Promoting Early Literacy of Preschool Children:

A Study of the Effectiveness of *Funnix Beginning Reading*

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Executive Summary

Funnix Beginning Reading is a computer-based reading instructional program and is part of the large corpus of Direct Instruction (DI) curricular materials. Like other DI materials, *Funnix* was developed through a long process of formative evaluation and field testing and is carefully structured and designed to provide systematic and explicit instruction. While a large body of research has documented the success of DI programs such as *Reading Mastery* in promoting achievement, relatively less work has examined *Funnix Beginning Reading* or its print counterpart, *Horizons*.

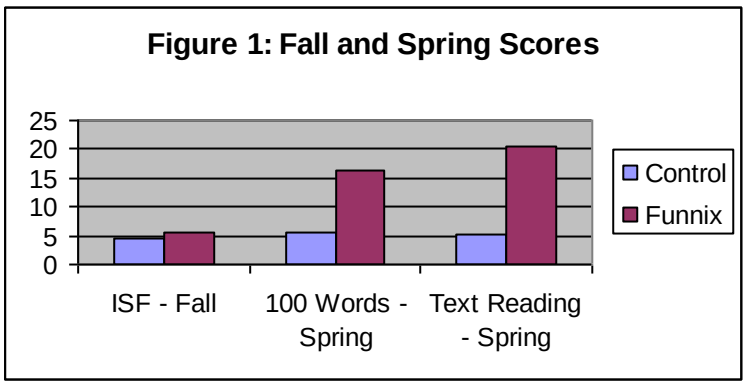
This paper reports the results of a study that employed a pretest-posttest control group design to examine the relationship of instruction in *Funnix Beginning Reading* to the development of beginning reading skills. Thirty-seven four year old Head Start students in a suburban area of the southern United States were randomly assigned to receive 30 minutes of daily instruction in *Funnix* or the same amount of time in additional instruction in their regular Language Arts program. Students came from six different classrooms. All instruction for students in the Control group was provided by their classroom teachers and teaching assistants. Instruction for the Experimental group was provided by high school aged tutors who received six hours of training before beginning their work with the students and had on-site supervision from a certified teacher during the tutoring sessions. All students were from low income families. Almost half (n=18) of the students were racial-ethnic minorities, and over a quarter (10/37) were from homes with a language other than English was primarily used.

Pretesting before instruction began indicated that there were no significant differences between the two groups in beginning literacy skills. However, by winter and spring the students in the *Funnix* group had significantly higher scores on various DIBELS measures of beginning literacy, including accurate naming of letters (LNF), identifying the initial sounds of words (ISF), reading nonsense words (NWF), and separating words into phonemes (PSF). In the spring students in the *Funnix* group were also more likely to correctly answer any items on the Woodcock Reading Mastery Word Identification and Word Attack subtests and had significantly higher scores on two oral reading tests. Comparison of scores to established benchmarks indicate that the *Funnix* students were more likely than the students in the Control group to have acquired early reading skills related to later academic success. These results remained with statistical controls and with a reduced sample that individually matched students in the two groups on their fall test scores, gender, and race-ethnicity. The results also occurred among students who would be seen as at risk because of their racial-ethnic status and/or the language spoken in their home, as well as among other students.

Researchers have set a value of Cohen's d equal to .25 (measured as the difference between two means divided by the common standard deviation) as the level of difference between two groups that reflects an educationally important finding. The effect sizes of differences between the *Funnix* group and Control group in the spring ranged from .51 to 2.24, with an average value of 1.00. Effect sizes from scores obtained in the winter, partway through

the school year, ranged from .72 to 1.55, with an average value of .88. In short, all of the effect sizes indicated an impact that far surpassed the usual criterion of educationally important effects.

Figure 1 illustrates the magnitude of these differences. Results with the DIBELS test of Initial Sound Fluency administered in the fall and two oral reading measures administered in the spring are shown. While children had, on average, very similar scores in the fall, by the spring those exposed to *Funnix* had substantially higher achievement.



In general, the results of this study suggest that *Funnix Beginning Reading* is effective in enhancing the beginning literacy skills of low-income preschool aged children. The results remain with strong controls for children's initial skills. The validity of these findings is enhanced by the random assignment of children to treatment and by the use of multiple instructors in both the experimental and control groups. Finally, the results demonstrate how high school aged students, with adequate support and supervision, can serve as effective reading tutors in a preschool setting.

Acknowledgements

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A large body of literature documents the relationship of early reading achievement to later academic accomplishments and economic and social well-being. Students who are poor readers in first grade have substantially higher probabilities of later academic, economic, and social problems than students who achieve at grade level at that time (e.g. Juel, 1988; Lipson & Wixson, 1997; Snider & Tarver, 1987; Wharton-McDonald, Pressley, & Hampston, 1998). These consistent and strong research findings have prompted extensive policy attention to promoting early reading achievement. These concerns have been especially marked for populations that are judged to be at risk based on the poverty status of their families or other characteristics. This study addresses this concern by examining the effectiveness of an early reading intervention.

Using a classic experimental design with random assignment of students to conditions, the study compares the beginning literacy skills of four year old Head Start students who used *Funnix Beginning Reading*, a computer-based reading instructional program, with the achievement of students who had the same amount of extended instruction in their usual language arts curriculum. Each Funnix student was paired with a high school tutor who implemented the Funnix computerized program 30 minutes a day. The other students worked with their regular classroom teachers. Results indicate that the *Funnix* students had significantly higher beginning reading skills at the end of the school year than students in the control condition and were thus much better prepared for later academic success.

The sections below provide additional details regarding the *Funnix* program, describe the methodology used in the study, present the results, and then discuss the implications of these results for promoting early reading skills in a manner that produces educationally meaningful change in a cost effective manner.

Related Literature

Funnix Beginning Reading is part of the large Direct Instruction corpus of curricular material. The sections below summarize research on Direct Instruction in general and on curricula related to the *Funnix* program.

Direct Instruction

Direct Instruction (distinguished from other "direct instruction" approaches, which embody only some of DI's characteristics, by the use of capital letters) was developed by Siegfried Engelmann and colleagues (Engelmann & Carnine 1982, Engelmann 2007) in the late 1960s. It has long been recognized as one of the most effective programs in promoting student achievement. The curricula are highly structured and carefully designed to provide systematic and explicit instruction. They are also designed to accelerate students' learning by teaching more than traditional programs in the same amount of time.

All DI programs include five critical features. First, lessons do not focus on a single topic (such as rhyming or vocabulary), but instead work on five or more different skills. Each skill is practiced and applied on more than one lesson, providing repeated and integrated practice. Second, only about ten percent of any one lesson involves new skills or concepts, with the remainder involving review and application of material that was introduced previously. This small-step design and continuous review has been found to ensure that all children learn all the skills and concepts presented, even as they become increasingly complex. Third, the DI programs are scripted to ensure that teachers provide explanations that are adequate, quick, and efficient. Fourth, the programs are structured to permit accurate predictions of students' progress, with the expectation that students will progress at the rate of one lesson per day if they are given sufficient time and follow the program carefully. Finally, all DI programs are extensively pre-tested and then revised based on children's performances during the field tests.

Direct Instruction was first developed through work with preschool children, often from high poverty, inner city neighborhoods. This work demonstrated that, when presented with explicit and systematic instruction, with well designed sequencing of material and schedules of reinforcement, all children, even those often thought to be "high risk" or "hard to teach" can learn material generally taught only to those who were much older (Engelmann 2007). The subsequent large-scale Follow Through experiment, which compared a wide variety of curricula and involved thousands of students in dozens of communities, demonstrated that Direct Instruction promoted significantly higher achievement and more positive self-concepts and school related attitudes than any other curriculum.

