Scientific Evaluation of the Effects of the Kindergarten SMART/Boost-Up Intervention for First-Grade Reading Readiness 2004-2005

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Abstract: This randomly-assigned experimental-control study focused on the effectiveness of the SMART/Boost-Up intervention for improving first grade reading readiness, including phonemic awareness . The study took place in Leon County (Tallahassee), Florida and focused on students in the twelve Title I schools throughout the county. The evaluation included published instruments as well as instruments developed by the evaluator. The target of the evaluation was to examine the fidelity of the training, examine parent and teacher views of the intervention and to determine the effectiveness of the intervention on the reading readiness of the experimental group as compared to the control group. What we found was strong parent and teacher satisfaction with the program. It was difficult to determine the fidelity of the intervention due to a fair amount of missing information in the fidelity surveys. Effect sizes for phonemic awareness skills were strong on the W-J-III (d=1.13-1.58) and DIBELS high fidelity SMART schools (d=.8) Beginning Reading Skills on the Metropolitan Readiness Test (MRT6) revealed that 90% of experimental pupils scored in the top quartile of norms. We did have problems of small n's and uneven sample sizes between experimental and control groups that could clearly effect our outcomes. In conclusion we find SMART/Boost-Up to be a promising intervention in worthy of more research and evaluation, especially with low-performing students from backgrounds of economic disadvantage who require more than one year of compensatory stimulation.

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First-Grade Reading Readiness

Introduction: "Reading is the foundation of all learning. Our children must learn to read well if they're to excel in life and achieve their dreams," (U.S. Secretary of Education Rod Paige, July 9, 2002). The Nation's Report Card-Reading Highlights examined reading achievement across the United States, in fourth and eighth grade public schools. The percentages of fourth and eighth graders reading achievement level was given for the states and jurisdictions that participated in the 2003 reading assessment. The three achievement levels the participants were assigned to include: *Basic*, *Proficient*, and *Advanced.* The *Proficient* achievement level is identified by the National Assessment Governing Board as the standard all students should reach (National Center for Education Statistics, 2004). The Nation reported 37% of fourth grade and 26% of eighth grade students are not reading at the *Basic* level.

Race/ethnicity differences in reading across the nation are provided in the table below. The data shows the white group is the only majority that is performing at or above basic reading. All other racial/ethnicity groups have much lower performance percentages on *Basic* and *Proficiency* levels (National Center for Education Statistics, 2003).

National 4th Grade Reading Proficiency Based on Race/Ethnicity

Race/Ethnicity	Percentage At or Above Basic	Percentage At or Above Proficiency
White	75%	41%
Black	40%	13%
Hispanic	44%	15%
Asian/Pacific Islander	70%	38%
American Indian/Alaska Native	47%	16%

Terminology of race/ethnicity classifications are based on the descriptions provided by the National Center for Education Statistics.

National 8th Grade Reading Proficiency Based on Race/Ethnicity

Race/Ethnicity	Percentage At or Above Basic	Percentage At or Above Proficiency
White	83%	41%
Black	54%	13%
Hispanic	56%	15%
Asian/Pacific Islander	79%	40%
American Indian/Alaska Native	57%	17%

Terminology of race/ethnicity classifications are based on the descriptions provided by the National Center for Education Statistics.

There is a high correlation between poverty and poor academic achievement (Rollin, Arnold, Solomon, Rubin, & Holland, 2003). There is a disproportionate representation of minorities represented in the lower socioeconomic status. Gershoff (2003) examined the well-being of children across all incomes and race-ethnicity groups in a nationally representative sample of children attending kindergarten. Findings revealed that children

in families whose incomes fell below 200 percent of the federal poverty level (FPL) were well below average in reading, math, and general knowledge test scores, compared to well-above-average scores of children living in families with incomes over 300 percent of FPL.

In our current society of No Child Left Behind, accountability and achievement are a national priority. However, how does that fact transfer to children who attend public schools? More importantly, how can we help prepare children be better readers? The Stimulating Maturity through Accelerated Readiness Training (SMART)/Boost-Up program answers these fundamental questions, and provides a model program to improve student reading performance. However, it is important to have an understanding of early childhood reading readiness and the theoretical foundations that the SMART/Boost-Up is based on.

Review of Literature: *Theories of Development and Reading Readiness*

The first five years of life are a time of enormous growth of linguistic, conceptual, social, emotional, and motor competence. Right from birth a healthy child is an active participant in that growth, exploring the environment, learning to communicate, and, in relatively short order, beginning to construct ideas and theories about how things work in the surrounding world. The pace of learning, however, will depend on whether and to what extent the child's inclinations to learn encounter and engage supporting environments. Therefore, the environment in which a child grows up has a powerful impact on child development and learning (Bowman, Donovan, & Burns, 2000). Resulting in extreme variations/ranges of abilities and skills by the time they enter elementary school (Saluja, Scott-Little, & Clifford, 2000).With these drastic individual differences it is taken for granted that each child has acquired the readiness skills necessary to be able to learn to read by the time they enter elementary school. As a matter of fact, the majority of states determine a child's eligibility for kindergarten by his or her age, regardless of what the child may have or may not have been exposed to. Typically, children enter kindergarten in the fall if they have turned or will turn 5 years old by a certain cut-off date (Bowman, Donovan, & Burns, 2000; & Education Commission of the States, 2004).

Some researchers argue that a person's readiness for academic learning should be based on his/her developmental readiness, not on chronological age requirements (Bowman, Donovan, & Burns, 2000). These readiness skills include oral language development (listening and speaking), visual recognition and discrimination, eye-hand coordination, social interaction patterns, attention for following directions, pencil-paper skills, general coordination for gross movement, and self-confidence for resilience in the face of challenges. Corso (1999) suggested that in order to develop these skills, as well as the necessary reading, writing, math, spelling, and social studies, children should (1) use movement activities that encourage the child to be active; (2) learn through interest; (3) enjoy playing because it is challenging, not because it is easy; and (4) learn primarily through the kinesthetic (moving and tactile) mode.

O'Dea (1998) found if a program focuses on integrating sensory feedback from the eye, ear, and mouth to track the correspondence between the sound patterns of oral language and the alphabetical patterns of written language, there is an average growth in reading comprehension of 1.0 years in 18 weeks of instruction. Further, there was a growth of approximately 6.5 months in reading decoding. In addition, improved attitudes toward reading were also observed (O'Dea, 1998). Grimwood and Rutherford (1980) conducted a study that assessed the effectiveness of sensory integrative therapy with first-grade the whole nonsense word. For example, if the stimulus word is "vaj" the student could say /v/ /a/ /j/ or say the word /vaj/ to obtain a total of three letter sounds correct. The student is allowed 1 minute to produce as many letter-sounds as he/she can, and the final score is the number of letter-sounds produced correctly in one minute. Because the measure is fluency based, students receive a higher score if they are phonologically recoding the word and receive a lower score if they are providing letter sounds in isolation. The NWF measure also takes about 2 minutes to administer and has over 20 alternate forms for monitoring progress. The one-month, alternate-form reliability for NWF is .83 (Good et al., in press). The concurrent criterion-validity of DIBELS NWF with the Woodcock-Johnson Psycho-Educational Battery-Revised readiness cluster score is .36 to .59 in first grade (Good et al., in press). The predictive validity of DIBELS NWF in first grade with the Woodcock-Johnson Psycho-Educational Battery total reading cluster score is .66 (Good et al., in press).

Letter Naming Fluency (LNF) is a standardized, individually administered test that provides a measure of risk. Students are presented with a upper- and lower-case letters arranged in a random order and are asked to name as many letters as they can. Students are told if they do not know a letter they will be told the letter. The student is allowed 1 minute to produce as many letter names as he/she can, and the score is the number of letters named correctly in 1 minute. Students are considered at risk for difficulty achieving early literacy benchmark goals if they perform in the lowest 20% of students in their district. That is, below the 20th percentile using local district norms. Students are considered at some risk if they perform between the 20th and 40th percentile using local norms. Students are considered at low risk if they perform above the 40th percentile using local norms. The 1-month, alternate-form reliability of LNF is .88 (Good et al., in press). The median criterion-related validity of LNF with the Woodcock-Johnson Psycho-Educational Battery-Revised readiness cluster standard score is .70 in kindergarten (Good et al., in press). The predictive validity of kindergarten LNF with first-grade Woodcock-Johnson Psycho-Educational Battery-Revised reading cluster standard score is .65 and .71 (Good et al., in press).

