5-2016

Differences Between Two Head Start Locations Using the Developmental Indicators for the Assessment of Learning (DIAL) as a Measure of Language and Concepts

Hailey Guthrie
University of Arkansas, Fayetteville

Differences Between Two Head Start Locations Using the Developmental Indicators for the Assessment of Learning (DIAL) as a Measure of Language and Concepts

The acquisition of concepts is critical to the development of language, cognition, and reading. According to the Developmental Indicators for the Assessment of Learning, Fourth Edition (DIAL-4), concepts are the "building blocks of knowledge that allow children to organize and categorize information" (Mardell & Goldenburg, 2011, p.8). Language is considered integral to emotional, social, and cognitive development (Copple & Bredekamp, 2009). Maternal education is a factor on children's language development; the higher the education level of the mother, the greater the child's language skills (Dollaghan et al., 1999). Further, additional research has shown that increase in maternal education results in increases children's language skills (Magnuson, Sexton, Davis-Kean, & Hutson, 2009). Duhan (2010) notes that children living in a rural setting understand fewer basic concepts than their peers, putting them at risk for lower vocabulary knowledge from a very early age. Thus, it appears that a number of factors affect early language and conceptual knowledge; however, it is unclear how these aspects contribute to language, concept, and motoric acquisition.

One important contributing factor to concept acquisition is early exposure to language. Basic concept understanding is essential in the classroom, even at a young age. Concepts are for comprehending texts, and the material gets increasingly more difficult as the child gets older. Pikulski and Templeton (2004) stated that as texts become more challenging at each grade level, students begin to fall behind. Concepts provide the base foundation children need in order to understand the language used in the classroom (Duncan et al., 2007). Like concepts, language is imperative for learning across the curriculum. As specific academic subjects become more challenging, the foundational language must be present for the child to be academically

successful (Mardell & Goldenburg, 2011). Basic concepts are often used in instructional teaching in order to request something of the children ("Stand at the *back* of the line," "put the paper *in* your desk," "circle *all* the correct answers"). Thus, early concept exposure is critical to later academic success. Language skills are imperative for learning across the curriculum. For example, children need to know the foundational basis of math in order to understand more challenging mathematical aspects in later years. Language development is also needed to achieve adequate reading comprehension (Mardell & Goldenburg, 2011).

Another important contributing factor to concept acquisition is socio-economic-status (SES). Since Head Start is a government-funded program for children in poverty-stricken homes, it is important to note that children attending a school in a low SES area could have a higher risk of delay in comprehension skills than children in middle or high SES areas. (Basit, Hughes, Iqbal, & Cooper, 2014). Pikulski and Templeton (2004) also indicate that children that are raised in a low SES family have less verbal interaction in the home, resulting in starting school with a lower vocabulary than their peers. Findings also denote that once a gap in concept knowledge is established in early childhood, it is extremely hard to recover (Pikulski & Templeton, 2004). Research has shown that SES is significantly correlated with a child's vocabulary and that a child from a low SES home develops vocabulary slower (Hoff, 2003). In addition to slow vocabulary development, a separate study found that children in lower SES families showed a slower rate of growth in the area of expressive language (Pungello, et al., 2009). Head Start students are typically seen as needing intervention in order to be as ready as their peers when entering formal education. It was noted by the United States government that all children should enter formal education ready to learn. Head Start is designed to prepare lower SES children for formal education (Wilson, 2004).

A third factor known to affect early vocabulary and concept development is maternal education. Hammer, Farkas, & Maczuga (2010) found that even when every mother participating in the study had a low education level, any individual with somewhat of a higher education had larger vocabularies (Hammer et al., 2010). For example, a mother with a high school education had a larger vocabulary than a mother with a middle school education. Children's letter recognition and language were both low when maternal education levels were low. Muluk and Anlar (2013) conducted a study to assess factors affecting language development screening test results. The findings of this study expressed that there is a direct correlation between items known on the language screener and the level of the mother's education (Muluk & Anlar, 2013). Some of the factors analyzed when discussing language include mean length of utterances (MLU), number of different words (NDW), and the total number of words (TNW) used. To further elaborate on a previous mentioned study, Dollaghen found that as maternal education levels increased, the children's MLU, NDW, and TNW scores increased (Dollaghan et al., 1999). The comprehension and production of language are both affected by maternal number of years schooling (Letts et al., 2012). In this study, the children whose mothers had a higher education performed better with comprehension and production of language (Letts et al., 2012).

Further research has indicated that maternal education also has a factor in the quality of the child's preschool (Augustine, Cavanagh, & Crosnoe, 2009). Augustine et al. (2009) illustrated that maternal education affects both the child-care arrangements and the child's school readiness levels. The findings suggest that children with more educated mothers are more likely to be placed in child-care environments that are more beneficial academically. Further, given that SES, child-care environment, and maternal education are related, it is also possible that

interactions between these factors account for significant influences on basic concept development.