Numerous studies since that time have replicated these results, documenting the superiority of the various Direct Instruction curricula in promoting achievement in reading and other areas. These results have appeared with the general population (e.g. Becker & Carnine, 1980; Carlson & Francis 2002; O'Brien & Ware 2002; Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977, Vitale & Joseph 2008) and with students with disabilities. Studies have demonstrated the effectiveness of Direct Instruction reading programs with students with learning disabilities (Benner, 2007; Benner, Kinder, Beaudoin, Stein, & Hirschmann, 2005; Cooke, Gibbs, Campbell, & Shalvis, 2004; Kuder, 1990; Kuder, 1991; Malmgren & Leone, 2000; Scarlato & Asahara, 2004), students with intellectual disabilities (Flores, Shippen, Alberto, & Crowe, 2004; Haring & Krug, 1975; Maggs & Morath, 1976; Malmgren & Leone, 2000; Riepl, Marchand-Martella, & Martella, 2008), children who demonstrate developmental delays (Flores & Ganz, 2007; Riepl, Marchand-Martella, & Martella, 2008), and students identified with emotional disturbance (Benner, 2007; Cooke, Gibbs, Campbell, & Shalvis, 2004; Malmgren & Leone, 2000; Scarlato & Asahara, 2004; Strong, Wehby, Falk, & Lane, 2004). Additionally, Direct Instruction reading programs have been effectively implemented outside of traditional elementary schools in a variety of settings, including middle schools (Dowdell, 1996; Grossen, 2004; Lewis, 1982; Shippen, Houchins, Steventon, & Sartow, 2005), high schools (Harris, Marchand-Martella, & Martella, 2000; Marchand-Martella, Martella, Orlob, & Ebey, 2000), a residential treatment center (Scarlato & Asahara, 2004), alternative schools (Steventon & Fredrick, 2003), and juvenile corrections facilities (Drakeford, 2002; Houchins, Jolivette, Krezmien, & Baltodano, 2008; Malmgren & Leone, 2000;). Lastly, Direct Instruction programs have been shown to be effective in increasing reading achievement with English Language

Learners (Grossen, 2004; Gunn, Smolkowski, Biglan, & Black, 2002; Kamps, Abbott, Greenwood, Arreage-Mayer, Wills, Longstaff, Culpepper, & Walton, 2007).

Funnix Beginning Reading

Over the last four decades the Direct Instruction corpus of curricula has grown. *Funnix Beginning Reading* builds on the Direct Instruction program called *Horizons* (published by SRA) and developed in the late 1990s.

Like all of the DI programs, *Horizons* was developed with careful and extensive field testing to ensure that the curriculum was effective. The first set of field testing involved four separate phases, spanning a period of five years. These tests included students in four different states, from a wide range of socio-demographic backgrounds, and from both urban and suburban communities. The field test groups included students learning at grade level as well as below-average performers. They also included teachers familiar with DI and those new to the method. Based on the feedback that was received through these multiple replications the program was carefully honed to ensure that it promoted learning in the most efficient and effective manner. Subsequent expansions and modifications of *Horizons* followed similar steps, resulting in a curriculum, like earlier elements of DI, where every element has been tested in a classroom (SRA 1999, see also Engelmann 2000).

Research using the final published version of *Horizons* indicates that students using the program have significantly higher achievement than students who use other materials. For instance, Tobin (2003, 2004) studied students in classes that used *Horizons* in first grade and those that used another basal curriculum (*Silver, Burdett and Ginn*). At the end of first grade the *Horizons* students had significantly higher reading achievement scores, using a variety of measures (Tobin 2003). These differences persisted into higher grades, with students who had the *Horizons* curriculum having significantly higher scores on statewide assessments of reading at the end of 3rd grade and English and language arts at the end of 4th grade (Tobin 2004). In a later study Tobin (2009) compared reading achievement of first grade students in a school that used the *Horizons Fast Track A-B* curriculum with the achievement of students in a different school in the same district that used the Guiding Reading approach. Results favored the students in the Guided Reading program for the beginning literacy skills of phoneme segmentation (the ability to say all the sounds in a word), but the *Horizons* students in oral reading fluency (the ability to read text correctly and fluently). Finally, Cooke, Gibbs, Campbell, and Shalvis (2004) compared achievement outcomes of students using *Horizons Fast Track A-B* and *Reading Mastery Fast Cycle*, another Direct Instruction program, and found no statistical differences between the two groups. With both programs students' achievement gains were strong. In other words, the high achievement typical of *Reading Mastery* students also appeared with *Horizons* students.

While *Horizons* is delivered only through printed material, *Funnix* packages the curriculum in a format that is accessed and used on a computer. The program includes 120 carefully sequenced lessons using a computer reading format and narrator, coordinated graphics, and animation. Each lesson requires about 30 minutes to complete. A manual and CD disk for parents, or other instructors, explains the details of the reading instruction and the procedures

that should be followed when using the program. Teachers or tutors must operate a mouse during lessons to preserve the prompting, pacing and directions built into the *Funnix* program and to facilitate the provision of the feedback that is built-in to reinforce appropriate responses and correct mistakes.

Both *Horizons* and *Funnix* incorporate four phases of instruction. The first is a pre-reading phase, in which children learn to identify letters and their sounds. Second is a highly prompted reading phase, where students learn, successively, to read words in isolation; then words, phrases and sentences in stories; then short stories consisting of two sentences; and, eventually, short stories about 90 words in length. In this phase prompts are used to help students recognize the presence of irregular words, letter combinations and silent letters. A third, less-prompted reading phase, includes stories with few prompts. Some of the stories are ones that they read earlier, but the prompts are removed, while other stories are new and written with few prompts. In the fourth, and final, phase, all prompts have been removed from the word lists and stories.

As in all the Direct Instruction material, the pacing, scope, and sequence of *Horizons* and *Funnix* has been carefully designed and tested. For instance, the programs always pre-teach sounds and words before they appear in stories, building from teaching of individual sounds, to using the sounds in words, and then having the words within a story. In addition, the sequence in which letters are introduced is carefully designed based on research regarding how difficult it is for students to learn each letter sound or letter group. Sounds are introduced from the easiest to the most difficult, and high-utility letter sounds are introduced before low-utility sounds. Blending and segmenting phonemic tasks are taught explicitly and are also carefully sequenced, again building on previous research.

Each *Funnix* lesson includes elements related to decoding and comprehension. *Funnix* promotes fluency throughout the sequence by directing children to reread lists of sounds, lists of words, and stories. *Funnix* also promotes fluency by gradually and systematically adjusting the audio and visual prompts that signal responses. Comprehension activities are presented in connection with story reading throughout the sequence. In the first two phases, before children have learned to read stories, *Funnix Beginning Reading* presents stories orally and asks comprehension questions. After children begin reading stories, at the end of the second phase, they answer orally presented comprehension questions during a second reading of the story. At the end of *Funnix Beginning Reading* children read and write answers to story questions and other comprehension activities using an associated workbook. The workbook activities also include practice in beginning spelling.

Funnix includes strategies for teaching children multisyllabic words and more sophisticated text. After children master sounding out regular words and gain automaticity in decoding whole words *Funnix* begins teaching children to apply a sounding-out strategy to read more complex words. Children learn and apply strategies that focus on the spelling of words and that focus on familiar word parts. They also learn strategies for expressively reading connected text that contains sophisticated punctuation marks (quotes, exclamations, and ellipses). Funnix has been designed to be used in schools as the primary reading program, as an intervention program, as a supplement, or as a Summer School or After-School program. It can

be used in small groups, as a tutorial with a regular tutor, in a peer-tutoring setting, or as a reinforcer in a paired practice setting.

The Florida Center for Reading Research reviews curricular programs and reports the extent to which they contain characteristics known to enhance student achievement. Their report on *Funnix* noted numerous strengths: "*Funnix* programs include modeling, scaffolding, ample support, guided repetitions, and continuous monitoring and assessment of student progress. *Funnix* programs are explicit and systematic." Their assessment reported no weaknesses in the curriculum (FCRR 2004).

Two previous, small-scale studies of student achievement have found a relationship between using *Funnix* and higher achievement. Parlange (2004) examined changes in scores on standardized tests of reading achievement of 10 preschool aged children who used the *Funnix* program. Comparisons of changes in reading achievement over time with normative samples indicated that all of the children experienced substantial improvement in word attack and expressive language after using the program. Similarly, Watson and Hempenstall (2008) compared the achievement growth of 15 kindergarten and first grade students who used *Funnix* in at-home settings with their parents with a wait-listed comparison group of students in the same grades. The *Funnix* students in both grades had statistically significant improvements over time, but only the gains for the Kindergarten students were significantly greater than those in the comparison group.

This study adds to this body of work. It focuses on preschool children from low income backgrounds and incorporates random assignment of students into either the *Funnix* program or a control condition. In addition, instead of using preschool teachers or parents to present the program, this study used high school age tutors in a supervised classroom setting.

Research Design

Participants and Procedures

Participants in this study were students in a Head Start program in a suburban area of the Southern United States. Forty students from approximately 100 four year olds in six classrooms were randomly selected to participate. The students selected for the study were then randomly divided into two groups, one of which was determined as the experimental (Funnix) group and the other as the control group. Because of attrition the final sample included 37 students (19 in the control group and 18 in the experimental group). Nineteen of the children were non-Hispanic whites, 13 of the children were African American, 4 were Hispanic, and 1 was Asian American. Ten of the children came from homes where English was not the primary language. All of the children were from low income families.