Analyses

The major focus of the evaluation is to examine the effectiveness of the SMART/Boost-Up program in improving reading proficiency, relative to traditional instruction. Therefore, data analysis procedures will be employed to examine outcome differences between the intervention and control groups. Analysis of covariance (ANCOVA) designs

will be the primary statistical techniques utilized. These techniques allow for a comparison between the two groups (intervention and control), while controlling for mitigating factors, such as prior reading readiness, socioeconomic status and teacher skill and experience. Group differences will be evaluated in terms of both statistical and practical significance. Additionally, potential mitigating factors (covariates) will be tested for significance.

These analyses will be conducted for the entire sample together, as well as for students by ethnicity. The purpose here will be to examine whether the SMART/Boost-Up program is equally effective for students of differing ethnicities. Outcomes among the subgroup of 100 students, to whom the additional assessments will be administered, will also be analyzed using ANCOVA techniques. SPSS Statistical Software will be used for the bulk of the quantitative analyses.

In addition, the fidelity instrument and parent and teacher survey/questionnaires will be analyzed to determine effects on student achievement.

Conclusion

This paper has described the research design; psychometric instruments, data analysis, student population, and the intervention being tested have been described. However, as in any study there may be necessary adjustments to meet the needs of a "real life" study. All individuals participating in this project did remain as true to this design as was possible.

Recent brain research confirms the idea that children's brains, which develop at an extraordinary pace between conception and the early school years, are receptive to stimulation. Scientists describe this phenomenon as "plasticity". Researchers know that by increasing the frequency, intensity and duration of specific stimulation, a child's brain can become efficient in receiving and processing information. This will then put the child's brain in an optimal learning state. Turkeltaub, Gareau, Flowers, Zeffiro, and Eden (2003) using a task that isolates reading-related brain activity and minimizes confounding performance effects, did a cross-sectional functional magnetic resonance imaging (fMRI) study. It was found that learning to read is associated with two patterns of change in brain activity: increased activity in left-hemisphere middle temporal and inferior frontal gyri and decreased activity in right inferotemporal cortical areas. Activity in the left-posterior superior temporal sulcus of the youngest readers was associated with the maturation of their phonological processing abilities.

The SMART/Boost-Up Program Theoretical Foundation

A Chance to Grow/New Visions School's educators recognized the limited resources public schools face today. With that in mind, they drew from a wide range of sources such as clinical interventions and the most recent brain research, combining them into a 30-minute stimulation program that can be implemented classroom-wide. After

implementing SMART for over ten years, they documented significant increases in learning readiness and reading achievement. Historically, some of the models the SMART program draws from have had mixed reviews as separate, stand-alone interventions (e.g. Jean Ayres and Sensory Integration.) This research design will be the first attempt to evaluate the effect of the SMART model involving a rigorous scientific design.

One of these models that is incorporated into the SMART/Boost-Up program is the use and understanding of a neurophysiological approach to reading readiness. This theory emphasizes the use of the brain and certain brain mechanisms which are specialized for language, specifically in the component responsible for phonologic analysis. "With the emergence of functional imaging methods that allow for the detection, localization, and quantification of brain activity associated with cognitive function, it is possible to assess systematically the putative brain mechanisms [for reading and language comprehension]" (Simos, Fletcher, Bergman, Breier, Foorman, Castillo, Davis, Fitzgerald, & Papanicolaou, 2002). Therefore researchers are now able to pinpoint areas of the brain where reading and language occur, design treatments around those specific areas, and measure effectiveness through brain imaging.

Visual Skills Development derived from techniques found in Developmental Optometry is another element of the SMART/Boost-Up program. In particular, the SMART/Boost-Up program works with children to develop general eye movement ability and coordination skills which allows individuals to move their eyes in order to fixate on objects and to develop mature eye-hand coordination, including printing ability. Over the last century, our dependence on near-vision has increased tremendously as a result of the time spent with computers, television, and video games. It is estimated that students today read about three times as many textbooks as they did 50 years ago. This increased use of near-vision has placed an additional strain on the eyes, and some experts suggest that vision difficulties have consequently increased. Schools often screen for vision with a Snellen chart that does not diagnose focusing skills, depth perception, eye movement, or visual perception. Even a student with 20/20 vision can experience headaches, eyestrain, or fatigue as a result of a problem focusing both eyes. This can affect the student's comprehension, ability to pay attention in class, and overall school performance. Recognizing the difference between acuity problems and vision problems is important. Eye movement and eye-hand coordination are neuro-developmental aspects of readiness that can be stimulated systematically in the classroom. (Association for Comprehensive Neurotherapy, 2004).

Another major theory that is incorporated into the SMART/Boost-Up program is the theory of primitive and postural reflexes by Sally Goddard Blythe (Blythe, 2003). Sally Goddard Blythe (2003) stated the following:

> It is an accepted fact that the presence of primitive and postural reflexes at key stages in development provides reliable indicators of central nervous system maturity and signs of neurological dysfunction. In the first 6 - 12 months of post-natal life, the primitive reflexes should gradually be inhibited by the developing brain to be

> replaced by postural reflexes; Postural reflexes should be fully developed by three and a half years of age. The transformation from primitive to postural reflex that takes place in the first three and a half years of life, lays the foundations for the control of balance, posture and later motor skills. If primitive and postural reflexes do not mature at the correct developmental stage, they are said to aberrant. Aberrant reflexes can result in immature motor development despite the acquisition of later developmental skills. When a cluster of abnormal reflexes persist, Neuro-Developmental Delay is said to be present. It is also recognized that aberrant reflexes can affect higher cortical functioning particularly in the area of education (Ayres 1972, 1973; Bender 1976; & Blythe & McGlown 1979), but 25 years after this research, the concept remains controversial. (Pp.1-2)

Direct Instruction is based on Zigfried Engelmann's theory that children can learn at an accelerated rate if educators deliver instructions that are clear, are able to predict likely misinterpretations and therefore reduce confusion, and assist in forming generalizations. It is a highly structured, intensive teaching program that aims to absolutely prepare the educator in such a way that all children learn to 100% mastery of the subject. His unparalleled success garnished the attention and partnership of Carl Bereiter at the University of Illinois. After Bereiter left Illinois, Wesley Becker replaced him as preschool project director, and the Engelmann-Becker team was formed. This team joined Project Follow Through in 1967. Direct Instruction gained popularity and attention on a national scale as the results of Follow Through came in, "When the testing was over, students in Direct Instruction classrooms had placed first in reading, first in math, first in spelling, and first in language. No other model came close." (Association for Direct Instruction, 2004). The Wisconsin Policy Research Institute recently released a report on the success of Direct Instruction (Schug, Tarver, & Western, 2001). Other researchers agree that in order to address the needs of children most at risk of reading failure, the same instructional components are relevant but they need to be made more explicit and comprehensive, more intensive, and more supportive in small-group or one-on one formats (Foorman & Torgesen, 2001; & Torgesen, 2002). The general application of direct instruction principles has become understood as explicit curriculum modeling to individual and/or group mastery. The SMART program uses these principles of direct instruction applied to brain stimulation in order to develop reading readiness skills.

Other models emphasizing neurodevelopmental maturity include the work of Bender (1971, 1976), Blythe and Goddard (2002), and sensory integration by Dr. Jean Ayres. For most children, sensory integration develops in the course of ordinary childhood activities. Motor planning ability is a natural outcome of the process, as is the ability to adapt to incoming sensations. But for some children, sensory integration does not develop as efficiently as it should. When the process is disordered, a number of problems in learning, development, or behavior may become evident (Ayers, 1979). This theory has been developed and refined by the research of Dr. Ayres, as well as other physical and occupational therapists (Miller, 2001). In addition, literature from the fields of neuropsychology, neurology, physiology, child development, and psychology has contributed to theory development and intervention strategies (Sensory Integration International, 2004). Bender, Blythe and Goddard emphasize the inhibition of primitive

reflexes and the emergence of postural reflexes as the cortex develops. Some primitive reflexes may persist and interfere with concentration, perception and self-control because of inadequate early movement opportunity required for maturation.