Smith's research (2015) provided evidence indicating that students of the same age attending different Head Start programs within the same county performed differently on the Bracken Basic Concept Scale – Third Edition (BBCS: 3), despite uniform requirements to meet the government-funded program (e.g., SES). As such, it is as yet unclear what factors may influence differences in basic concept scores for these two local Head Start programs.

The purpose of this study is to determine whether or not there are differences in socio-demographic factors as indicated in the literature that shed light on differences in language, conceptual, and motoric knowledge between two different Head Starts in the Northwest Arkansas region. The specific aims of the study are to first collect socio-demographic information via questionnaire concerning maternal education, household income, language spoken at home, and ethnicity to explore variables that may be different between the families attending the two Head Start programs. Second, an objective measure of language, conceptual, and motoric knowledge (i.e., the DIAL-4) will be used to gather further information about differences in concept and language knowledge between children attending the two Head Start programs. This research is imperative for our region, especially the Head Start community. If the disparities and unequal elements contributing to the discrepancy between the two locations can be determined, changes can be implemented. These changes can create more equal learning opportunities in the Northwest Arkansas region. This early intervention will benefit students and level the playing field, giving every student equal opportunity to be successful.

The research questions of the current study were as follows:

1.) Are there significant differences in motor, language, and conceptual knowledge as assessed on the DIAL-4 screener of students attending two different Head Start programs in neighboring cities?
2.) Are there differences in the demographic information of families that have children attending Head Start programs in two local cities?

Methods

Participants

Families that participated in the present study had at least one child enrolled in one of two local Head Start programs in adjoining cities. Twenty families from the first Head Start location (location A) and twenty-three families from the second Head Start location (location B) participated in the study. The mean age for children at location A was 46 months (standard deviation = 8 months) and 47 months (standard deviation= 8 months) for location B. Children with otitis media and/or a documented disability were excluded from participation. There was no significant difference in age ($t(41)= -0.523$, $p= .604$) between groups.

Procedures

Initial contact was made with parents during beginning of the spring semester at local Head Start schools. The principle investigator provided an explanation of the study procedures, benefits, and answer any questions parents might have. Consent forms and surveys approved by the University's Institutional Review Board were administered at the schools and sent home with children. DIAL-4s were administered to all children attending Head Start programs in the fall. Consent forms and surveys were completed and picked up by the principle investigator and the

DIAL-4 was collected for analysis. Only the data from those students with signed consent forms was used for this study.

Analysis

The DIAL-4 results were compared between groups, assessing motor, language and conceptual understanding using independent t-tests. Independent t-tests and descriptive statistics were used to compare demographic information between the two Head Start locations.

Results

Results from independent *t* – tests revealed no significant differences between the DIAL-4 concept and language sub-test standard scores when Head Start locations A and B were compared (t (41) =-.275, p=.785; t (41) =-1.47, p=.149, respectively). DIAL motor sub-test scores for Head start locations A and B were significantly different (t(41) =-2.180, p<.05). The mean motor standard score for the location A was 94.90 and the mean motor standard score for the location B was 104.91. No significant difference was found on the DIAL-4 total standard scores (i.e., a combination of all three subtests) (t (41) = -1.734, p=.091).

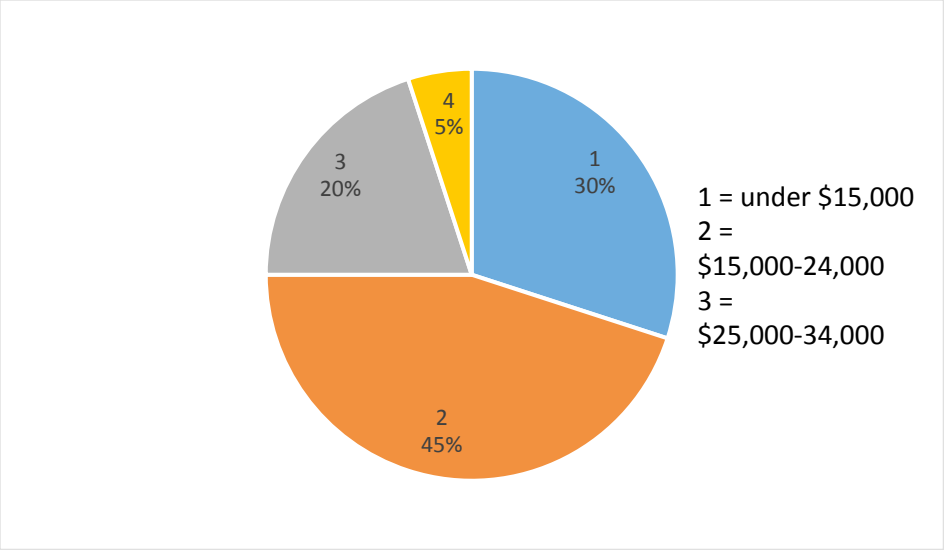
The mean standard scores and standard deviations (SDs) for locations A and B were, respectively, 94.00 (13) and 95.35 (18) for concepts, 92.40 (13) and 99.74 (19) for language, and 92.05 (11) and 100.04 (18) for the total DIAL-4 score (see Table 1).