All students in the Head Start classrooms received regular in-class instruction with the locally adopted language arts curriculum. The program was developed by a consortium of Head Start programs within the state and was self-published by Head Start. In addition, students in both the *Funnix* and the Control groups received 30 minutes of supplemental instruction, but the nature of the instruction varied. Those in the control group received 30 minutes of additional

instruction in their regular language arts program. This occurred in a full class or small group format, as specified by the adopted curriculum, and was provided by their regular classroom teachers and teachers' aides. Students in the experimental group followed the *Funnix* curriculum, also receiving 30 minutes of instruction in the program on each school day.

The *Funnix* instruction was provided by public high school students from the local community. Students chosen to work with the pre-schoolers were carefully screened and selected based on their past academic performance, school attendance, good conduct, and recommendations from the school counselor. Each high school student was matched with one preschool student and worked with that student throughout the year.

The high school students were trained for a total of 6 hours on how to serve as a *Funnix* instructor. The training focused on details of using the program and also on appropriate procedures for reinforcing the preschoolers. They were told to be positive, upbeat, and encouraging, while allowing the children to have enough "think time" to work through a problem. Tutors were instructed on how to control the mouse in order to pace the program appropriately. They were also instructed in the proper procedures for correcting different types of student errors, and they were trained on how to model correct answers for children who were hesitant or didn't know an answer.

In addition to technical instruction on the *Funnix* program, the tutors were given detailed guidance on the standards of conduct required for working in the Head Start classrooms and signed forms indicating that they understood the standards to which they would be held. At the end of the year the high school tutors were required to write an essay regarding their experience and received grades, as well as other recognition, for their work. Appendix A includes additional information on the training provided to the high school students.

Funnix students and their individual tutors worked either in the Head Start Media Center or in a classroom that was designated for their exclusive use. Computer stations were installed in these two settings and cardboard study carrels were provided for each computer station to minimize visual distractions. All paired sets of tutors and students had a computer workstation and used earphones to eliminate all auditory disturbances from other groups working with the *Funnix* program in the same room.

A certified teacher with a Master's degree who had formerly worked at the tutors' high school supervised the implementation of the daily *Funnix* instruction at the Head Start site. She was present for each day of instruction, actively observed the patterns of tutoring, and intervened as needed. Tutors were required to keep track of their students' progress. At the end of each tutoring session they completed a log sheet that recorded the lessons and tasks that were covered, activities that were completed, their assessment of the child's performance, and any additional comments or concerns. Instruction began in October 2006 and continued until May 2007.

Children were tested three times during the year: in late September 2006, before instruction began; in January 2007, midway through the school year; and in May 2007, at the end of the year. Testers were independent of the Head Start Program and the school district and were supervised and trained by an independent school psychologist.

Measures

Table 1 lists the measures that were administered to all of the children in the experimental and control groups. The Basic Language Concepts Test (BLCT) (Engelmann, Ross, & Bingham 1982), formerly called the Basic Concept Inventory, was administered at all three testing periods. The BLCT is an individually administered instrument designed to screen children, 4 ½ to 6 years of age, for language skills important for beginning school learning. It is also used to diagnose specific skill deficiencies and to provide baseline measures for evaluating progress. It can be compared with normative data and has established reliability and validity. The test assesses four general areas: 1) receptive language, the child's ability to understand common words or phrases; 2) imitative function, the child's ability to repeat statements by the tester; 3) representational functions, or the child's ability to answer simple questions; and 4) a pattern function, the child's ability to repeat a patterned series and recognize a sequence of actions.

In the fall administration the language skills of many of the children were very low. To minimize their discomfort the testers ceased administration of the BLCT if they were unable to answer more than three of the first 14 receptive language items correctly. As a result, less than half (n=13) of the children completed the test in the fall, and we only report data on the BLCT for winter and spring. The total score on the test is the number of errors and may be compared to norms from the original test standardization.

The Dynamic Test of Basic Literacy Skills (DIBELS) (6^{th} edition) was administered in fall, winter, and spring. The DIBELS measures have high statistical reliability and can be compared against established benchmarks that indicate the level at which students should achieve to reach generally accepted literacy goals. All of the measures are timed assessments, and scores reflect the number of correct answers given within a set duration. The Kindergarten Benchmark Assessment form was used. Initial sound fluency (ISF) and letter naming fluency (LNF) were assessed in the fall; phoneme segmentation fluency (PSF), nonsense word fluency (NWF), ISF and LNF were assessed in the winter; and LNF, PSF, and NWF were assessed in the spring. Both the raw scores (the number of correct responses in a minute) and whether or not the child reached kindergarten benchmarks were examined. Benchmarks were examined for the corresponding time point in kindergarten (fall, winter or spring) as well as, for the spring scores, the score that would be expected at the beginning of kindergarten (for LNF and ISF) or mid-way through kindergarten (for PSF and NWF).

Two measures of oral reading fluency were assessed in the spring. The first was the "100 Word List," which presents children with a set of 100 words that are typically learned early in a reading program. Words on the list are no more than two syllables, but contain a variety of vowel and consonant combinations. Students are asked to read the words, and responses are marked as incorrect if the child reads the word incorrectly or does not respond within four seconds. Testing is terminated after the child misses four words in a row or indicates that he or she doesn't know how to read any more words (after being asked about "a" and "I"). The score on the test is simply the number of words read correctly. A copy of the 100 word test is included in Appendix B.

The other measure of oral reading was derived from two short controlled text passages, each involving a very short story. The number of words that students read correctly in the two passages were highly correlated (r = .97), so these numbers were summed for analysis. The controlled text passages are also included in Appendix B.

Finally, all students were given the Word Identification and Word Attack subtests of the Woodcock Reading Mastery Achievement Test (WRMT). The students' scores on these tests were highly skewed, with a majority having no answers correct. Thus, instead of the standard scoring system, a simple dichotomy was created separating those with no correct answers from those with 1 or more correct answers.

Analysis

The scores of students in the control and experimental group were compared in several different ways. First, simple descriptive statistics (means and standard deviations) were obtained for the raw scores for each testing period. To obtain an estimate of the magnitude of the difference between the two groups, t-tests and effect sizes (Cohen's d) were calculated. If *Funnix* were more effective than the regular classroom curriculum in promoting beginning literacy we would expect greater differences between the two groups at the later administrations. We also use the published norms for the BLCT and benchmarks for the DIBELS measures to calculate the proportion of children in each group who would be considered at risk for future academic problems. If *Funnix* were more effective we would expect fewer *Funnix* students to be at risk at the winter and spring administrations.

Second, we used multivariate analyses. Students' growth over time on the BCLT and the DIBELS measures was examined using repeated measures analyses of variance, with the tests at each time point as repeated measures and experimental condition as a factor. If *Funnix* were more effective stronger gains would be expected for the experimental group. This would result in a significant interaction between the repeated measures and condition. For the analyses of the two measures of reading fluency (the 100 word test and the Controlled Text Passages) and the subtests of the Woodcock, analysis of covariance was used with the fall Letter Naming Fluency measure as a covariate and experimental condition as a factor. Fall LNF was chosen as the covariate after preliminary analysis indicated that it had the highest correlation of all of the fall scores with the spring measures of reading fluency (r = .57 for the 100 word test and .53 for the controlled text).

Finally, we conducted three other analyses as ways of providing additional controls. We used post-hoc matching to create a sample of students as closely matched as possible on beginning literacy scores as well as gender and race ethnicity. To obtain the cases, the students were rank ordered on their pretest scores on Letter Naming Fluency. Then, pairs of children with similar LNF scores and equivalent race-ethnicity, home language and gender were selected. One member of each pair had been randomly assigned to the control group and one had been randomly assigned to the *Funnix* group. We first calculated descriptive statistics, t-tests, and Cohen's d values for this reduced sample and compared the results to those obtained with the total group. Then we focused on two pairs of children, one with very low scores at pretest and one with high scores, and compared changes in their scores over the academic year. Finally, we

divided the children into two groups based on their race-ethnicity and home language and examined the average scores on tests completed in the spring for minority and non-minority students in the Funnix and control groups.

It should be remembered that the sample size for this study is very small, with fewer than 20 students within each group. However, the research design includes several important elements that enhance its internal validity. First, the students were randomly assigned to the experimental and control group, the classic method of ensuring comparability of groups. Second, all children received the same amount of additional instruction in language arts. The only difference was the curriculum that was used for this additional instruction. Third, multiple instructors were involved with both the experimental and control group, thus eliminating the possibility of an instructor-treatment interaction.