The SMART/Boost-Up program incorporates and integrates techniques from several theories into its program, thereby providing a model of development and understanding that is cutting edge with demonstrated effectiveness. This program involves activities that integrate heightened visual, auditory, vestibular and kinesthetic inputs to the brain over the course of the school year. For example, kinesthetic stimulation through arm and hand movement provides patterns of proper position and letter formation for superior printing. SMART/Boost-Up, in effect, provides a booster effect for achievement in any academic curriculum that the teacher uses. Students attain mastery more quickly and progress steadily through sequential curricula in early reading, math and printing skills. Students build the underlying readiness abilities in listening skills for pre-phonic phonemic awareness, systematic visual abilities and eye-hand coordination that provide a solid foundation for basic academic skills performance. By helping bond students to school through consistent early success and high-level performance in a joyful context, SMART/Boost-Up is expected to prevent later dropouts due to school failure. By helping students master basic skills at an automatic level, SMART/Boost-Up allows students to apply those basic skills to higher order thinking in interesting curriculum.

While SMART/Boost-Up can help all children increase their eye-hand coordination, visual perception and reading readiness skills, it is particularly effective in helping to resolve learning readiness gaps for students in the bottom half of academic achievement. Additionally, the program compensates for children's lack of stimulation during the early years due to poverty and other factors.

For many children from backgrounds or continuing experience of economic disadvantage (low-income, poverty), cultural (deprivation practices, anti-schooling bias) and especially African American males (low birth weight, non-standard English, etc), more than one year of SMART programming is necessary in order to produce effects. Two or more school years and summer programs have shown encouraging results in some districts.

This large discrepancy in reading proficiency across the nation is important to emphasize because the SMART/Boost-Up program has demonstrated gains in reading across all cultures and is particularly effective for children performing in the bottom half of academic achievement (who may be deficient in neurological/physiological stimulation).

Florida and Leon County Demographics and 2003-2004 Reading Data

Since the SMART/Boost-Up program is implementing this study in Florida it is essential to understand reading levels of students in the state. In Florida, the fourth grade distribution was 37% *Below Basic*, 31% *Basic*, 24% *Proficient*, and 8% *Advanced*. The eighth grade distribution was 32% *Below Basic*, 41% *Basic*, 24% *Proficient,* and 2% *Advanced*. The results for the fourth grade in Florida are not significantly different from the nation, but the results for the eighth grade are significantly lower than the national

average (National Center for Education Statistics, 2003). The State of Florida reported 37% of fourth grade are not reading at the *Basic* level. The State of Florida reported 32% of eighth grade students are not reading at the *Basic* level.

Study design

This section describes the results of the Smart Boost-Up evaluation in Tallahassee Florida 2004-2005. We will describe the process for determining equivalency between the experimental and control groups as well as the results of the teacher and parent surveys, the fidelity instrument and the results of the Woodcock-Johnson Tests of Cognitive Abilities and Academic Achievement-Third Edition(W-J-III), the Metropolitan Readiness Test-Sixth Edition and the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) data. We looked at the control group and experimental group on a set of demographic variables as well as the W-J-III to determine equivalency of groups. Equivalency would allow us to test the difference between groups at the end of the intervention and report with confidence that the differences at post-test were due to the intervention.

The SMART/Boost-Up program was implemented in the Leon County School District (Tallahassee) during the 2004-2005 school year. Twelve Title I elementary schools in the Leon County School District agreed to participate in the study. The United States Department of Education (2004) stated that Title I is intended to ensure that all children have the opportunity to obtain high-quality education and reach proficiency on challenging state academic standards and assessments. Specifically, schools with poverty rates of 50 % or higher or those with the highest poverty rates are given Title I funds. The demographics that comprise the twelve elementary schools are included in the table 1 below.

Table 1
Leon County District Title I School Demographics for Kindergarten 2003-2004

Title I Elementary Schools	White	Black	Hispanic	Asian	Indian	Multicultural	Male	Female	School Readiness Uniform Screening (SRUSS) Administered 1st 45-calendar days	Free or Reduced-Price Lunch By School
Apalachee	24	74	1	4	0	3	58	48	78% Ready	65%
Astoria	22	63	2	1	0	13	56	45	92% Ready	63%
Bond	0	45	0	0	0	2	30	17	78% Ready	94%
Caroline Brevard	3	80	1	0	1	1	42	44	55% Ready	90%
Hartsfield	14	77	1	3	0	5	54	46	82% Ready	67%
Oak Ridge	7	61	2	0	0	3	41	32	74% Ready	90%
Pineview	4	85	9	3	0	1	61	41	75% Ready	82%
Riley	2	67	1	0	0	3	37	36	64% Ready	93%
Ruediger	14	56	1	3	0	0	34	40	78% Ready	69%
Sabal Palm	21	79	6	0	0	0	59	47	72% Ready	88%
Wesson	1	50	0	0	0	0	25	26	80% Ready	97%
Woodville	51	19	0	1	0	2	37	36	71% Ready	57%

Third, fourth, and fifth grade students take the Florida Comprehensive Assessment Test (FCAT) Reading Tests annually. FCAT Reading scores are reported in terms of five achievement levels (1-low to 5-high). The schools that participated in this study reported the percentages of students that scored three and above on measures of reading (see table 2 below).

Table 2
Leon County District Title I School FCAT Results in Reading 2003-2004

Title I Elementary Schools	Grade 3	Grade 4	Grade 5
Apalachee	63%	59%	58%
Astoria	68%	74%	71%
Bond	48%	30%	32%
Caroline Brevard	31%	55%	30%
Hartsfield	71%	77%	47%
Oak Ridge	54%	44%	42%
Pineview	46%	60%	55%
Riley	63%	56%	39%
Ruediger	74%	67%	52%
Sabal Palm	51%	50%	56%
Wesson	36%	54%	43%
Woodville	59%	57%	52%

A Chance to Grow/New Visions School contracted Education Public Policy and Consulting (EPPC) Global Management Inc. to evaluate the design, implementation, instruments, and analyses. EPPC is a partnership that has been formed to provide services to various educational entities. EPPC has had a history of providing evaluative, curricular, research, and other consultative services to various educational agencies, both public and private. EPPC has demonstrated success with scientific evaluation, which often includes coordinating/implementing a process that gathers both qualitative and quantitative data of the project's progress and determining the extent to which the desired outcomes are met.

Method

Participants and Procedure

Participants were males and females enrolled in the Leon County District Title I elementary school kindergarten classrooms during the 2004-2005 school year. The range in age was expected to be from 4 (meeting the five year old cutoff date) to 6 years. It was anticipated that all racial/ethnic groups would be represented with a higher representation of black students (based on 2003-2004 data) with the exception of Woodville Elementary School. In addition, the majority of students received free/reduced lunch (based on 2003-2004 data).

Participants for this study were distributed in twelve Title I kindergarten classrooms. These twelve schools were randomly chosen to be in the control and experimental groups using the *Table of Random Numbers* (Kendall & Smith, 1939). All of the students were given the standard measures administered by the Leon County School District and the Metropolitan Readiness Tests, Sixth Edition (MRT-6) administered by EPPC Global Management Inc. An additional group of approximately 100 students was to be randomly selected from the control and experimental groups for pre- and post-test administration of subtests on the Woodcock-Johnson (WJ III) Tests of Cognitive and Academic Achievement by EPPC Global Management Inc. Parental and participant consent forms were distributed and collected prior to administration of the W-J-III. In order to assure confidentiality all students were assigned numbers and all data was coded to ensure the protection and anonymity of all participants. EPPC Global Management Inc. submitted a "Request for Research" through Leon County Schools and obtained Institutional Review Board (IRB) approval. Data collection took place during the fall 2004 and the spring 2005.

In addition to the assessments administered to the children by Leon County and EPPC Global Management, Inc., parents and teachers were asked to fill out surveys/ questionnaires. The parent survey included items such as parent/child involvement and the influence parents have on student outcomes. The teacher survey included items that contribute to positive student outcomes associated with the SMART/Boost-Up model. Both of these instruments were developed, refined and collected at the end of the 2005 school year.

In order to assess the fidelity of implementation, the evaluators observed the teachers during the 2004-05 school year on items that would influence student outcomes.

