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The Efficacy of Training Kindergartners in Assisted Self-Graphing as a Supplemental Intervention within a Response-to-Intervention Model

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The Efficacy of Training Kindergartners in Assisted Self-Graphing as a Supplemental Intervention within a Response-to-Intervention Model

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Abstract

This investigation examined the efficacy of assisted self-graphing for improving early literacy skills within an urban public school that employed a response-to-intervention model. Self-graphing supplemented the classwide kindergarten reading instruction and an empirically-based small group literacy intervention. Effects were studied through a multiple baseline across participants design \((N = 3)\). The efficacy and social validity of self-graphing also were analyzed. The study demonstrated that kindergarteners are capable of self-graphing with adult assistance. However, on 43% of occasions, children chose not to self-graph. Furthermore, while there is some evidence that the self-graphing intervention produced increases in students' phoneme segmentation fluency (the primary dependent measure), findings were not strong overall and did not show effectiveness for the secondary dependent measure, nonsense word fluency, used to assess generalization of self-graphing skills. Sample selection may have attenuated findings in that students acquired some targeted skills prior to the onset of self-graphing. Recommendations for future use of self-graphing were suggested.
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The Efficacy of Training Kindergartners in Assisted Self-Graphing as a Supplemental Intervention within a Response-to-Intervention Model

Response-to-Intervention (RTI) is basically a continuum of intervention intensities in which a student receives a sequence of instructional modifications until one is identified as being effective, according to progress monitoring data (Daly, Persampieri, McCurdy, & Gortmaker, 2005). Decisions about service delivery and eligibility for special education services are then based on decision rules and/or judgments concerning the intensity of instruction or intervention and the needs of an individual student.

RTI is typically delivered through a multi-tiered model in which data are collected regularly to make informed decisions regarding services. The first tier may include system- and class-wide academic or behavioral prevention efforts or universal interventions that support all, or many, students in the general education setting (Gresham, 2004). Tier 2 would be considered if some students’ performance level and rate of progress are discrepant from their peers and/or local or national norms, after having received the Tier 1 level of supports for a sufficient amount of time. During Tier 2, the targeted students should receive supplemental empirically-based interventions designed to help their group-related needs (Batsche et al., 2005; NASP, 2003). Tier 2 interventions may consist of increasing practice opportunities for academic, language, or social skills through group interventions that may include evidence-based tutoring programs.

If a student continues to lag behind his/her peers after receiving
high-quality Tier 1 and 2 interventions for a sufficient amount of time, he/she would be referred to a Tier 3 level of support. Tier 3 interventions should be more intensive and individualized to a student’s specific needs. If unsuccessful in Tier 3, or if the intervention is judged as highly intensive and in need of specialized services or support, a multi-disciplinary team would initiate the problem-solving process to determine whether or not the student is in need of specialized instruction (NASP, 2003). However, at present there are likely to be variances in RTI models at state and local levels.

Current federal legislation supports the use of RTI for Specific Learning Disabilities (SLD) and requires schools to provide access to scientifically-based instruction at all tiers (PL 108-446, 2004; PL 107-110, 2001). Additionally, scientifically-based interventions must be provided to a student for a sufficient amount of time (not specified) prior to considering special education for that student (PL 108-446, 2004; PL 107-110, 2001). The No Child Left Behind Act (PL 107-110, 2001) describes scientifically-based research as involving rigorous, systematic, and objective procedures to gain reliable and valid information supporting educational activities and programs.

Single-subject research can be employed to develop evidence-based practices by making comparisons between- and within-participants, and through replication efforts (Horner, Carr, Halle, Odom, & Wolery, 2005). Utilizing single-subject research, a functional relationship between an independent and dependent variable can be documented, while controlling for internal validity and enhancing external validity (Horner et al., 2005).
Past studies examining the effects of self-graphing have found that it has been associated with improvements in reading fluency and comprehension, math, and written expression (Gunter, Miller, & Venn, 2003; Shimabakuro, Prater, Jenkins, & Edelen-Smith, 1999). However, despite extensive research in the general area of self-monitoring, there has been only a small amount of research conducted with young children. Self-graphing may be an appropriate supplemental intervention to already occurring interventions at any of the three tiers. However, validity evidence is needed prior to its use with young children.