Results

Descriptive Statistics and Bivariate Analyses

Table 2 gives descriptive statistics (means and standard deviations) on all measures for all administrations, and Table 3 gives the results of t-tests comparing mean scores for the two groups at each time point and the corresponding effect sizes. As would be expected, given the random assignment design, differences between the two groups on scores obtained in the fall were not statistically significant, although the *Funnix* students had slightly higher scores on both measures (LNF and ISF).

In winter, as expected, the *Funnix* students had scores that were significantly higher than those of students in the control conditions on all of the measures. The *Funnix* students had significantly fewer errors on the BCLT and significantly higher scores on the four DIBELS measures: letter naming fluency, initial sound fluency, phoneme segmentation fluency, and nonsense word fluency. The Cohen's d values comparing scores of students in the two groups, a standard measure of effect size, range from .72 to 1.55, well beyond the levels typically characterized as large or as educationally significant.

The results in spring continue to show a strong advantage for the *Funnix* students. The *Funnix* students had higher scores on all the measures, although the t-tests indicate that the differences were statistically significant only with the DIBELS measures of beginning literacy and whether or not the children were able to answer any items correctly on the Woodcock test. All of the effect sizes comparing the scores for the *Funnix* and control group, including those that were not statistically significant, easily surpass the usual criterion of educationally significant (.25).

Table 4 reports the proportion of students within each group who would be considered "at risk" of not meeting established literacy goals (Panel A) and "at low risk" of not meeting these goals (Panel B) using established benchmarks for the DIBELS measures for kindergarten students (Good, Simmons, Kame'enui, Kaminski, & Wallin 2002). The first three columns of Table 4 report the proportions using the benchmarks for fall, winter, and spring for kindergarten students. However, because the children in this study were only in pre-school, a fourth column

compares their spring scores with the fall Kindergarten norms or, in the case of NSF and PSF, the winter norms. These results are perhaps most important, for they indicate the extent to which children in the two groups would be considered either at risk or at low risk for later success compared to other children at the beginning of kindergarten.

Where there are differences they again favor the *Funnix* group. In fall, as would be expected, there are few differences between the groups. But, in both winter and spring, the Funnix students are far less likely to be at risk of later academic problems and far more likely to be at low risk for such problems. Results in the fourth column, which compare the last scores obtained in preschool with the first set of kindergarten norms, indicate that the control students achieved the greatest success in learning their letters and initial sounds. None of the students in either the control group or the *Funnix* group would be considered at risk based on their Letter Naming Fluency scores, and all of the *Funnix* students and a majority of the control students (.8) would be considered at low risk. Similarly, none of the *Funnix* students and only one of the control students would be considered at risk given their Initial Sound Fluency scores.

The results are strikingly different with the measures of nonsense word fluency and phonemic segmentation fluency, measures which are much more closely related to actual reading. Using the mid-year Kindergarten norms (the earliest that are available), over half of the control students but only a handful of the *Funnix* students (1 to 3 students) would be considered at risk of not meeting literacy goals given these measures. Similarly, only 2 of the control students but substantial numbers of the *Funnix* students (8 for NWF and all but 2 for PSF) would be considered at low risk.

The comparisons to the norms for the total scores on the BLCT (Engelmann, Ross, & Bingham 1982, p. 49) are shown in Table 5. Recall that scores were not available for most of the children for the fall administration because very few children could complete the test. By winter, a majority of the children completed the test and by spring all of the children did so. At both the winter and spring administrations, a majority of the children in the *Funnix* group had scores above the median and half of the Funnix students scored in the top quartile (twice the proportion that would be expected). A third of the control students scored above the median at the winter testing and almost two-thirds did so at the spring testing. None of the control students scored in the top quartile at the winter testing, while four students (slightly more than one-fifth of the group) did so in the spring.

Multivariate Analyses

Table 6 reports the results of multivariate analyses. Even though students were randomly assigned to treatment condition, these analyses are arguably more accurate than those presented in Tables 2 through 5 because they control for children's initial levels of achievement before exposure to the curriculum. The first panel of Table 6 reports the results of the repeated measures analyses of variance, with scores on the BLCT and the DIBELS measures as repeated measures and condition (control group and Funnix) as the factor. The F values associated with time (the repeated measures) and condition are significant in all five analyses, and the F values associated with the interaction effect are significant in all but the analysis of letter naming fluency.

These results indicate that the changes over time in the scores were significant but that, for most variables, the pace of change varied significantly between the two groups. As can be seen from Table 2, the changes over time in the DIBELS measures were substantially greater for the Funnix group than for the control group. From the fall to the spring administration, the average LNF score increased by 25 points for the Funnix students, but only by 16 points for the control students. From fall to winter the ISF scores increased by 12 points for the Funnix students, but only 6 points for the control students. Differences in changes in PSF and NWF from winter to spring were even stronger: a 14 point increase in PSF for the Funnix students compared to only a 4 point increase for the control students and a 7 point increase in NWF for Funnix students, but only a 1 point increase for the control students.

Although the analysis of variance results with the BLCT are similar to the other results, the changes that underlie the F scores were slightly different. At both the winter and spring testing periods the *Funnix* students had fewer errors but the significant interaction effect resulted from greater change in the control group over time. The greater change within the control group may reflect both a regression toward the mean for the control group and a ceiling effect for the Funnix group. As shown in Table 5, by the winter testing the Funnix group was already performing at a level well above the expected level for four year olds, while the Control group was not.

The second panel of Table 6 gives the results of analyses of covariance with the reading scores as dependent, fall Letter Naming Fluency score as a covariate, and condition as a factor. There were significant interaction effects with the analyses of the two measures of Oral Reading Fluency: the 100 Word Test and the Controlled Text Passages, indicating that the relationship of fall LNF scores to spring reading scores varied from one group to another. The data in Table 7 help explain why this result occurred, with cross-tabulations of LNF scores and reading outcomes within each group. Students in each group were differentiated based on their fall LNF scores using the DIBELS benchmark for "low risk" at the fall Kindergarten administration (correctly identifying 8 or more letter names). It can be seen that, within the control group, the majority of children had very low spring scores, whether or not they would be considered at low risk. In contrast, the majority of students in the *Funnix* group, no matter what their fall LNF scores, had higher scores on these spring measures of oral reading.

The analyses of covariance with the dichotomous variables derived from the Woodcock indicate that the main effect of group was significant for both variables, while the main effect of LNF was significant only for the measure of word identification. Again, the descriptive data in Table 7 illustrate why these patterns occurred. Students in the Funnix group were much more likely to identify at least one word correctly and to correctly attack words (the main effect of condition). At the same time, there were strong differences between those with high and low scores on LNF only with the measure of word identification. This occurred because, on the measure of word attack, the vast majority of students in the control condition had no correct responses while the majority of students in the *Funnix* condition had at least one correct response, regardless of their fall LNF scores.

Matched Samples

Even though the differences between the two groups on the measures used as pretests in the fall were not statistically significant, the *Funnix* students had slightly higher scores than the Control students and the Cohen's d value associated with the fall LNF score could be considered educationally significant (.39). The multivariate tests reported above adjust for these differences statistically, but to provide additional controls we conducted three additional procedures: 1) examining descriptive statistics using a reduced sample of students matched on fall scores, gender and race-ethnicity; 2) examining the pattern of achievement gains over the school year for students in two of these matched pairs; and 3) dividing the sample by race-ethnicity and home language and comparing scores of students in these more homogeneous groups.

Descriptive Statistics for a Reduced Sample – Our reduced sample that matched students on their fall scores, gender, and race-ethnicity included 24 of the 37 students. Two of the pairs (4 students) were boys, while the remaining pairs were girls. In seven of the pairs both children were white, in four pairs both children were African American, and in one pair the *Funnix* child was African American while the child in the Control group was Asian American.

Table 8 gives descriptive statistics (means and standard deviations) for students in both the Control and *Funnix* group within this reduced sample, the t-tests and Cohen's d values associated with these results, and the corresponding t values and effect sizes for the entire sample. (These values are the same as those reported in Table 4.) The results in Table 9 indicate that children in the Control group of this reduced sample had slightly higher LNF and ISF scores in the fall, although the t-tests were not significant and the d values fell shy of the level generally considered educationally significant. This result reverses that obtained for the total sample, where students in the *Funnix* group had slightly higher fall scores.