Instruments

The instruments for this study were administered by EPPC Global Management Inc. and/or the Leon County Public Schools. Leon County agreed to share relevant demographic and assessment data collected during the 2004-2005 school year. The instruments administered to students in the SMART/Boost-Up classes included the Metropolitan Readiness Tests, Sixth Edition (MRT-6); the Woodcock-Johnson (W-J-III) Tests of Cognitive Abilities and Academic Achievement; a parent survey; a teacher survey; and fidelity instrument. Leon County will administer the Dynamic Indicators of Basic Early Literacy Skills (DIBELS).

Metropolitan Readiness Tests, Sixth Edition (MRT-6). The MRT-6 Level 2 is a group-administered assessment that emphasizes the strategies and processes in beginning reading and mathematics. Level 1 (individual administered) and Level 2 include measures of auditory, visual, language, and quantitative processes, but the content of each level varies slightly to accommodate differences in stages of development.

Woodcock-Johnson (WJ III) Tests of Cognitive Abilities. The W-J-III Tests of Cognitive Abilities is based on the Cattell-Horn-Carroll (CHC) theory of cognitive abilities, which combines Cattell and Horn's *Gf-Gc* theory and Carroll's three-stratum theory. The CHC theory provides the most comprehensive framework available for understanding the structure of human cognitive abilities. The Standard Battery consists of tests 1 through 10, and the Extended Battery includes tests 11 through 20. Depending on the purpose and extent of the assessment, examiners can use the Standard Battery alone or in conjunction with the Extended Battery. The Standard Battery includes: (1) Verbal Comprehension; (2) Visual-Auditory Learning; (3) Spatial Relations; (4) Sound Blending; (5) Concept Formation; (6) Visual Matching; (7) Numbers Reversed; (8) Incomplete Words; (9) Auditory Working Memory; and (10) Visual Auditory Learning-Delayed. The Extended Battery includes: (11) General Information; (12) Retrieval Fluency; (13) Picture Recognition; (14) Auditory Attention; (15) Analysis-Synthesis; (16) Decision Speed; (17) Memory for Words; (18) Rapid Picture Naming; (19) Planning; and (20) Pair Cancellation.

Due to the design of this study the following tests/clusters were administered: sound blending (r.86) and auditory attention (r.87) combined yields the Auditory Processing (r.89) cluster; and sound blending (r.86) and incomplete words (r.77) combined yields the Phonemic Awareness (r.88) cluster.

Woodcock-Johnson (WJ III) Tests of Achievement. The WJ III Tests of Achievement has two parallel forms (A and B) that are divided into two batteries—Standard and Extended. The Standard Battery includes tests 1 through 12 that provide a broad set of scores. The 10 tests in the Extended Battery provide more in-depth diagnostic information on specific academic strengths and weaknesses. Examiners can administer the Standard Battery either alone or with the Extended Battery. The Standard Battery includes: (1) Letter-Word Identification; (2) Reading Fluency; (3) Story Recall; (4) Understanding Directions; (5) Calculation; (6) Math Fluency; (7) Spelling; (8) Writing Fluency; (9) Passage Comprehension; (10) Applied Problems; (11) Writing Samples; and (12) Story Recall-Delayed. The Extended Battery includes: (13) Word Attack; (14) Picture Vocabulary; (15) Oral Comprehension; (16) Editing; (17) Reading Vocabulary; (18) Quantitative Concepts; (19) Academic Knowledge; (20) Spelling of Sounds; (21) Sound Awareness; and (22) Punctuation & Capitalization.

Due to the design of this study the following tests/clusters were administered: word attack (r.87) and spelling of sounds (r.74) combined yields the Phoneme/Grapheme Knowledge (r.89) cluster; and word attack (r.87) and letter-word identification (r.91) combined yields the Basic Reading Skills (r.93) cluster.

Reliabilities for the W-J-III Tests of Cognitive Abilities and Tests of Achievement were calculated for all tests across their range of intended use and included all norming subjects tested at each technical age level. The reliabilities for all but the speeded tests and tests with multiple-point scoring systems were calculated using the split-half procedure. The calculation of split-half coefficients was corrected for length provided by odd and even test items. All split-half coefficients were corrected for length of the

published tests using the Spearman-Brown correction formula. Because the split-half procedure was inappropriate for some tests, the reliabilities for the W-J-III speeded tests and tests with multiple-point scored items were calculated using Rasch analysis procedures. Of the 42 median test reliabilities, 38 are .80 or higher and 15 are .90 or higher. Although these strong reliabilities for individual tests, the WJ III cluster scores are the recommended scores for interpretation. Cluster scores are based on combinations of two or more tests and as a result consistently demonstrate higher reliabilities.

A number of special studies reported in the *Technical Manual* show that the W-J-III tests and clusters correlate well with other tests measuring similar constructs. The General Intellectual Ability (GIA-Std and GIA-Ext) scores had correlations ranging from .67 to .76 across several samples. Correlations in the range are similar to those reported in other publications and test manuals between full scale or composite scores of other major intelligence batteries.

Parent Survey. For this study a survey/questionnaire was developed to be administered to the parents. This survey included items such as parent/child involvement and the influence parents have on student outcomes.

Teacher Survey. For this study a survey/questionnaire was developed to be administered to the teachers. This survey included items that contribute to positive student outcomes associated with the SMART/Boost-Up model.

Fidelity Instrument. For this study, unannounced observations of the teacher in the classroom were made. While the teachers were being observed, trained personnel recorded behaviors in order to evaluate teacher performance and effectiveness in carrying out the SMART/Boost-up activities. Over the years, the classroom portion of the SMART/Boost-up implementation has not always been complete, so observation were added in order to assure full implementation.

Dynamic Indicators of Basic Early Literacy Skills (DIBELS). DIBELS are a set of standardized individually administered measures of early literacy development. The DIBELS measures student development of phonological awareness, alphabetic understanding, automaticity and fluency. DIBELS is considered "benchmark" data, meaning that students were assessed three times per year and then entered into a database for progress monitoring. There are four components to the DIBELS. These include Initial Sound Fluency (ISF), Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), and Letter Naming Fluency (LNF).

Initial Sound Fluency (ISF) is a standardized, individually administered measure of phonological awareness that assesses a child's ability to recognize and produce the initial sound in an orally presented word (Kaminski & Good, 1996, 1998; & Laimon, 1994). The examiner presents four pictures to the child, names each picture, and then asks the child to identify (i.e., point to or say) the picture that begins with the sound produced orally by the examiner. For example, the examiner says, "This is sink, cat, gloves, and hat. Which picture begins with /s/?" and the student points to the correct picture. The child is

also asked to orally produce the beginning sound for an orally presented word that matches one of the given pictures. The examiner calculates the amount of time taken to identify/produce the correct sound and converts the score into the number of onsets correct in a minute. The ISF measure takes about 3 minutes to administer and has over 20 alternate forms to monitor progress. Alternate-form reliability of the ISF measure is .72 (Good, Kaminski, Shinn, Bratten, Shinn, & Laimon, in press). While that level of reliability is low with respect to standards for educational decision-making (Salvia & Ysseldyke, 2001) it can easily be repeated. By repeating the assessment four times, the resulting average has a reliability of .91 (Nunnally, 1978). The concurrent criterion-related validity of ISF with DIBELS PSF is .48 and .36 with the Woodcock-Johnson Psycho-Educational Battery readiness cluster score (Good et al., in press). The predictive validity of ISF is .36 with the Woodcock-Johnson Psycho-Educational Battery total reading cluster score (Good et al., in press).

Phoneme Segmentation Fluency (PSF) is a standardized, individually administered test of phonological awareness (Kaminski & Good, 1996). The PSF measure assesses a student's ability to segment three- and four-phoneme words into their individual phonemes fluently. The PSF measure has been found to be a good predictor of later reading achievement and is intended for use with students from the winter of kindergarten to the middle of first grade (Kaminski & Good, 1996). The PSF task is administered by the examiner orally presenting words of three to four phonemes. It requires the student to produce verbally the individual phonemes for each word. For example, the examiner says "sat," and the student says "/s/ /a/ /t/" to receive three possible points for the word. After the student responds, the examiner presents the next word, and the number of correct phonemes produced in one minute determines the final score. The PSF measure takes about 2 minutes to administer and has over 20 alternate forms for monitoring progress. The two-week, alternate-form reliability for the PSF measure is .88 (Kaminski & Good, 1996), and the one-month, alternate-form reliability is .79 (Good et al., in press). Concurrent criterion validity of PSF is .54 with the Woodcock-Johnson Psycho-Educational Battery readiness cluster score (Good et al., in press). The predictive validity of the PSF with the DIBELS NWF is .62 and with the Woodcock-Johnson Psycho-Educational Battery total reading cluster score is .68 (Good et al., in press).