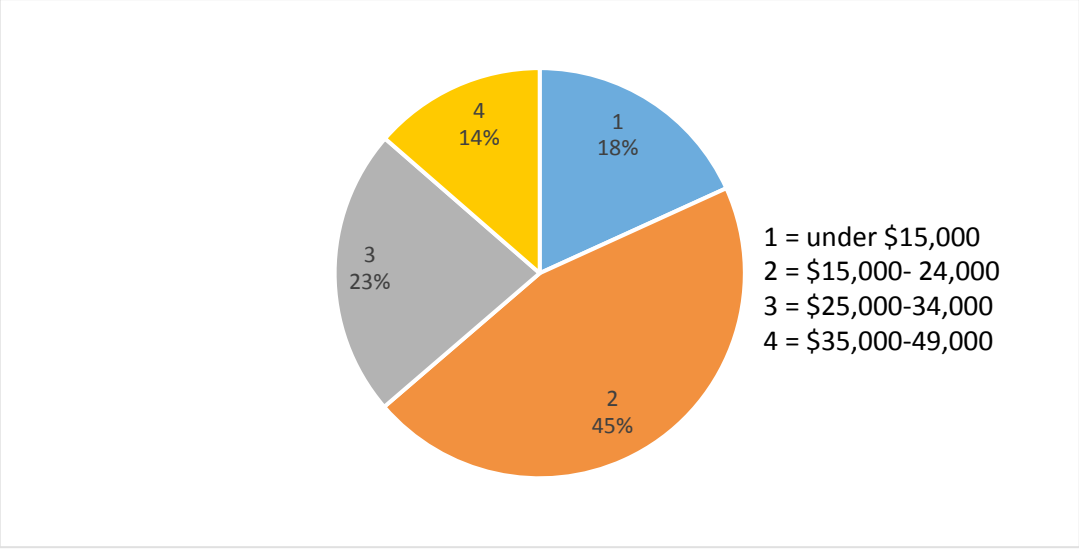
Table 1 *Means and standard deviations (SD) for motor, concepts, language, and total standard scores on the DIAL-4.*

	Location A Mean (SD)	Location B Mean (SD)
Motor: Standard Score	94.90 (14.860)	104.91 (16.744)
Concepts: Standard Score	94.00 (13.373)	95.35 (18.012)
Language: Standard Score	92.40 (13.088)	99.74 (18.677)
DIAL: Standard Score	92.05 (11.399)	100.04 (17.654)

For locations A and B, the majority of families reported annual incomes in the $15,000 – 24,000 range (see Figures 1 & 2). No notable differences in income between the two locations were observed.