The results for scores obtained in Winter and Spring indicate a consistent advantage for students in the *Funnix* group. Students in the Funnix group had fewer errors on the BLCT and higher scores on the DIBELS measures of beginning literacy, read more words correctly in the tests of oral reading, and were more likely to have any correct answers on the Woodcock Reading Mastery test. Even with the very small sample size these differences were statistically significant (two-tail test) on 4 of the 13 comparisons. All but one of the effect sizes met or surpassed the usual criterion of educationally important. Comparing the results with those obtained for the full sample indicates that the effect sizes and t-tests are, as would be expected, smaller with the reduced sample than with the full sample. It is important to stress, however, that the substantive nature of the differences between the two groups, with the Funnix students having higher scores on all measures and effect sizes consistently large, are the same for both the total and the reduced sample.

Case Studies: Two Matched Pairs – Table 9 reports results for two of the matched pairs used in the analysis reported in Table 8. Two of the children started their preschool year with serious deficits and two could be considered better prepared for success. One student from each pair was in the control group and one was in the *Funnix* group. Table 9 includes the DIBELS scores for each child as well as the scores on the spring reading measures and the BLCT.

The children in the pair with high pretest scores were both white females. Both of them had high scores on the letter naming and initial sound fluency measures, but the child in the control group had markedly higher scores on the ISF. By the winter testing period the *Funnix* child had markedly higher scores on all of the measures. She scored 32 on ISF, 43 on LNF, 33 on PSF, and 25 on NWF, compared to scores, respectively of 16, 22, 14, and 0 for the child in the Control group. At the spring testing the girl in the *Funnix* group had markedly fewer errors on the BLCT (9 versus 14). She also continued to have markedly higher scores on the beginning literacy measures: 42 on LNF, 46 on PSF, and 9 on NWF compared to 37, 11, and 0 for the girl in the control group. Most striking are the differences in the two measures of oral reading, with the child in the *Funnix* group easily reading both isolated words and connected text and the child in the Control group able to read only 3 words, including "a" and "I."

The two children matched for their low pretest scores were black males. Both of the children had scores of zero on the fall administration of the LNF and ISF measures. However, by the winter testing period, the boy in the *Funnix* group had markedly higher scores than the boy in the Control group on three of the DIBELS measures: 15 on ISF, 21 on LNF, and 13 on PSF, compared to 9, 5, and 0 for the boy in the Control Group. At that testing, however, the *Funnix* child scored 0 on NWF, while the boy in the Control group scored 3. At the spring testing the child in the *Funnix* group had markedly higher scores on LNF, PSF, and NWF: 24, 25, and 10 compared to 0, 0, and 1 for the boy in the Control Group. Both boys, however, had very low scores on the two oral reading measures. Thus, even though the boy in the *Funnix* group had not reached the point of independent reading by spring, he was much better prepared to succeed in Kindergarten than the boy in the control group.

Controlling for Race-Ethnicity and Home Language – As a final analysis and check on our results we divided the sample into two groups: 1) students who come from families whose home language is not English and/or who are not non-Hispanic whites and 2) students who are non-Hispanic whites and whose families speak English at home. Although all the children came from low-income homes, it could be expected that race-ethnicity and home language could provide further educational barriers. It could be expected that children in the latter group would have an educational advantage.

Table 10 gives the spring scores for students in the Control and *Funnix* group within each of these categories. The results confirm those obtained through other analyses. The students in the *Funnix* condition outperformed students in the Control group on all measures with fewer errors on the BLCT and higher scores on the DIBELS measures and the 4 reading measures. In addition, within the *Funnix* group, and in contrast to the Control group, differences between the average scores of minority and non-minority students were quite small. Given the small sample size extensive multivariate analyses were not conducted, but future research should examine the ways in which *Funnix* can counteract educational disparities associated with race-ethnicity and language background.

Summary and Discussion

This paper examines the relationship of instruction in the computer-based *Funnix Beginning Reading* program to the development of beginning reading skills. The study employed

a pretest-posttest control group design with Head Start students from a suburban community in the southern United States. Students from six different classrooms were randomly assigned to the experimental or control group. Those in the control group received 30 minutes of additional instruction each day in their usual Language Arts curriculum. All instruction for students in the Control group was provided by their classroom teachers and teaching assistants. Students in the experimental group received 30 minutes of instruction with *Funnix Beginning Reading*. Instruction for the *Funnix* group was provided by high school aged tutors, who were trained and supervised by an experienced teacher.

Pretesting before instruction began indicated that there were no significant differences between the two groups in beginning literacy skills. However, by winter and spring the students in the *Funnix* group had significantly higher scores on numerous measures of beginning literacy. These results occurred with simple comparison of means, comparisons of scores to established benchmarks, and multivariate analyses that controlled for initial levels of skill. The results also appeared when a reduced sample that individually matched children on their pre-test scores was used and when analyses were conducted separately for minority and non-minority children. Two case-wise comparisons of children with similar initial skill levels illustrated the magnitude of these changes.

In general, the results indicate that four year old children in a Head Start program can develop strong beginning literacy skills with instruction in *Funnix Beginning Reading*. By the end of the academic year the vast majority of all the students in the study – both those who received enhanced instruction in their regular Head Start curriculum and those in the *Funnix* group – had expertise in letter naming and knowledge of initial sounds that would bode well for their future success. However, a large proportion of the children in the *Funnix* program had also acquired skills that are much closer to true beginning reading, with significantly higher scores on the DIBELS measures of nonsense word fluency and phonemic segmentation fluency as well as higher scores on several reading measures. Only one of the *Funnix* students would be considered at risk of later literacy problems based on the spring Phonemic Segmentation Fluency score, and only three of these students would be considered at risk based on their Nonsense Word Fluency scores. Note that both of these measures of "at risk" are based on norms developed for kindergarten students at mid-year, fully 9 months after the testing period for the Head Start students.

The extraordinarily high scores of the *Funnix* students on the test of basic language concepts (BLCT) also illustrate this superior achievement. By definition, one would expect students' scores to be equally distributed across the percentiles developed through the testing norms (e.g. 25 percent below the 25^{th} percentile, etc.). By the spring testing, the students in the control group had a distribution that was similar to this expectation and, in fact, had slightly more students than would be expected with scores above the median (12 versus 9-10). A slightly larger proportion of the *Funnix* students were above the median, but, even more striking, half of the *Funnix* students scored in the top quartile – twice the proportion that would be expected by chance. A close inspection of the data in Table 5 suggests that these increases in language skills occurred soon after beginning *Funnix* instruction. At the winter testing half of the *Funnix* students, but none of the Control students, scored in the top quartile. This could suggest that

instruction in *Funnix* contributed to both beginning literacy as well as general language development.

Even though the sample size was relatively small, most results were statistically significant. In addition, virtually all effect sizes were quite large, well beyond the levels traditionally cited as educationally important. The fact that the students were randomly assigned to treatment and that they came from several different classrooms enhances the internal validity of the findings. The use of multivariate statistics and the replication of results with a smaller, closely matched sample, also help to validate the findings.

The results obtained in this study largely replicate findings obtained in other studies of *Funnix Beginning Reading*. Yet, it would be important to continue examination of the program and its implementations. Studies should include larger samples, samples from other areas of the country, and students of other ages. It could also be informative to compare the results obtained when different tutors are used to help the children with the program, perhaps comparing adult volunteers, teen volunteers, teacher aides, and parents. Finally, it would be important to examine factors that are related to students' pace of completing the program. Some students in the *Funnix* group in this study progressed very rapidly through the lessons, while others had slower progress. Factors that could explain these variations might include those related to children's initial skills, their English proficiency, the characteristics of the tutor, and the relationship between the tutor and child.

Other preschool programs could potentially learn from these results. They illustrate the ways in which low income students can develop strong beginning literacy skills that provide a solid foundation for early reading. The *Funnix* program was implemented in a low-cost manner, using high school volunteers and involving only 30 minutes a day of additional instruction. Introducing such a program could involve a relatively minor alteration in a pre-school schedule and potentially utilize volunteers who are already active and committed. It should be emphasized, however, that the implementation involved in this study involved strong support for the tutors, with on-site guidance, regular reporting procedures, and consultations with difficulties. While not extraordinarily expensive, these supportive measures helped promote fidelity of implementation and the smooth operation of the tutorial program. Including such support would be important to help promote success.

Finally, the potentially positive impact of the program on the high school tutors should not be ignored. Interviews with supervisory personnel indicated that the tutors found the program rewarding and satisfying. Providing recognition to the students, both at the preschool site and at their high school, helped make the experience prestigious among the high school peers and promoted commitment. Many preschools are located close to high schools and also encourage their students to provide community service. Thus, a tutoring program such as the one described in this paper, could benefit not just the preschoolers but also the high school tutors (Primm, personal communication, 2009).