The efficacy of self-graphing with young children can be studied by operationally defining the intervention, implementing it with fidelity, and then exhibiting results that document the self-graphing intervention to be functionally related to positive changes in students' learning (Horner et al., 2005). The current study assessed the outcomes of training kindergarten students in self-graphing concepts and skills, monitored students’ acquisition of these skills, and had students self-graph their progress, with their tutors’ assistance, using data from early literacy measures. The self-graphing intervention was researched as a supplement to a programmatic Tier 2 early literacy intervention.

**Self-Monitoring and Graphing**

Self-monitoring is said to have occurred when an individual assesses whether or not a targeted behavior has occurred (Reid, 1996). Some researchers may add that the student also would record the results, whereas others would consider this to be a discrete operation termed self-recording (Reid, 1996). The two most common types of self-monitoring are self-monitoring of attention (SMA)
Self-monitoring and self-graphing of performance (SMP; Reid, 1996). SMA consists of instructing students to self-assess whether or not they are paying attention when cued, and to record their own results (Reid, 1996). SMP consists of instructing students to self-assess a characteristic of their performance, and to record their own results (Reid, 1996). SMP covers a wide array of intervention outcomes such as productivity (the number of attempted problems), accuracy (the number of correctly completed problems), and strategy use (whether or not the steps of the strategy were completed) (Reid, 1996). The current study employed self-monitoring of accuracy.

Self-monitoring has been reported to be socially valid in terms of being easy to implement in classrooms (Shimabakuro et al., 1999), being understandable to students (Blandford & Lloyd, 1987), and having a substantial literature base to assist practitioners in implementing these interventions (Reid, 1996). A possible benefit of self-monitoring is that the instructional activity may become automatic, meaning that the child would not need cues or prompts to perform the behavior once the intervention has been faded (Blandford & Lloyd, 1987).

Self-graphing is a condition in which a student records his/her own results on a graphic display. Whereas self-monitoring is a construct that can occur without being observed, self-graphing is an overt physical action performed as a visual supplement to self-monitoring. Therefore, students can self-monitor their accuracy or performance by quantifiably displaying their progress in the form of a graph, and then assessing whether or not they reached their goal.
Self-Monitoring and Performance

Research targeting academic performance has shown increases in on-task behaviors as well as academic productivity. Data reported by McLaughlin (1984) indicated that students in a self-contained or special class and labeled by their educational team as having behavioral disorders, who were performing somewhere in the range of first through third grade (although aged 9-15), significantly increased assignment completion when a self-recording intervention was implemented. According to visual analysis, both experimental groups (self-recording and self-recording + backup consequences) completed a higher percentage of assignments and were on task for a greater percentage of time than the control group. The students who earned reinforcers performed at a higher level on both dependent variables than the group that only self-recorded, but this difference was slight.

In all studies reviewed, students were found to require additional cues such as self-monitoring forms in order to be most successful at completing the procedures. Piersel (1985) examined the effects that self-monitoring and twice-weekly sessions with a school psychologist had on academic performance, together and separately, in an A-BC-A-B-C-BC-C time-series design. A was baseline; B was self-monitoring; C consisted of the student meeting with a psychologist to discuss the chart, progress, school work, and goal setting; and BC was the combination of self-monitoring and meeting with the psychologist. For the self-monitoring condition, the participant, a third grader, was required to self-chart the completion of his assignments on a form taped to his desk as he
turned them in to his teacher. According to visual analysis, while the meetings had minimal effects, self-monitoring increased assignment completion considerably. Additionally, during follow-up, when the self-monitoring form was not present, assignment completion rates dropped considerably. However, this study did not appear to fade the use of the self-monitoring form; it was simply removed. Perhaps if the researcher would have included a programmatic fading condition, he would have had different findings. According to Piersel’s (1985) results, one could infer that self-monitoring is effective at increasing assignment completion and that using a recording device is a critical variable, unless it has been in place long enough for the behavior to become automatic.