Figures 1 and 2. *Reported annual family income for locations A and B.*

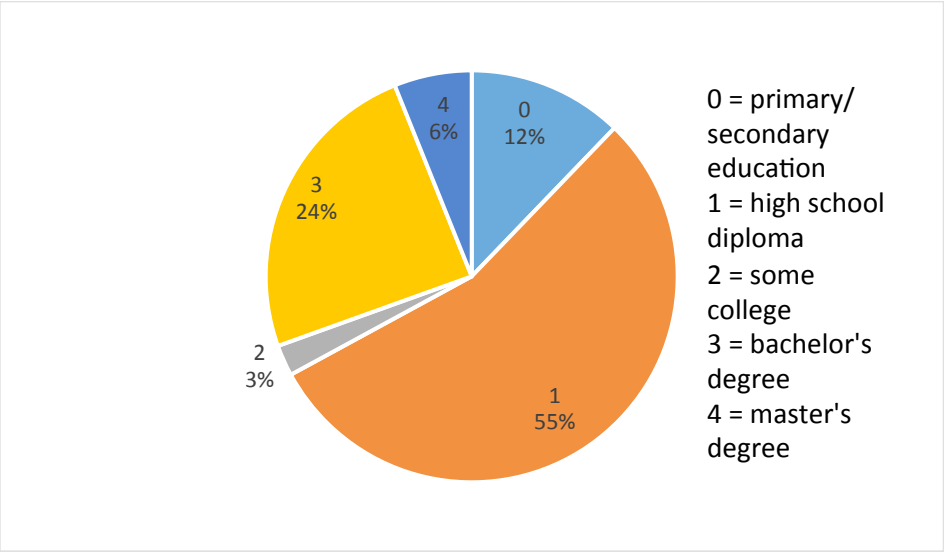


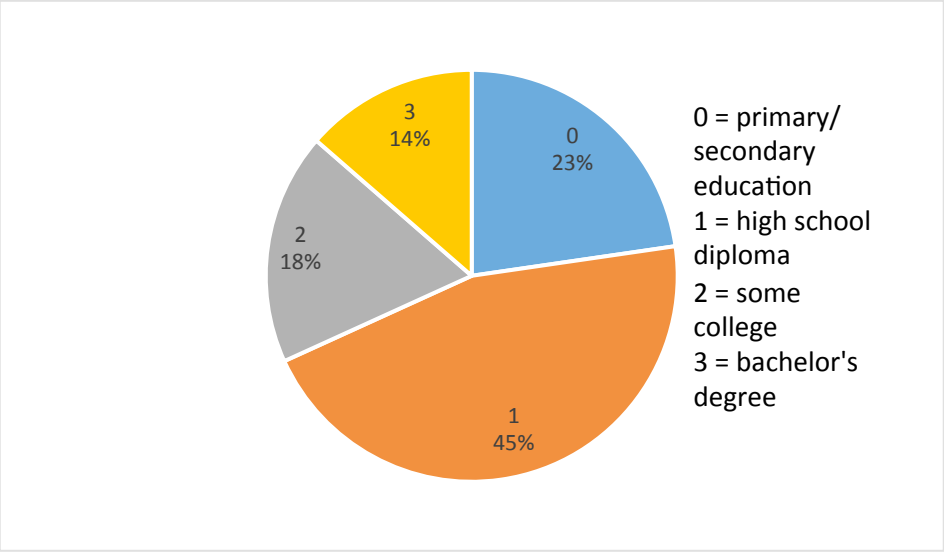


For both locations A & B, the majority of mothers reported having a high school diploma. Notable differences include some mothers (3%) having a Master's degree at location A (0% at

location B) and a higher number of parents with a bachelor's degree at location A than location B (24% compared to 14%).

Figures 3 and 4. *Reported maternal education for locations A & B.*

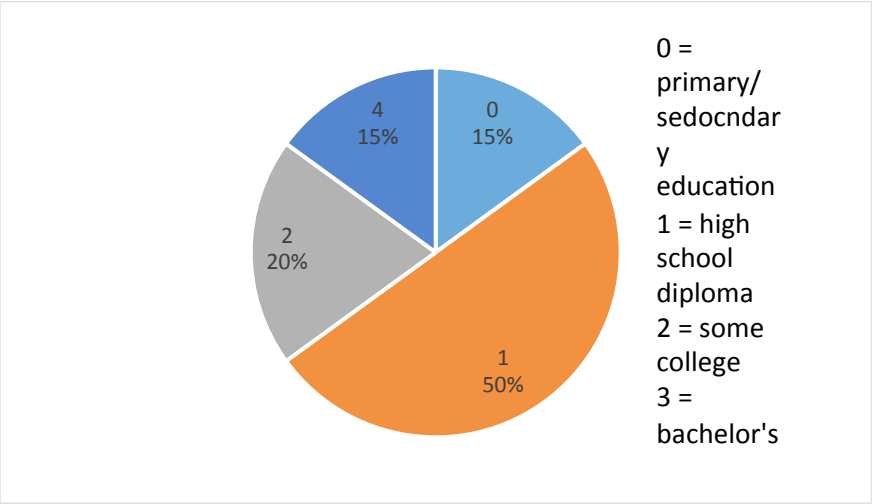


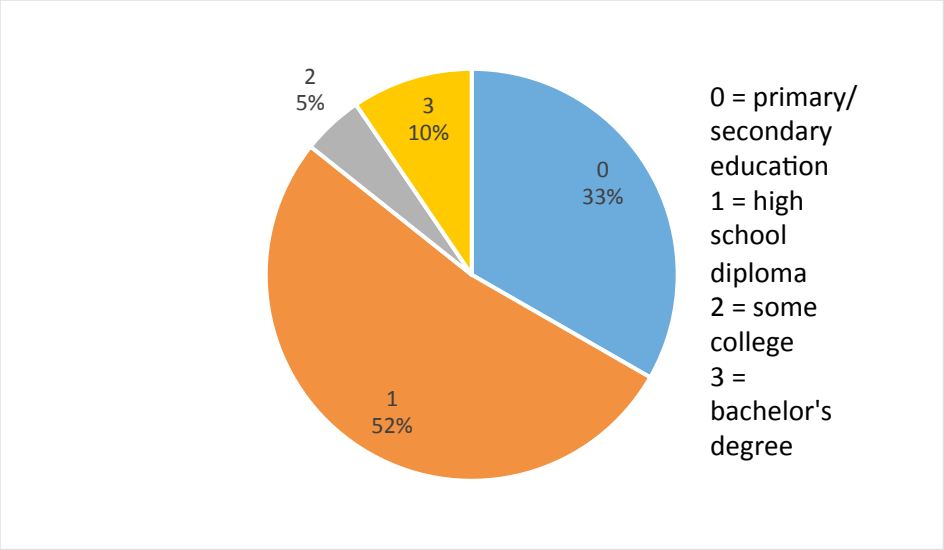


The majority of fathers at both Head Start locations reported obtaining a high school degree. More fathers at locations A were either in college or had completed some college courses (20% and 5%, respectively) or had completed a master's degree (15% and 0%, respectively). At

location B, fathers reported not having obtained a high school diploma (33%) as compared to location A (15%).