Table 1: Measures Administered to Students by Testing Time

	Fall	Winter	Spring
Basic Language Concepts Test	X	X	X
Initial Sound Fluency (ISF)	X	X	
Letter Naming Fluency (LNF)	X	X	X
Phoneme Segementation Fluency (PSF)		X	X
Nonsense Word Fluency (NWF)		X	X
Controlled Text Passages (2 passages)			X
100 Word Test			X
Woodcock RM Word Identification			X
Woodcock RM Word Attack			X

Table 2: Descriptive Statistics by Group

	Fall			Winter			Spring		
	Mean	s.d.	n	Mean	s.d.	n	Mean	s.d.	n
BLCT - Total Score (# Errors)									
Control Group	-----	-----	-----	30.7	9.5	15	22.4	7.9	19
Funnix Group	-----	-----	-----	19.2	10.7	14	18.0	9.6	18
Letter Naming Fluency (LNF)									
Control Group	8.8	9.1	19	17.6	11.7	19	24.6	15.5	19
Funnix Group	12.8	11.3	18	27.7	16.1	18	37.8	17.1	18
Initial Sound Fluency (ISF)									
Control Group	4.4	5.6	19	10.7	5.3	18	-----	-----	-----
Funnix Group	5.4	6.3	18	17.7	9.0	17	-----	-----	-----
Phoneme Segementation Fluency (PSF)									
Control Group	-----	-----	-----	4.1	4.7	19	8.2	9.4	19
Funnix Group	-----	-----	-----	18.0	13.4	18	32.1	12.0	18
Nonsense Word Fluency (NWF)									
Control Group	-----	-----	-----	3.6	5.8	19	4.7	6.7	19
Funnix Group	-----	-----	-----	13.9	19.6	17	20.8	31.5	18
100 Word Test									
Control Group	-----	-----	-----	-----	-----	-----	5.5	12.3	19
Funnix Group	-----	-----	-----	-----	-----	-----	16.2	25.7	18
Controlled Text Passages									
Control Group	-----	-----	-----	-----	-----	-----	5.4	17.6	19
Funnix Group	-----	-----	-----	-----	-----	-----	20.3	41.2	18
Woodcock RM Word Identification									
Control Group	-----	-----	-----	-----	-----	-----	0.32	0.48	19
Funnix Group	-----	-----	-----	-----	-----	-----	0.78	0.43	18
Woodcock RM Word Attack									
Control Group	-----	-----	-----	-----	-----	-----	0.12	0.33	17
Funnix Group	-----	-----	-----	-----	-----	-----	0.72	0.46	18

Note: As explained in the text, the data given for the Woodcock subtests indicate if the child was able to answer any items correctly (1 = yes, 0 = no).

Table 3 - t-test results and effect sizes, by testing period

	Fall			Winter			Spring		
	t	p	d	t	p	d	t	p	D
BLCT - Total	-----	-----	-----	-3.04	0.01	-1.14	-1.54	0.13	-0.51
LNF	1.17	0.25	0.39	2.19	0.04	0.72	2.47	0.02	0.81
ISF	0.49	0.63	0.17	2.82	0.01	0.98	-----	-----	-----
PSF	-----	-----	-----	4.19	<.001	1.55	6.79	<.001	2.24
NWF	-----	-----	-----	2.07	0.05	0.80	2.13	0.05	0.85
100 Word	-----	-----	-----	-----	-----	-----	1.60	0.12	0.56
Controlled Text	-----	-----	-----	-----	-----	-----	1.42	0.17	0.51
Woodcock RM Word Id							3.09	0.004	1.02
Woodcock RM Word Attack							4.47	<.001	1.52

Note: The statistics in this table were computed for each testing period and each measure. For example, the t-test and effect size for fall LNF compares the average LNF raw score of the control group and the Funnix group for that time period. All probabilities are two-tailed.

Table 4: Proportion of Students at Risk of Later Literacy Problems by Group, Measure, and Testing Period

A. Proportion at Risk by Group, Measure, and Reference Period

	Fall with Fall K Norms	Winter with Winter K Norms	Spring with Spring K Norms	Spring with Fall K Norms*
Letter Naming Fluency				
Control	0.32	0.47	0.63	0.00
Funnix	0.28	0.28	0.28	0.00
Odds Ratio				
Initial Sound Fluency				
Control	0.58	0.50		0.06
Funnix	0.50	0.24		0.00
Nonsense Word Fluency				
Control		0.74	0.84	0.58
Funnix		0.29	0.56	0.17
Phonemic Segmentation Fluency				
Control		0.63	0.58	0.53
Funnix		0.17	0.06	0.06

B. Proportion at "Low Risk" by Group, Measure, and Reference Period

	Fall with Fall K Norms	Winter with Winter K Norms	Spring with Spring K Norms	Spring with Fall K Norms*
Letter Naming Fluency				
Control	0.47	0.37	0.16	0.79
Funnix	0.61	0.50	0.44	1.00
Initial Sound Fluency				
Control	0.21	0.00	-----	0.78
Funnix	0.33	0.24	-----	0.76
Nonsense Word Fluency				
Control		0.16	0.00	0.16
Funnix		0.35	0.22	0.44
Phonemic Segmentation Fluency				
Control		0.00	0.00	0.16
Funnix		0.39	0.50	0.89

*For NWF and PSF the winter K benchmarks were used because there are no benchmarks for fall. In addition, for ISF the score obtained in winter was used for the calculations.

Table 5: Percentile Scores of BCLT by Condition and Testing Period

A: Winter Testing	Control	Funnix	Total
1st to 25th percentile (highest scores)	0	7	7
26th to 50th percentile	5	2	7
51st to 75th percentile	3	4	7
76th to 100th percentile	7	1	8
Total	15	14	29
B: Spring Testing			
1st to 25th percentile (highest scores)	4	9	13
26th to 50th percentile	8	4	12
51st to 75th percentile	4	3	7
76th to 100th percentile	3	2	5
Total	19	18	37

Note: The BCLT scores are the number of errors a child made. Norms used for calculating the percentiles were obtained for children aged 55 to 60 months (4 1/2 to 5 years).

Table 6: Multivariate Analyses

	Time		Condition		Interaction	
A: Repeated Measures Analyses						
	F	p	F	p	F	p
BLCT - Total	26.27	<.001	7.49	0.01	5.24	0.03
LNF	39.77	<.001	5.36	0.03	2.20	0.13
ISF	50.60	<.001	4.13	0.05	6.02	0.02
PSF	24.33	<.001	44.13	<.001	7.31	0.01
NWF	6.18	0.018	5.33	0.03	3.68	0.06
B: Analyses of Covariance	LNF-Fall		Condition		Interaction	
	F	p	F	p	F	p
100 Word Test	12.21	0.001	0.44	0.51	4.2	0.05
Controlled Text Passages	9.63	0.004	0.55	0.46	3.9	0.06
WRM Word Identification	7.77	0.01	4.02	0.05	0.03	0.87
WRM Word Attack	1.13	0.3	4.78	0.04	0.84	0.37

Note: The measures derived from the Woodcock Reading Mastery subtests are a simple dichotomy based on whether or not the student was able to answer any items correctly. As noted in the text, this procedure was adopted because the distribution of raw scores was so highly skewed, especially among the control group.

Table 7: Reading Achievement Scores by Fall Letter Naming Fluency and Condition

	Control		Funnix	
Controlled Text Passage	Not at Low Risk	At Low Risk	Not at Low Risk	At Low Risk
None correct	9	6	2	3
One to ten correct	1	0	4	3
Eleven of more correct	0	3	1	5
Total	10	9	7	11
100 Word Test				
None correct	4	2	2	1
One to two correct	5	3	0	0
Three to ten correct	1	1	4	5
More than ten correct	0	3	1	5
Total	10	6	7	11
WRM Word ID				
None correct	9	4	4	0
One or more correct	1	5	3	11
Total	10	9	7	11
WRM Word Attack				
None correct	9	6	3	2
One or more correct	0	2	4	9
Total	9	8	7	11

Note: Low LNF score is defined as knowing 7 or fewer letter names; a high LNF score is defined as knowing 8 or more letter names. This is the benchmark for being at low risk for poor language and reading outcomes for an assessment at the beginning of kindergarten.