Nonsense Word Fluency (NWF) is a standardized, individually administered test of the the whole nonsense word. For example, if the stimulus word is "vaj" the student could say /v/ /a/ /j/ or say the word /vaj/ to obtain a total of three letter sounds correct. With children predicted to be "at risk" for later reading failure, following two half-hour nonsense-word therapy sessions per week over 24 weeks, the experimental group performed significantly higher then the control group on measures of reading ability.

The student is allowed 1 minute to produce as many letter-sounds as he/she can, and the final score is the number of letter-sounds produced correctly in one minute. Because the measure is fluency based, students receive a higher score if they are phonologically

recoding the word and receive a lower score if they are providing letter sounds in isolation. The NWF measure also takes about 2 minutes to administer and has over 20 alternate forms for monitoring progress. The one-month, alternate-form reliability for NWF is .83 (Good et al., in press). The concurrent criterion-validity of DIBELS NWF with the Woodcock-Johnson Psycho-Educational Battery-Revised readiness cluster score is .36 to .59 in first grade (Good et al., in press). The predictive validity of DIBELS NWF in first grade with the Woodcock-Johnson Psycho-Educational Battery total reading cluster score is .66 (Good et al., in press).

Letter Naming Fluency (LNF) is a standardized, individually administered test that provides a measure of risk. Students are presented with a upper- and lower-case letters arranged in a random order and are asked to name as many letters as they can. Students are told if they do not know a letter they will be told the letter. The student is allowed 1 minute to produce as many letter names as he/she can, and the score is the number of letters named correctly in 1 minute. Students are considered at risk for difficulty achieving early literacy benchmark goals if they perform in the lowest 20% of students in their district. That is, below the 20th percentile using local district norms. Students are considered at some risk if they perform between the 20th and 40th percentile using local norms. Students are considered at low risk if they perform above the 40th percentile using local norms. The 1-month, alternate-form reliability of LNF is .88 (Good et al., in press). The median criterion-related validity of LNF with the Woodcock-Johnson Psycho-Educational Battery-Revised readiness cluster standard score is .70 in kindergarten (Good et al., in press). The predictive validity of kindergarten LNF with first-grade Woodcock-Johnson Psycho-Educational Battery-Revised reading cluster standard score is .65 and .71 (Good et al., in press).

Analyses

The major focus of the evaluation examined the effectiveness of the SMART/Boost-Up program in improving reading readiness proficiency, relative to traditional instruction. Therefore, data analysis procedures will be employed to examine outcome differences between the intervention and control group means and variances using ANOVA.

These analyses were conducted on composites samples from the classes, and dis-aggregation by low-income/economic disadvantage, racial minority, and special education when appropriate. The purpose here will be to examine whether the SMART/Boost-Up program is equally effective for students of differing ethnicities. Outcomes among the subgroup of 100 students, to whom the additional assessments will be administered, will also be analyzed using ANOVA techniques. SPSS Statistical Software was used for the bulk of the quantitative analyses.

In addition, the fidelity instrument and parent and teacher survey/questionnaires were analyzed to determine subjective attitudes and perceptions on the overall program.

Experimental and Control Group Equivalence on W-J-III Pre-Test

Using an alpha of .05 and the significance criteria associated with an assumption of equal variances, independent samples t-tests were used to compare the control group and the experimental group standard scores for each of WJ-III clusters and subtests administered. The students tested totaled 161 with 79 in the experimental group and 82 in the control group. The assumption of equal variances was validated using Levene's test for equality of variances. If Levene's statistic suggested inequality, the significance criteria associated with equal variance not assumed was used. Independent samples t-tests revealed that there were no statistically significant differences between the control group and the experimental group for each of the 4 WJ-III clusters used in this study. The pre-test mean differences between the control group and experimental group for each of the 6 subtests were not statistically significant for 5 of the 6 subtests. The mean score for both groups on each cluster and subtest are listed in table 3. The mean for the control group Cognitive Incomplete Words (M=84.21, SD=18.05) was significantly lower than the experimental group (M=95.28, SD=15.58). Despite this finding, the overall results of these preliminary analyses suggest that non-equivalence will not influence the outcome of this study.

Table 3 – *Assessment of Group Equivalence using 2-tailed independent t-test pre-test (Means, t-statistic, and significance) df=1,161 Experimental N=79 Control N=82*

WJ-III Subtest/Cluster	**Control**	**Experiment**	**t-value**	**Sig.**
Cognitive Cluster--AUDITORY PROCESSING	102.45	104.51	-0.53	.596
Cognitive Cluster--PHONEMIC AWARENESS	95.79	101.49	-1.39	.166
Achievement Cluster--BASIC READING SKILLS	110.45	105.65	1.88	.063
Achievement Cluster-PHONOL/GRAPH KNOWL	103.03	98.24	1.73	.088
Cognitive Sound Blending	104.89	107.84	-0.69	.492
Cognitive Incomplete Words*	84.21	95.28	-2.80	.006
Cognitive Auditory Attention	103.43	103.27	0.05	.957
Achievement Letter-Word Identification	110.00	106.76	1.41	.163
Achievement Word Attack	108.71	104.91	1.61	.113
Achievement Spelling of Sounds	98.38	94.19	1.29	.203

- - the difference between mean scores is statistically significant at .05

Equivalencies Graphs

Inspection of the following figures indicates equivalency on all the critical variables needed to demonstrate that the populations that made up the control and experimental and control groups did not differ on any of the critical dimensions

Figure 1. W-J-III Pre-test Experimental (N=79)-Control (N=82) Standard Score Averages Profile