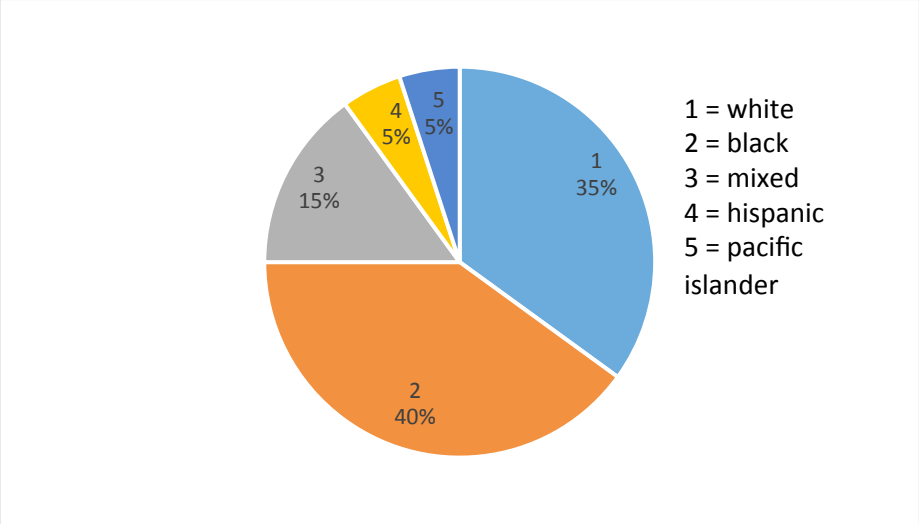
Figures 5 and 6. *Reported paternal education for locations A & B.*

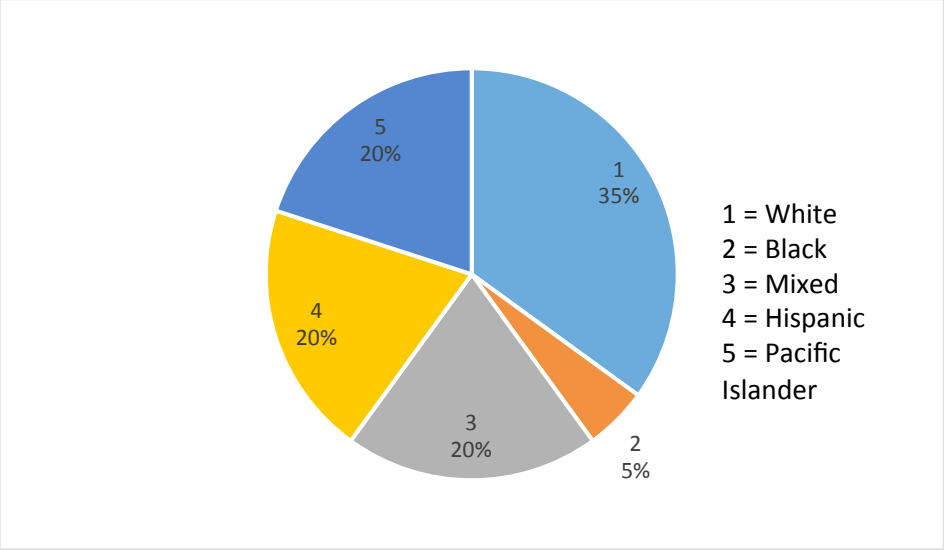




The majority of participants at location A identified as black/African American (40%) and the majority at location B identified as white/Caucasian (35%). At location A, white was the next largest category (35%) followed by mixed at 15%. Pacific Islander and mixed were equally represented at location B (each at 20% of the population at B).

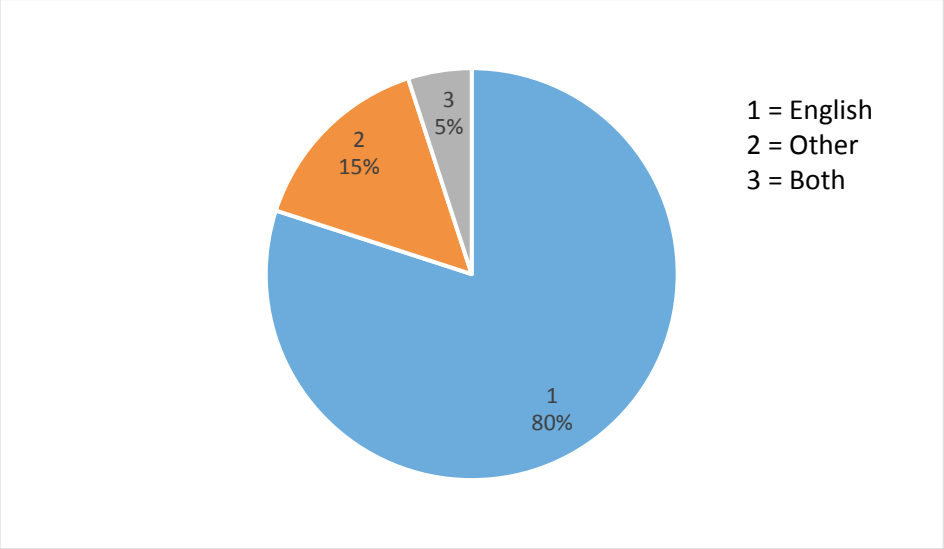
Figures 7 and 8. *Reported race for locations A & B.*