Table 8: Means and t-Tests, and Effect Sizes with Restricted, Matched Sample and t-test Results and Effect Sizes for Total Sample

					Matched Sample				Total Sample		
	Condition	N	Mean	S.D.	t	df	p	Cohen's D	t	p	Cohen's d
LNF - Fall	Control	12	12.5	9.2	-0.53	22	0.60	-0.21	1.17	0.25	0.39
	Funnix	12	10.5	9.5							
ISF - Fall	Control	12	5.0	6.7	-0.28	22	0.78	-0.11	0.49	0.63	0.17
	Funnix	12	4.3	6.0							
BLCT - Winter (total errors)	Control	9	27.4	9.4	-1.35	16	0.20	-0.64	-3.04	0.005	-1.14
	Funnix	9	20.4	12.4							
ISF - Winter	Control	11	10.3	6.5	1.91	20	0.07	0.83	2.82	0.01	0.98
	Funnix	11	17.0	9.5							
LNF - Winter	Control	12	22.5	11.8	0.67	22	0.51	0.27	2.19	0.04	0.72
	Funnix	12	25.5	10.2							
PSF - Winter	Control	12	4.8	5.0	2.41	16	0.03	1.04	4.19	<.001	1.55
	Funnix	12	12.8	10.3							
NWF - Winter	Control	12	5.0	6.9	1.17	21	0.26	0.49	2.07	0.05	0.80
	Funnix	11	8.5	7.7							
BLCT - Spring (total errors)	Control	12	21.6	6.8	-0.61	22	0.55	-0.25	-1.54	0.13	-0.51
	Funnix	12	19.3	10.9							
LNF - Spring	Control	12	27.9	17.4	0.96	22	0.35	0.40	2.47	0.02	0.81
	Funnix	12	33.8	12.4							
PSF - Spring	Control	12	11.3	10.2	4.04	22	0.00	1.67	6.79	<.001	2.24
	Funnix	12	31.3	13.8							
NWF - Spring	Control	12	6.3	7.7	1.58	22	0.13	0.65	2.13	0.05	0.85
	Funnix	12	11.6	8.6							
100 Word Test (# correct)	Control	12	6.3	14.5	0.35	22	0.73	0.14	1.60	0.12	0.56
	Funnix	12	8.0	9.7							
Controlled Text Passages	Control	12	1.3	0.8	1.82	22	0.08	0.74	1.42	0.17	0.51
	Funnix	12	1.9	0.8							
Word ID (any correct)	Control	12	0.3	0.5	2.16	22	0.04	0.88	3.09	0.004	1.02
	Funnix	12	0.8	0.5							
Word Attack (any correct)	Control	11	0.2	0.4	2.57	21	0.02	1.08	4.47	<.001	1.52
	Funnix	12	0.7	0.5							

Note: The results for the total sample are equivalent to those given in Table 3. All probabilities are two-tail.

Table 9: Case-Wise Comparison, Matched Pairs

	High Pretest Scores		Low Pretest Scores	
	Control	Funnix	Control	Funnix
Fall LNF	24	26	0	0
Fall ISF	19	7	0	0
Winter ISF	16	32	9	15
Winter LNF	22	43	5	21
Winter PSF	14	33	0	13
Winter NWF	0	25	3	0
Total BLCT Errors - Spring	14	9	27	19
Spring LNF	37	42	7	24
Spring PSF	11	46	0	25
Spring NWF	0	9	0	10
100 word test	3	37	1	0
Controlled text passage	0	31	0	0
WJ Word ID (raw score)	0	20	0	0
WJ Word Attack (raw score)	0	3	0	0

Table 10: Mean Scores on Spring Tests by Minority Status and Group

	Minority Students		Non-Minority Students	
	Control	Funnix	Control	Funnix
Spring BLCT (errors)	23.4	17.8	21.1	18.3
Spring LNF	19.6	38.6	31.4	36.6
Spring PSF	8.0	32.4	8.4	31.6
Spring NWF	4.1	24.4	5.5	15.3
Word ID (any correct)	2.2	10.0	5.9	8.1
Word Attack (any correct)	0.3	5.4	0.2	3.6
100 word test	3.0	19.1	9.0	11.7
Controlled Text Passage	1.2	2.0	1.6	2.1
N	11	11	8	7

Note: Non-minority students are non-Hispanic whites whose families speak English at home.

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Appendix A: Material Used with the High School Tutors.

TRAINING PLAN DETAIL

Training Plan for SRA Students

Created By:
Last Update Date:
Comment:

ADMINISTERING CHILD CARE PROGRAMS
- Develop recordkeeping system.
- Promote child care program.
- Establish emergency evacuation procedure.

PERFORMING SECRETARIAL/CLERICAL ACTIVITIES
- Maintain records.
- Greet guests.

PROVIDING FOR THE PHYSICAL NEEDS OF CHILDREN
- Supervise bathroom procedures.

CONDUCTING LEARNING ACTIVITIES
- Read stories to children.
- Listen to children read.
- Tell a story using teaching aides.
- Conduct calendar time.

GUIDING SOCIAL AND EMOTIONAL DEVELOPMENT
- Assist child to deal with emotional upset.
- Promote good social attitudes among children.

MAINTAINING SANITARY ENVIRONMENT
- Supervise routine clean up by children.

PERFORMING SAFETY FUNCTIONS
- Conduct inspection for safety hazards.
- Conduct emergency evacuation drill.

ELEMENTARY EXPERIENCE
Training Plan

Tasks/ Procedures	1	2	3	4	5
A. Complete School's Specific Program Requirements					
• Organize for assumption of teaching responsibilities					
• Adhere to school dress code, smoking, punctuality, etc.					
• Maintain confidentiality of school matters					
• Clarify and maintain student/teacher roles					
• Conference with cooperating teacher					
• Complete paperwork requirements					
• Participate in evaluation process					
• Participate in school-related activities					
• Attend seminars					
B. Exhibit Commitment to Professional Growth					
• Maintain current and factual information in discipline					
• Initiate development of personal teaching style					
• Develop self-improvement plan					
• Implement self-improvement plan					
• Participate in available training when possible					
C. Design Instruction					
• Consult with teacher about lesson					
• Incorporate established curriculum guidelines					
• Identify goals and objectives					
• Identify prerequisite skills and knowledge					
• Review information on student characteristics and needs with cooperating teacher					
• Decide on materials and resources					
• Select teaching strategies					
• Allocate time for specific activities					
• Determine evaluation procedures					

• Prepare materials					
• Prepare alternative activities					
• Develop "Special Needs" plan variations					
D. Implement Instruction					
• Establish and maintain class focus					
• Implement prepared instructional plan					
• Involve students in learning					
• Provide complete academic feedback to students					
• Monitor pace of overall learning experience					
• Adjust learning experience according to current circumstances					
• Monitor individual student progress during lesson					
• Integrate curriculum content					
• Connect past present and future learning (building for transfer)					
• Provide closure					
E. Facilitate Learning					
• Establish a mutually respectful environment					
• Accommodate student differences					
• Encourage student contributions					
• Incorporate concept of diversity					
• Teach students to monitor own thinking					
F. Manage Student Behavior					
• Model desired behavior					
• Develop strategies to encourage positive consequences					
• Provide opportunity for student responsibility					
• Enforce expectations and consequences					
• Confer with appropriate teachers regarding student behavior					
• Participate with cooperating teacher in conferences related to student					
• Enforce behavior standards during non-class time (lunch, halls, etc.)					
G. Evaluate Student Progress					
• Maintain up-to-date evaluation systems, e.g. portfolios, files, etc.					
• Monitor student achievement progress					
• Explore evaluation techniques to assess performance					
H. Assess Personal Performance					
• Practice reflective inquiry					
• Seek feedback from cooperating teacher, supervisor or other professional					
• Assess progress on stated objectives					
• Collaborate with peers					

I. Maintain Physical Learning Environment					
• Maintain a clean and comfortable classroom					
• Follow safety rules					
• Display instructional information and student work					
• Accommodate physical needs of students					
• Rearrange physical environment					
• Determine classroom procedures for crisis management					
J. Assist Cooperating Teacher with Administrative Tasks					
• Maintain and monitor attendance and other records					
• Participate in advisement activities, e.g. homeroom					

NINTH DISTRICT OPPORTUNITY, INC.
GAINESVILLE, GEORGIA

CHILD CARE STANDARD OF CONDUCT

These Standards of Conduct serve as a guide to staff members in making decisions about their actions, help protect staff against allegations of misconduct and reinforce appropriate professional behavior.

1) I will respect and promote the unique identity of each child and family and staff.

2) I will refrain from stereotyping on the basis of gender, race, ethnicity, culture, religion or disability.