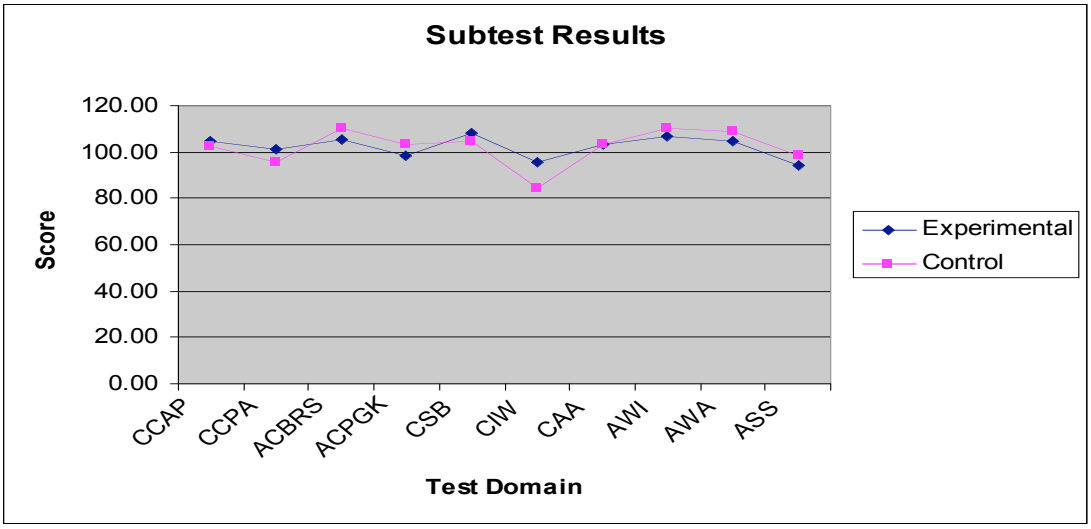


Figure 2. W-J-III Pre-test ESE vs. Non-ESE Standard Score Averages Profile

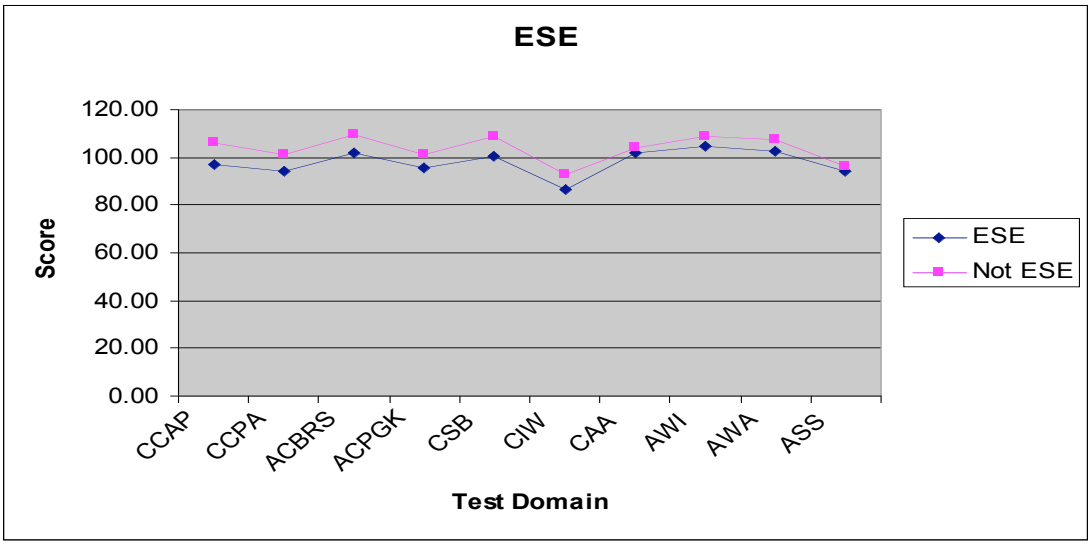


Figure 3. W-J-III Pre-test White vs. Non-white Ethnicity Standard Score Averages Profile

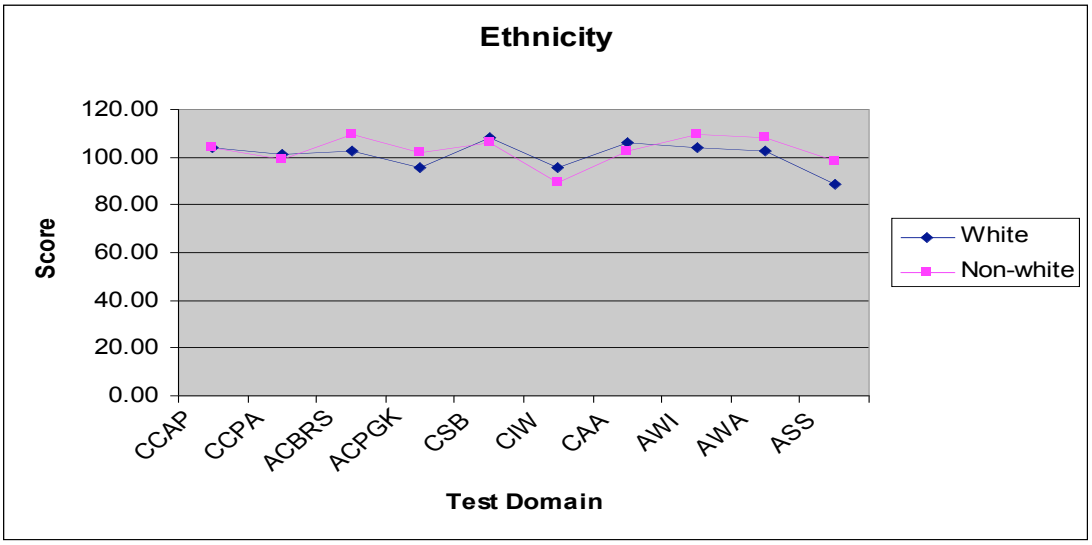


Figure 4. W-J-III Pre-test Free & Reduced-Price Lunch vs. No-FRPL Standard Score Averages Profile

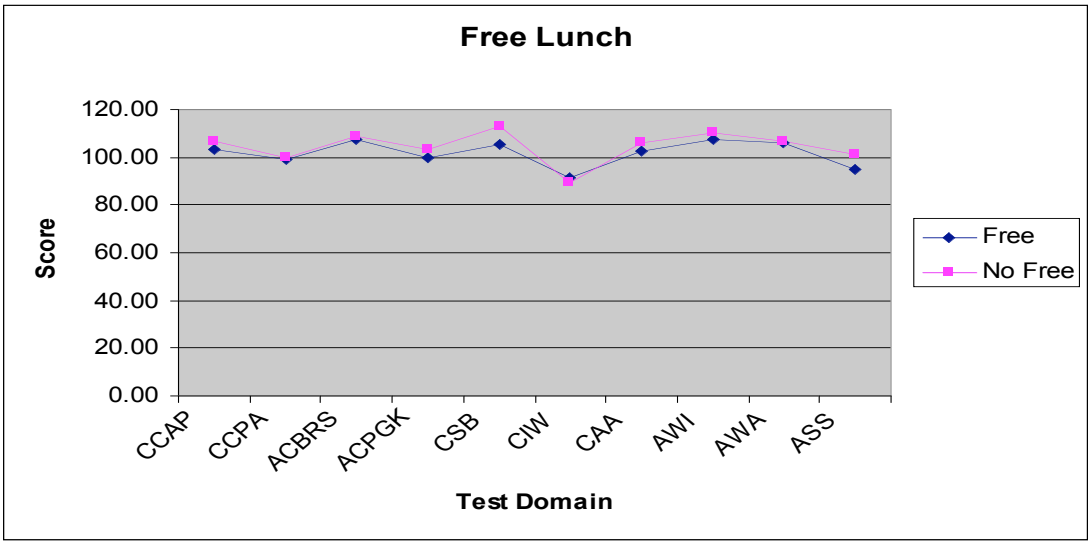
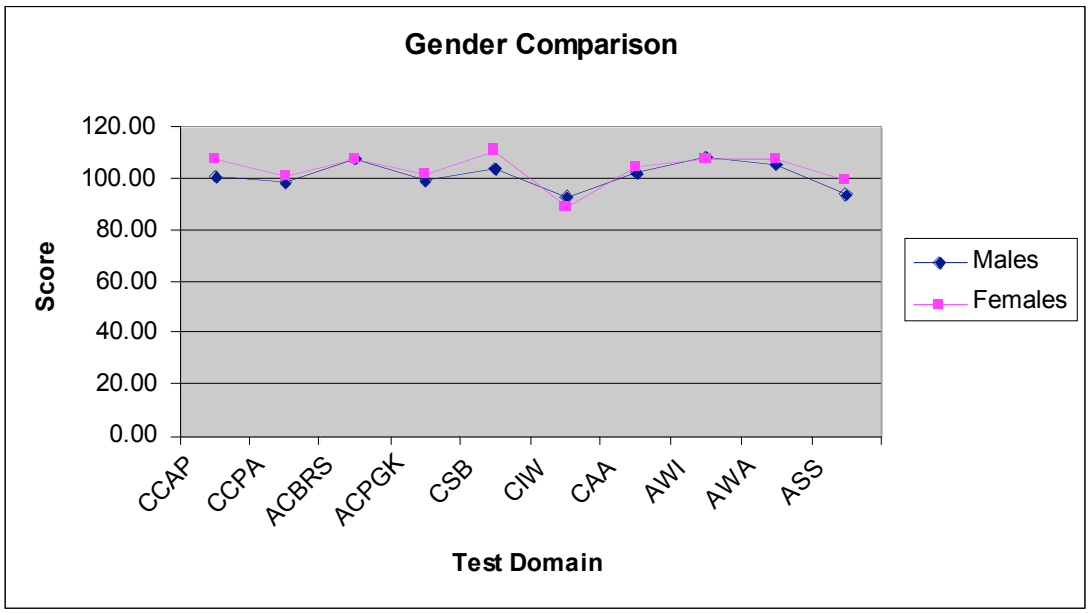


Figure 5. W-J-III Pre-test Males vs. Females Standard Score Averages Profile



Results

Post-test data for the W-J-III used an independent samples F-test of statistical significance (ANOVA) at the p = .05 level. Administration of the W-J-III subtests was conducted by the EPPC evaluators to randomly selected students. We were only able to use those W-J-III data sets that were fully completed. Many of the W-J-III were partially completed and therefore could not be used for the statistical analysis. The small samples (N=24) certainly affected our result. Seventy-nine percent of the students qualified for free and reduced lunch, 42 percent were female and eight percent were in special education.