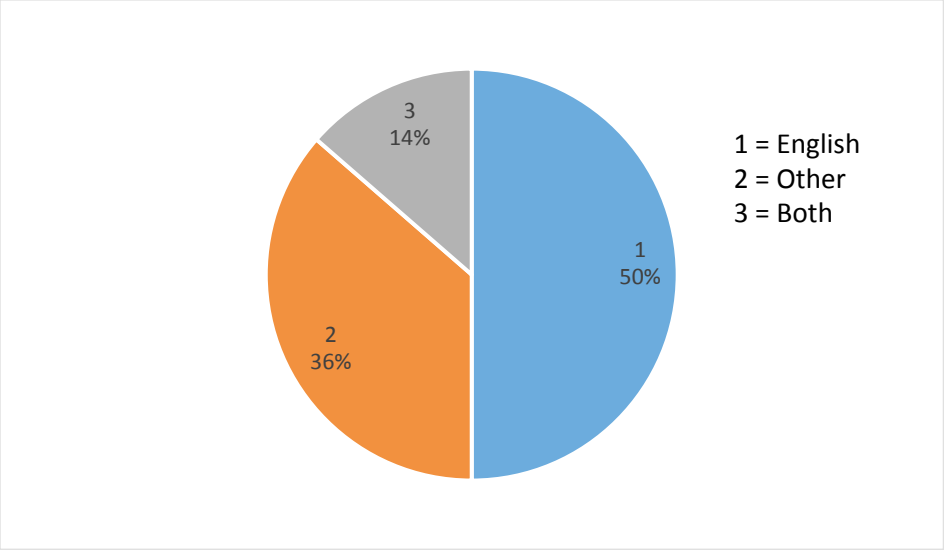




For both locations A and B, the language spoken in the home was English (50% and 80%, respectively). Also at both locations, the next largest population was homes in which two languages (English and other) were spoken (15% and 36% respectively).

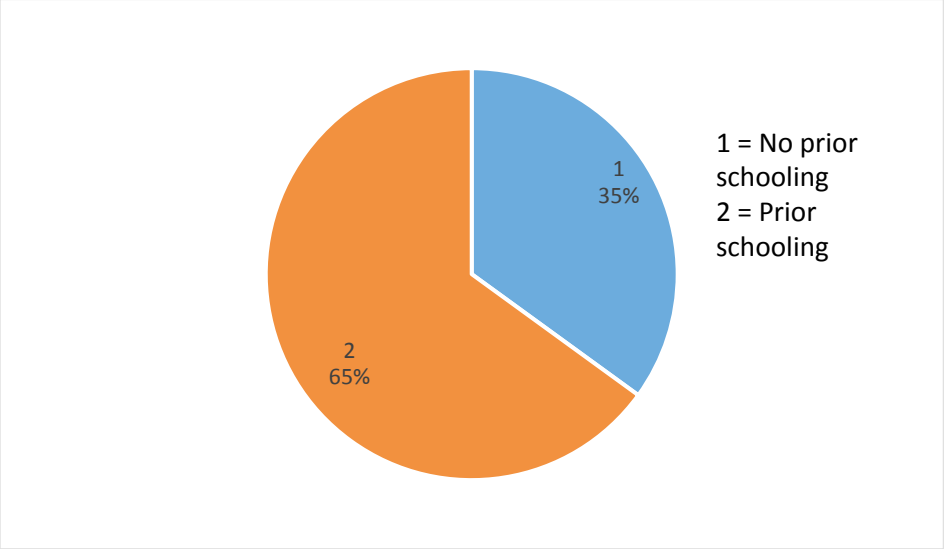
Figures 9 and 10. *Reported language spoken at home for locations A & B*.