3) I will follow program confidentiality policies concerning information relating to children, families and other staff members.

4) No child will be left alone or unsupervised while under my care.

5) I will use positive methods of child guidance and will not engage in corporal punishment, emotional or physical abuse or humiliation. I will not employ methods of discipline that involve isolation, the use of food as punishment or reward, or the denial of basic needs.

6) I will provide an environment that is supportive of each child's social and emotional development.

7) I will take pride in the cleanliness and maintenance of materials, equipment, vehicles and facilities provided for my use.

_____
Staff Signature Printed Name of Staff

_____
Date

_____
County/Site

Youth Apprenticeship Program

Buford City High School

CONFIDENTIALITY STATEMENT

All information concerning families, students, Buford Head Start personnel, or any other business must be held in strict confidence and must not be discussed with persons not concerned with such information inside the facility.

I understand that intentional or involuntary violation of the confidentiality may result in severing any future involvement in student work experiences. Disciplinary action may follow.

I, hereby, acknowledge and recognize my responsibilities for maintaining confidentiality and pledge I will not violate this trust by accessing or disseminating information without proper authorization.

_____

Student Signature *Date*

APPRENTICESHIP TRAINING AGREEMENT

Apprentice's Name_____
Address_____
Phone_____
Date of Birth_____ Social Security Number_____

Parent/Guardian's Name_____
Phone_____

Business/Employer_____
Address_____
Phone_____

Apprenticeship Coordinator_____
Phone_____

The YOUTH APPRENTICESHIP PRTNERS agree to the following terms:

APPRENTICE STUDENT AND/OR PARENT/GUARDIAN RESPONSIBLITIES

- Maintain an overall 2.5 GPA.
- Adhere to the school system's policies on behavior, dress code and all other school based rules.
- Understand that enrollment into technical school/college, should be complete before high school graduation.
- Abide by the attendance policies of the workplace, the apprentice must attend school if working on school days.
- Arrive on time daily for both school and work, and if late or absent for reasons beyond apprentice's control, will call the appropriate personnel.
- Arrive at the workplace properly dressed.
- If under 18, to obtain a valid work permit.
- Provide own transportation to and from the workplace.
- Meet job requirements and expectations as outlined in the Youth Apprenticeship Training Plan.
- Agree to release information and school related records, (Disciplinary Record, Attendance Records, Academic Records) as it pertains to the school system's Youth Apprenticeship Program.
- Agree to share his/her success with others.
- Agree to maintain a notebook/journal that will include work reports, training plan and other items as directed.
- Grant consent to be photographed for educational and promotional purposes (video, photographs for brochures, news articles).
- Grant permission for work related emergency treatment. Medical personnel will make reasonable attempts to contact the parents before initiating emergency treatment as deemed necessary by the employer/emergency service.
- Assume full responsibility for the conduct and safety of the apprentice in traveling between home, school, and work, as well as while engaged in school projects and activities off campus.
- Understand that if an apprentice looses his/her job through negligence or misdemeanor or failure to maintain required academic standards he/she is subject to dismissal from the program and may not receive school credit, which might impact high school graduation.
- Grant consent for pre-employment or routine physical, required laboratory work, immunizations, x-ray, drug test, as required by employer.

_____
(Student Signature) (Date)

_____
(Parent/Guardian Signature) (Date)

FUNNIX TUTORIAL DAILY LOG SHEET

Student's name:_____ **Date:**_____

Lessons Covered: _____ **Last Task Covered:**_____

Student's Performance:

Letter/Sound Identification _____

_____

Word Reading_____

_____

_____

First Reading of Story_____

_____

_____

Second Reading of Story_____

_____

_____

Workbook Activities_____

_____

_____

Overall Performance_____

_____

_____

_____

Comments, Concerns or Questions for Instructor_____

_____

_____

_____

Tutor's Signature:_____

FUNNIX TUTORIAL DAILY LOG SHEET

TEACHING LETTERS: m, f, e, r

Student's name: _____ Date: _____

Lessons Covered: _____ Last Task Covered: _____

Student's Performance:

Letter/Picture Identification _____

_____

_____

Overall Performance: _____

_____

_____

_____

Comments, Concerns or Questions for Instructor _____

_____

_____

Tutor's Signature: _____

BHS Peer Tutor Grade Form

School _____ **Date**_____

Peer Tutor's Name_____ **Head Start Supervisor's Name**_____

Semester (circle one): Fall Spring **High School Instructor's Name**_____

Circle the description that corresponds to the ratings

For scoring purposes, add the following points for each rating in the corresponding columns		**1**	**2**	**3**	**4**	**5**
1.	**Unexcused Absences**	5+	5	4	3	0-2
2.	**Keeps thorough journal**	0-24%	25-49%	50-74%	75-99%	100%
3.	**Maintains appropriate instructional behaviors:**					
	a. Previously reviews lesson	False	Somewhat False	Neutral	Somewhat True	True
	b. Follows the script	False	Somewhat False	Neutral	Somewhat True	True
	c. Corrects errors appropriately	False	Somewhat False	Neutral	Somewhat True	True
	d. Provides praise specifically and briefly	False	Somewhat False	Neutral	Somewhat True	True

4.	**Maintains professionalism while tutoring**	False	Somewhat False	Neutral	Somewhat True	True
5.	**Stays on task and tutors for full allotted time**	False	Somewhat False	Neutral	Somewhat True	True
6.	**Returns materials to Room daily**	False	Somewhat False	Neutral	Somewhat True	True
7.	**Maintains professional attitude toward Head Start Staff**	False	Somewhat False	Neutral	Somewhat True	True
8.	**Maintains professional attitude toward all BHS tutors**	False	Somewhat False	Neutral	Somewhat True	True
9.	**Maintains appropriate dress and appearance**	False	Somewhat False	Neutral	Somewhat True	True

Grading:

60=100	**44=84**
59=99	**43=83**
58=98	**42=82**
57=97	**41=81**
56=96	**40=80**
55=95	**39=79**
54=94	**38=78**
53=93	**37=77**
52=92	**36=76**
51=91	**35=75**
50=90	**34=74**
49=89	**33=73**
48=88	**32=72**
47=87	**31=71**
46=86	**30=70**
45=85	**29=69**

Letter Grading:

A=90-100
B=89-80
C=79-70
F=69-0

Final assignment:

What effect did being an SRA tutor have on you? How did your attitude change from beginning to end? How will working with these children influence your actions and decisions about your future?

Appendix B: The 100 Word Test and the Controlled Text Passages

TEST ADMINISTRATION

(Write the name of the child on a copy of the 100 word list.)

(Give the child your copy of the 100 word list.)

(Direct the child to touch the first word in the first row.)

These are rows of words. Read me these words.

(Make a mark through words that the child reads incorrectly, or doesn't respond to within 5 seconds.)

(Circle words that the child reads correctly.)

(If the child indicates that s/he can't read any words, direct him/her to the words 'a' and ask:) Do you know this word?

(Repeat for the word 'I')

Do you know any other words on this page?

(Terminate testing if the child misses 6 words in a row or when the child indicates that s/he doesn't know how to read any more words {after being asked about 'a' and 'I'}).

me	no	see	a	I
man	rat	mail	mean	rain
feel	for	fly	my	ant
ear	fine	ate	name	that
pile	dad	made	and	sit
these	sleep	store	cold	slow
you	dime	lid	with	win
over	do	go	pig	was
liked	lived	home	run	hug
caves	into	from	here	come
of	have	jump	fast	thing
why	barn	farm	start	fish
slide	under	bring	digging	her
mother	became	dark	going	not
corn	cow	faster	shirt	stopped
little	cops	down	fox	town
box	something	pond	each	sitting
throw	brother	riding	they	better
men	swimming	tub	yellow	getting
smile	yelled	drove	sleeping	yard

A rat and a mole sat near a tree. The mole liked to play. The mole played near pine trees, played on roads, and played in lakes.

Did the rat like to play near a tree, or on a road, or swim in a lake? No. The rat liked to nap and eat.

So the rat ate meat loaf, and corn from a can. After the rat ate, the mole said, "Take this mat and sleep near this tree. We will play when you wake up."

Those pals did that.

A pile of snow sat in the drive way near a man's home. The man raked the snow. The man said, "I need to clear this snow, so I can ride in my van to the store."

That snow made the man's feet cold. The man said, "I am so cold that I can rake no more."

Did the man cry? The man was so sad that tears came like rain. The tears landed on the pile and melted it away. The man smiled and said, "I made the drive way clear so now I will go to the store."