Post-test experimental and control differences in variance on the W-J-III subtests and clusters shown in Table 4 were statistically significant for four of ten comparisons. All means were higher for the experimental SMART/Boost-Up students. Effect sizes (d) for the areas attaining statistical significance are reported for the skills of Cognitive Sound Blending (d=1.39) and Incomplete Words[Closure] (d=1.58) that also contributed to statistically significant differences in the two Cognitive Clusters of Auditory Processing (d=1.13) and Phonemic Awareness (d=1.61). These effect sizes correspond to percentile equivalents of 91, 94, 87 and 94 respectively for these SMART/Boost-Up means compared to the 50th percentile of controls. The SMART/Boost-Up program contains

explicit modeling procedures for mastery of phonemic awareness skills using any curriculum, so these high levels of advanced skill are not unexpected.

Effect sizes for remaining areas are: CogAuditoryAttention d=.32, AchWordAttack d=.23, AchLetter-WordID d=.19, AchClusterBasicRdgSkills d=.23, AchClusterPhoneme/GraphemeKnowl p=.17. These effect sizes correspond to percentile rank equivalents of 62, 58, 57, 58, and 56. SMART/Boost-Up procedures for these skills are less explicit and teachers may tend to use procedures other than SMART modeling.

When we controlled for gender with the experimental students we achieved significance in the predicted direction for the same four areas: Cognitive Sound Blending, Incomplete Words[Closure], and the Cognitive Clusters of Auditory Processing and Phonemic Awareness were significantly higher for females than males. When we controlled for free and reduced lunch, only AchLetter-WordID was significantly higher (p=014) for regular students receiving non-F/RLunch (mean higher by 14 points); the skills of the disadvantaged low-income students were otherwise not significantly different from the advantaged students.

Table 4 – *Post-test Comparisons using F-tests (Means, F-statistic, and significance), df= 1,22, Experimental N=8, Control N=16 (8% SpEd, 79% F/RLunch, 42% Females)*

W-J-III Subtest/Cluster	Control	Experiment	F-value	Sig.
Cognitive Cluster--AUDITORY PROCESSING*	102.69	118.88	6.53	.018
Cognitive Cluster--PHONEMIC AWARENESS*	99.31	123.13	14.289	.001
Achievement Cluster--BASIC READING SKILLS	119.13	122.63	.387	.585
Achievement Cluster—PHN/GRAKNOWLEDGE	119.81	121.75	.166	.688
Cognitive Sound Blending*	104.69	124.25	9.798	.005
Cognitive Incomplete Words*	91.88	114.38	14.785	.001
Cognitive Auditory Attention	105.27	109.50	.509	.484
Achievement Letter-Word Identification	113.13	116.00	.190	.667
Achievement Word Attack	120.31	123.13	.338	.567
Achievement Spelling of Sounds	120.63	121.13	.008	.928

- - the difference between mean scores is statistically significant at .05

Metropolitan Readiness Test-Sixth Edition

Post-test results for the MRT6 are shown in Table 4 and some explanation is in order. First, the control group scores are complete sets of scores from advantaged classes in a non-Title 1 school whereas the experimental scores are mostly incomplete MRT6 tests form low Title 1 schools so these groups are not really comparable. The differences and characteristics are worth analyzing, however, as follows. The first two measures are combinations of other scores: the Beginning Reading Skill Area (BRS) combines Beginning Consonants, Sound-Letter Association and Aural Cloze for a total score, and the Pre-Reading Composite (PRC) consists of Story Comprehension combined with Beginning Reading Skill. The F-values for the Beginning Reading Skills Area and the Pre-Reading Composite indicate that the means and variances are different for these

combined scores. The equivalents for the BRS means are 37th and 60th percentiles for the composite experimental and control groups; none of subtests that contribute to these combination measures attains a probability level below .111 however, indicating that the means and variances are not significantly different for these two populations. Certain students are expected to have combinations of low scores, especially when eligible for special education. When ANOVA is controlled for special education in the experimental group all three BRS skills attain significant probability levels (p=.005 to .008) indicating that the special education students in the experimental group are responsible for the differences in the composite comparisons. When we controlled for F/R Lunch excluding students in special education, none of the comparisons attained the p=.05 level; the advantaged control and Title 1 experimental groups were not significantly different (p=.156 to .946). Furthermore, when experimental males and females were compared, no statistically significant differences obtained (p=.055 to .936), although story comprehension was somewhat depressed for males and approached significance at p=.055. The SMART/Boost-Up Title 1 males and females in regular education and with F/R Lunches achieved reading readiness levels on the MRT6 that were essentially similar to the levels of students in the advantaged classes. This comparison does not allow for determination of effect size for the MRT6 skills.

The Beginning Reading Skills readiness levels of both groups are high, but 74 of 75 SMART pupils scored above the 25th percentile (99%), 84% scored above the 90th percentile and 90.7% scored above the 80th percentile (in the top quartile).

Table 5 – *Post-test Comparison using F-tests (Means, F-statistic, and significance) df=1,94 Control N= 22, Experimental N=73 (19% SpEd, 67% F/RLunch, 76% Females),*

Metropolitan Readiness Test6 Area/Skill	**Control**	**Experiment**	**F-value**	**Sig.**
Beginning Reading Area	453.68	421.37	16.163	.000
Pre Reading Composite	439.41	416.46	9.501	.003
Beginning Consonants Skill	11.82	11.74	.114	.736
Sound-Letter Correspondence Skill	11.86	11.70	.500	.481
Aural Cloze Skill	11.82	11.88	.033	.855
Story Comprehension Skill	25.64	25.03	1.91	.171
Quantitative Concepts Skill	26.50	27.35	2.616	.111

- - the difference between mean scores is statistically significant at .05

Dynamic Indicators of Basic Early Literacy Skills (DIBELS)

The DIBELS data was collected quarterly by the classroom teachers during the 2004-05 school year. The composite sample size for the DIBELS was 277 with eighty five percent on free and reduced lunch, twenty-one percent in special education and sixty-nine percent female. Statistical comparison of F-values for composite experimental and control groups for DIBELS phonemic awareness skills revealed statistically significant

differences favoring the control group throughout the year on Letter Naming Fluency (p=000 to .016), and Nonsense Word Fluency (p=049) at year-end only. Group differences in Initial Sounds Fluency in the quarters 1-3 and Phonemic Segmentation in the last half of the year were not statistically significant (p=.42 to .669). In dis-aggregation, when we controlled for gender, females (Q3) were significantly higher than males in Q3 Initial Sound Fluency (p= .027) and Q4 Letter Naming Fluency (p=.038); In year-end Nonsense Word Fluency and Phonemic Segmentation Fluency males were not significantly lower than females. When we controlled for Low SES status, students qualifying for Free and Reduced Lunch were significantly lower early in the school year (p=.000 to .02) in all skills, but at year end with differences in means of only 2-3 points, probabilities were not significant for Initial Sound Fluency (p=.109) and Phonemic Segmentation Fluency (p=.529).

When we controlled for special education status we found these students initially scored significantly lower in 5 of 8 comparisons during the first three quarters, but by the fourth quarter the students in special education had improved to the point that they were significantly lower in Phonemic Segmentation Fluency only (p= 003). The differences in year-end means and distributions for the special education and regular students did not attain significance for Q3 Initial Sounds Fluency (.14), Q4 Letter Naming Fluency p=.088) and Q4 Nonsense Word Fluency (p=.067).

Effect sizes for regular minority females qualifying for Free/Reduced Lunch compared to controls were calculated as examples of results with an at-risk population. Effects sizes (n=35) were: LNF(Q4) d=1.58, ISF(Q3) d=.46, NWF(Q4) d=.37 and PSF(Q4) p=.48, corresponding to percentile rank equivalents of 94, 67, 63, and 68 compared to the 50th percentile of controls.

Finally, a year-end benchmark attainment for two of three subtests (LNF=40+, NWF=25+ & PSF=35+) was calculated for each pupil. Proportions of controls attaining the benchmark were higher for males (77.4% vs. 55.1% experimental) while females were similar (78.9% vs. 81.2% experimental). Comparison of SMART schools by Phonemic Segmentation Fluency indicated that three schools conducted the sound blending and other SMART PA techniques differently as shown by low proportions of pupils attaining the PSF benchmark (28.6% vs 73.2% high PA fidelity).