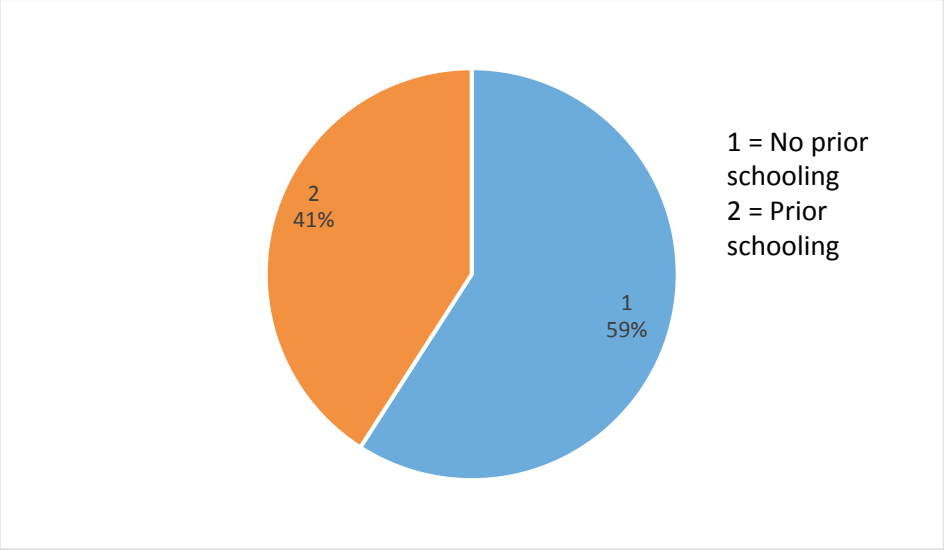




Location A had fewer students that had never had any previous schooling or daycare services provided than those that had (35% had no previous schooling, 65% did). However, at location B the majority of students did not have previous schooling (41% did not, 59% did have previous schooling.

Figures 11 and 12. Reported prior schooling for the child for locations A & B.





Discussion

The acquisition of motoric, conceptual and language development as it pertains to school readiness is critical to academic success. The Developmental Indicators for the Assessment of Learning, Fourth Edition (DIAL-4) is a screener provided to all children that are eligible to participate in the federally funded Head Start programs (Mardell & Goldenburg, 2011). This study was designed to see if students participating in Head Start programs in two nearby cities performed equally on the DIAL-4 and to determine if the demographic information of participating families in different cities was similar across Head Start locations.

Standard scores from the DIAL-4 concept, language and DIAL total were not significantly different between the two locations; however, all scores on all sub-tests and total results for both locations were above a standard score of 85. Thus, all mean scores were within one standard deviation of the population mean of 100, indicating that the DIAL is a reliable way to measure concept and language knowledge of preschoolers attending Head Start schools. This information also indicates that this measure, when given to all students as a screener, may not over identify children with conceptual or language delays.

Early exposure to language is essential for concept acquisition. Concept knowledge contributes to the foundational knowledge that is used in the classroom (Duncan et al., 2007). Sixty-five percent of students at location A had prior schooling; however, at location B, only 41% of the participants had prior schooling. Even though the students at location A, as a whole, had more schooling, their overall total score on the DIAL was was not significantly different than students at location B.

Socio-economic status has also been an indicator of concept and language development. Previous research has shown that low SES is indicative of a smaller vocabulary (Pikulski &

Templeton, 2004). In this study, SES was somewhat controlled for due to the all the participants being enrolled in a government-funded preschool where students who are enrolled must fall below the poverty line. The majority participants from both location A and B had an annual family income of $15,000-$24,000. It is interesting to note that previous research conducted between Head Start programs showed significant differences in concept knowledge when a full basic concept assessment was used (Smith, 2015). In this study, no significant differences using a screener for conceptual knowledge were found.

An additional factor that affects language and concept development is maternal education. A study found that maternal education had a direct correlation to the child's performance on language screener (Muluk & Anlar, 2013). Of the participants from location A and B combined, one of the mothers obtained a master's degree and six earned a bachelor's degree. The majority of mothers had a high school diploma as the highest level of education (55% of the mothers at location A and 45% at location B). In this study, the participant whose mother earned the highest education did not have the highest score on the DIAL. The student that scored the highest at location A had a mother that is currently in college, and at location B the student with the highest score had a mother who had an associate's degree.

Conclusion

Knowing how important motor, conceptual and language knowledge is to school readiness, it is best practice for programs such as Head Start to screen all students to obtain baseline data on children in such programs and identify those students with areas of weakness. A previous study by researcher Rebecca Smith concluded that baseline scores of a basic concept test were different between location A and B of this study (Smith, 2015). Different from the DIAL-4, the Bracken Basic Concept Scale – Third Edition (BBCS-3) assesses 10 categories of

basic concepts (e.g., direction, quantity, sequence, social awareness) using over 300 concepts. This study analyzed the results of the DIAL, which is a screener that uses far fewer items in each category assessed (language, concepts and motor). With the motor, language, and concept screener used in this study, there was no significant differences across location A and B. However, a more in-depth analysis of each student's ability to perform on specifically language or concept performance, as used in Smith's research, may show more variation. While it is certainly not best practice to feasibly use in depth assessments on each child, tests such as the BBCS-3 should be considered for those students that score low on the concept and language sections of the DIAL-4 screener.

