0.022***
DECA							
Total Protective Factors	56.9	9.1	58	52.3	9.0	25	**0.035***

*** p < .01*
** p<.05*

2. Demographics Associated with Child Outcomes

Consistent with previous research, both household income and maternal education were strongly correlated with all measures of child outcomes. Parent age was only significantly associated with child outcome scores on picture vocabulary. Child age was negatively associated with picture vocabulary. The correlations below can be understood as indicating effect size according to the following guidelines: .1 indicates a small effect size, .3 indicates a medium effect size, and .5 indicates a large effect size.

Table A.2: Correlations Between Child Outcomes & Demographic Characteristics including All Children

	1	2	3	4	5	6	7
1. Picture Vocabulary	1						
2. Total Protective Factors	.224	1					
3. Understanding Directions	**.339****	.177	1				
4. Applied Problems	**.507****	.164	**.436****	1			
5. Household income	**.465****	**.292***	**.374****	**.307***	1		
6. Maternal Education	**.491****	**.318****	**.357****	**.449***	**.744****	1	
7. Parent Age	**.310***	.172	.127	.110	**.496****	**.390****	1

*** p < .01*
** p<.05*

Table A.3: Correlations Between Child Outcomes & Demographic Characteristics including All Children

	1	2	3	4	5	6	7
1. Vocabulario sobre Dibujos	1						
2. Total Protective Factors	.117	1					
3. Comprensión de Indicaciones	**.735***	.215	1				
4. Problemas Aplicados	**.726***	.338	**.781***	1			
5. Household income	.340	.456	.174	.533	1		
6. Maternal Education	.426	.136	-.131	.370	.355	1	
7. Parent Age	-.504	-.118	-.519	-.137	-.045	.263	1

*** p < .01*
** p<.05*

The charts below indicate the level to which parent marital status, race-ethnicity, gender, and parent employment status were aligned with child outcomes. Parent marital status was the only categorical variable approaching significance for Total Protective Factors, and race was the only significant categorical variable for the Woodcock Johnson.
The eta-squared (η^2) is used as a measure of effect size, where .01 indicates a small effect, .06 indicates a medium effect, and .14 indicates a large effect.

Table A.4.1: Outcomes from ANOVAS Analyzing Associations Between Categorical Variables and Child Outcomes: Understanding Directions

Child Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=0.330, d^2=0.051
Married	106.74	11.59	35	
Civil Union/Dom. Part.	99.00	13.08	3	
Single	101.19	14.202	27	
Divorced	102.50	9.54	4	
Child Race/Ethnicity	Mean	Std. Deviation	N	p=0.052, d^2=0.110
White	109.36	11.06	25	
Black or African-American	100.88	12.73	17	
Hispanic/Latino of Any Race	101.05	11.61	22	
Multi-Racial or Other	99.00	17.75	6	
Gender				p=.0.721 d^2= 0.002
Female	103.33	13.67	40	
Male	104.43	11.52	30	
Parent Employed				p=0.145, d^2=0.031
Yes	94.75	9.22	4	
No	104.40	12.83	65	

*** p < .01*
** p<.05*

Table A.4.2: Outcomes from ANOVAS Analyzing Associations Between Categorical Variables and Child Outcomes: Applied Problems

Child Characteristics	Mean	Standard Deviation	N	Significance & Effect
Parent Marital Status				p=0.129, ɖ²=0.096
Married	107.93	17.05	29	
Civil Union/Dom. Part.	88.33	19.63	3	
Single	103.33	11.86	24	
Divorced	111.50	9.47	4	
Child Race/Ethnicity				**p= 0.011*, η²= 0.176**
White	112.74	14.65	23	
Black or African-American	97.00	15.41	15	
Hispanic/Latino of Any Race	103.33	10.181	18	
Multi-Racial or Other	102.20	19.64	5	
Gender				p=0.631, ɖ²=0.004
Female	104.44	15.31	36	
Male	106.36	15.16	25	
Parent Employed				p=0.755, ɖ²=0.002
Yes	107.50	10.41	4	
No	105.00	15.617	56	

*** p < .01*
** p<.05*

3. Child Outcomes and Quality

In the correlations chart table below, neither FCCERS scores nor PICCOLO scores were significantly correlated with child outcomes. The strongest correlations were among different sections of the WJ III. The weakest correlations were between the FCCERS and Problemas Aplicados.

Table A.5: Correlations Between Child Outcomes and Provider Quality including All Children

	1	2	3	4	5	6
1. Vocabulario sobre Dibujos	1					
2. Total Protective Factors	.117	1				
3. Comprensión de Indicaciones	**.735***	.215	1			
4. Problemas Aplicados	**.726***	.338	**.781***	1		
5. PICCOLO	.127	.130	.351	.128	1	
6. FCCERS	.338	.030	.067	.339	**.638***	1

*** p < .01*
** p<.05*