Three schools emphasized the SMART PA instruction in relation to DIBELS skills while three others did not. The effect size for MF benchmark attainment related to the SMART phonemic awareness instruction among SMART schools is d=.8 (Low PA SMART instruction mean = 99.8, SD31.8; High PA SMART instruction mean = 125.2, SD 49.5). This effect size corresponds to the 78th percentile when compared the PA instruction other than SMART at the 50th percentile. Two or more years of SMART PA modeling may be needed to bring low-performing males to the reading readiness standard. Without this explicit SMART modeling the readiness for phonetic analysis will be immature in comparison to pupils who receive the stimulation.

Table 6 – *Post-test Comparison using F-tests (Means, F-statistic, and significance) df=1,275 Experimental N=216 Control N=60 (21% SpEd, 84% F/RLunch, 42% Females)*

DIBELS Subtest/Quarter	Control	Experiment	F-value	Sig.
Initial Sounds Fluency (Q1)	11.90	11.23	.363	.547
Initial Sounds Fluency (Q2)	18.96	20.61	.640	.424
Initial Sounds Fluency (Q3)	23.31	24.26	.229	.632
Letter Naming Fluency (Q1)	25.80	16.11	19.83	.000
Letter Naming Fluency (Q2)	40.45	33.42	7.02	.009
Letter Naming Fluency (Q3)	43.53	37.64	5.83	.016
Letter Naming Fluency (Q4)	52.68	44.09	12.20	.001
Nonsense Word Fluency (Q3)	24.40	23.17	.236	.63
Nonsense Word Fluency (Q4)	39.85	33.50	3.90	.049
Phoneme Segmentation Fluency (Q3)	26.71	29.61	.99	.32
Phoneme Segmentation Fluency (Q4)	33.43	34.44	.15	.669

- - the difference between mean scores is statistically significant at .05

Fidelity Survey

Fidelity data: Forty-eight teachers from six schools were observed in order to determine the fidelity of the intervention. Teachers were observed on a predetermined schedule with the observations of their behavior recorded and evaluated. The observations were divided into two parts the first part related to the teachers approach to delivering the lessons and the second part related to the implementation of the various components of the program.

In terms of the teachers approach it was observed 83% used a positive tone and 64% were energetic in teaching the students, Seventy percent talked to the students about SMART/Boost- Activities and 95% used non-verbal reinforcer e.g., smiling, eye contact. Floor activities were closely monitored by 78% of the teachers. It was also observed that after three months of implementation nearly 96% of the students easily followed their teacher's direction.

Overall the data would suggest that the teachers had a positive influence in working with the students on implementing the program.

In terms of the implementation of various components of the program the data is uneven with a fair number of missing observations. We will report on those activities which were used appropriately at least 25% of the time based on our observations. An important caveat; this does not mean the activities were not implemented appropriately. We only reported what was observed and recorded. The following is a list of activities that met the 25% threshold: Number ladders, Wagon Wheels/mazes, Superman, Popcorn, Pencil or

Hot Dog Rolls, Spinning Boards, Helicopter Spins, Balance Beam, Hop Scotch, Balance and Rocker Boards, Alligator Crawl, Creep Track, Cross Pattern Walking.

Although some schools exhibited higher levels of program fidelity than others, it is clear that many of the activities met our threshold and the teachers were enthusiastic about delivering the program.

Parent Survey

Overall the parent survey turned out as expected. Forty-one parents completed the survey. Twenty-two of the parents had students either in Astoria Park or Caroline Brevard Elementary School. The majority of the parents were between the ages 25-34. Of the parents who responded to the survey, 92% were female. The yearly household income of 62.5% of the parents was less than $25,000 while 37.5% stated their household income was $25,000 or higher. Seventy-three percent of those surveyed were black while 24% reported being white. Thirty percent of the families surveyed were single parent homes while 70% reported two or more adults living in the home. Most homes (77.5%) have three children or less living in the home with 42.5% having exactly three children in the home. All but one family had English as being their primary language. Sixty-one percent of those survey reported graduating high school and completing as least some college or completing degrees.

Regarding parenting practices, over half of the parents reported reading to their child on daily basis. Seventy-three percent reported having 25 or more books in their home for their child to read. Seventy-three percent also reported playing learning games with their child at least a couple of times per week. A large percent (95) reported that their child played with other children at least a couple of times per week or daily. Although 29% of parents reported that their children watched 4+ hours of television/movies per day, 54% reported the child always had to have permission to watch television/movies. Additionally, 95% of parents reported that their child was rarely or never allowed to watch adult-themed television or movies. Also reported was that 54% of the children had a television in his/her bedroom.

Forty-one percent of the parents surveyed spoke with their child's kindergarten teacher once or more times per week. Thirty-one percent reported volunteering at their child's school once or more times per month. Eighty-five percent of the parents stated they helped with their child's homework on a daily basis. Sixty percent also stated that they had attended at least one PTA or PTO meeting at their child's school.

Teacher Survey

The sample size for the teacher survey was small n=14 Teachers from Leon County, Florida participated from the schools of Astoria Park, Caroline Brevard, Pineview, Ruediger, Sabal Palm, and Wesson. The pattern that emerged was that teachers were supportive of the implementation of the SMART program. The teacher survey results were encouraging for continuation of the SMART program. The participation in

learning, student motivation, social development and overall academic achievement was rated Average/Satisfactory or above as a general sentiment in regards to the SMART program in the following categories:

- The SMART program enhanced students' ability to pay attention.
- The SMART program aided students' ability to stay on task.
- The SMART program enhanced students' critical thinking skills.
- The SMART program helped students' with reading skills.
- The SMART program helped students' with motivation
- The SMART program helped students' social development.
- The SMART program helped students' overall academic achievement.

Teacher comments were:

- *I have enjoyed participating in the SMART program & hope to continue next year. I hope to make it better!*
- *I really thought the program was great and I really saw my students progress.*
- *I saw mostly a normal amount of growth in the children.*
- *Love the program*
- *My class as a whole did well this year and did better academically than most of the students that came late in the year.*
- *Many factors could have played a part in their success.*
- *I really like the program and wish we could have had more support from our administration.*
- *The SMART program boosts children's' self confidence.*
- *There is not enough time in the day to implement SMART program effectively.*
- *This is the first year I can say 50% of my students are leaving fluent readers.*

- *I am curious to compare to how next years K students do.*
- *Very effective program – My class and I really enjoyed it.*
- *We are really excited about this program.*
- *It's hard to rate because comparing to last years children is not valid and my group this year was very good. I was disappointed that we were not tested at the end.*
- *I would have liked to see results.*

Overall, teachers who are implementing the program appear to be satisfied with their results. Researchers would benefit from continuation of the study. The focus is not only on school performance, but includes the perception from the classroom level regarding the impact of the program.

Conclusion: Our results yielded mixed results. Clearly the parents and teachers were enthusiastic about the SMART/Boost up program. The fidelity data was incomplete but it did suggest that many of the activities were implemented as suggested. In terms of the data form the DIBLES, W-J-III and MRT6, we found some significant results in the predicted direction. Overall we feel this is a worthy project clearly aligned with the goals of NCLB and should be exposed to continuing assessment and trial. When a one-tailed test was used and variables were controlled by group for gender, free and reduced lunch, and special education status, the results were clearly more promising, including results with children predicted to be "at risk" for later reading failure. Following two half-hour therapy sessions per week over 24 weeks, the experimental group performed significantly higher than the control group on measures of reading ability. The W-J-III showed the highest number and proportion of significant findings in favor of the experimental group. Experimental non-white males were superior to controls in four of ten subtests on the W-J-III. Male and female differences were of interest as well as differences associated with free and reduced lunch.

Effect sizes for phonemic awareness skills were high on both the W-J-III (d=1.13-1.58) and for high PA fidelity SMART schools compared to lowPA fidelity on the DIBELS (d=.8).

Limitations: This was an intensive field based study that involved many Title 1 elementary schools in Leon County, Florida. We had to solicit many permission slips from parents, and teachers in order to engage in this research as a result we often did not get sufficient responses to allow us to test all possible subjects. As a result we found that we had either fairly small sample sizes and/or very uneven distribution of subjects between control and experimental groups. Clearly the small sample sizes and uneven n's may have affected our outcomes. The small sample size also resulted in large standard deviations and rather flat distributions which clearly would effect our analysis. Nevertheless, we found the Smart/Boost Up intervention to be promising.

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