The regions of study and sample size were contributing limitations to this study. More information could be obtained if the geographic area of interest was larger and more participants were utilized. Having the study limited to only two locations signifies that the information cannot be generalized. Also, as a result of having one primary investigator, there is potential for bias in several different areas of the study. In addition to researcher bias, there could be discrepancies in the DIAL-4 itself. The DIAL-4 is a screener, it is not a full language or concepts test battery. Also, the test is available in English and Spanish, but no other languages. Combining responses from location A and B, four different languages were marked as being the primary language spoken at home. Of the total number of participants, seven of them were tested in a language that is not their primary language spoken at home. This could indicate that the DIAL is not an adequate measure of the participant's skills because they are being tested in a language different than the one used most often at their home.

Future research could expand the geographic location and obtain more participants. It would be beneficial to examine how Head Start locations across the country performed and what

factors could be contributing to those scores. Performing the same study with a more in-depth assessment in place of the developmental screener could provide data that more truly reflects each child's level of performance.

References

Augustine, J., Cavanagh, S., Crosnoe, R. (2009). Maternal Education, Early Child Care and the Reproduction of Advantage. *Social Forces, 88,* 1-29.

Basit, T., Hughes, A., Iqbal, Z., Cooper, J. (2014). The influence of socio-economic status and ethnicity on speech and language development. *International Journal of Early Years Education, 23*. 115-133.

Bowers, L., Schwarz, I. (2013). Assessing Response to Basic Concept Instruction: Preliminary Evidence with Children Who Are Deaf. *Hammill Institute on Disabilities.* 1-11.

Copple, C., & Brendekamp, S. (Eds.). (2009). *Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth Through Age 8*. Washington, DC: NAEYC

Dollaghan, C., Campbell, T., Paradise, J., Feldman, H., Janosky, J., Pitcairn, D., & Kurs-Lasky, M. (1999). Maternal Education and Measures of Early Speech and Language. *Journal of Speech, Language, and Hearing Research*, 42, 1432-1443, 301-311.

Duhan, K. & Balda, S. (2010). Concept Development among Rural and Urban Preschoolers. *Haryana Agricultural University.* 33-36.

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., & Klebanov, P., Pagani, L., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K. (2007). School readiness and later achievement. *Developmental Psychology, 43,* 1428–1446.

EOA of Washington County, Inc. (2013). *Annual Report 2013*.

Hammer, C., Farkas, G., Maczuga, S. (2010). The Language and Literacy Development of Head Start Children: A Study Using the Family and Child Experiences Survey Database. *Language, Speech, and Hearing Services in Schools, 41.* 70-83.

Hoff, E. (2003). The Specificity of Environmental Influence: Socioeconomic Status Affects Early Vocabulary Development Via Maternal Speech. *Child Development, 74*, 1368-1378.

Klibanoff, R., Levine, S., Huttenlocher, J., Vasilyeva, M., & Hedges, L. (2006). Preschool Children's mathematical Knowledge: The Effect of Teacher "Math Talk." *Developmental Psychology*, 42, 59-69.

Letts, C., Edwards, S., Sinka, I., Schaefer, B., Gibbons, W. (2012). Socio-economic status and language acquisition: children's performance on the new Reynell Developmental Language Scales. *International Journal of Language and Communication Disorders, 48*. 131-143.

Magnuson, K., Sexton, H., Davis-Kean, P., Huston, A. (2009). Increases in Maternal Education and Young Children's Language Skills. *Merril-Palmer Quarterly, 55.* 319-350.

Mardell, C., Goldenburg, D. (2011). *Developmental Indicators for the Assessment of Learning, Fourth Edition Manual*. Bloomington, MN: Pearson

Muluk, N., Anlar, B. (2013). Language development and affecting factors in 3- to 6-year-old children. *Eur Arch Otorhinolaryngol*. 871-878.

Pikulski, J., Templeton, S. (2004). Teaching ad Developing Vocabulary: Key to Long-Term Reading Success. *Current Research in Reading/Language Arts*. 1-12.

Seifert, H., Schwarz, I. Treatment Effectiveness of Large Group Basic Concept Instruction With Head Start Students. *Language, Speech, and Hearing Services in Schools.* 60-64.

Smith, R. (2015). *Assessing vocabulary of children: Investigating the evaluation and instruction of basic concepts* (Unpublished master's thesis). The University of Arkansas, Fayetteville, AR.

Pungello, E., Iruka, I., Dotterer, A., Mills-Koonce, R., Reznick, J. The Effects of Socioeconomic Status, Race, and Parenting on Language Development in Early Childhood. *Developmental Psychology, 45*. 544-557

Wilson, P. (2004). A Preliminary Investigation of an Early Intervention Program: Examining the Intervention Effectiveness of the *Bracken Concept Development Program* and the *Bracken Basic Concept Scale-Revised* with Head Start Students. *Psychology in the Schools, 41*, 2004.