Self-Monitoring and Accuracy

Dunlap and Dunlap (1989) studied an intervention that involved raising students’ awareness of accuracy. They had three students, a fifth grader and two sixth graders that the researchers identified as having learning disabilities, self-monitor whether or not they correctly completed the appropriate steps required for accurate task performance. As demonstrated by a multiple baseline design, they found an increase in performance above the progress of didactic instruction alone and didactic instruction with contingent reinforcement when the self-monitoring package was implemented. The effects of the self-monitoring package appeared immediately and were large and fairly stable.

Rooney, Edward, Polloway, and Hallahan (1985) compared
self-monitoring of attention to self-monitoring of accuracy and to self-monitoring of both attention and accuracy with four elementary students the researchers described as having learning disabilities. The students were taught in a self-contained classroom and their mean performance score on achievement tests was generally below second-grade level. The self-monitoring of attention (SMA) was facilitated by having a tone randomly sound while the child worked on his math assignment. When the child heard the tone, he was supposed to either mark a box on his self-recording sheet that said “yes” he was paying attention or “no” he was not paying attention. During the self-monitoring of math accuracy phase (SM-MA), the child was directed to check the accuracy of his math work when he reached the visual prompt written next to the problem, and record on the self-recording sheet whether or not he answered the problem correctly. The combination phase included both of these interventions at once. They used visual analysis with an A-B-A-C-A-C-A time-series design to analyze their data, in which A was baseline, B was an alternation of SMA and SM-MA, and C was a combination of SMA and SM-MA. They found that for all four children, self-monitoring of attention combined with self-monitoring of accuracy resulted in improvements of attention. Two of the four children showed substantial improvements in attention while receiving SMA and SM-MA alone. Furthermore, for three of the four children, the percentage of accurate arithmetic responses increased during the combination phases over baseline; the other student showed an increase during one of the combination phases.
It is important to note that although self-monitoring has been associated with an increase in accuracy, it does not provide students with the instructional means for improving the quality of their responding; self-monitoring simply raises students’ awareness of accuracy (Reid, 1996). Therefore, self-monitoring may be used appropriately for drill-and-practice exercises or as a means for remediating a specific difficulty, but it should not be utilized alone for the purpose of acquiring new skills, or as a single solution for a student struggling academically (Hallahan & Lloyd, 1987; Snider, 1987).

**Self-Monitoring of Accuracy through Self-Graphing**

Self-graphing may have practical benefits, such as serving as record keeping for monitoring academic performance and teaching students the functional mathematical skills of computing percentages and plotting and analyzing graphs (Shimabakuro et al., 1999). Shimabakuro et al. (1999) studied a self-monitoring intervention that raised students’ awareness of accuracy by having the students self-graph their academic performance, productivity, and accuracy for reading comprehension, mathematics, and written expression. The researchers identified a sixth grader and two seventh graders as having both learning disabilities and Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD) and taught them to self-correct their own assignments, calculate their accuracy scores by dividing the number of correct items by the number of items completed and multiplying by 100, and to use a graph to record and plot their score (Shimabakuro et al., 1999). With
self-monitoring, the students demonstrated a noteworthy increase in their mean accuracy scores, as compared to their baseline scores, for reading comprehension, math, and written expression (Shimabakuro et al., 1999).

Gunter et al. (2003) looked at the effects of self-graphing for reading performance in a case study with a third grade student who the researchers identified as having an Emotional/Behavioral Disorder. They had the student use a desktop computer with standard spreadsheet software to record the total correct words she read per minute. The software automatically generated a graph of her progress. The researcher found that the student’s reading rate increased with the implementation of the self-graphing component, decreased during the withdrawal of the treatment phase, and then increased again during the final intervention phase.

In conclusion, there is support for self-graphing being a promising intervention for improving students’ accuracy on various CBM measures. However, the youngest students reported in the reviewed studies were in second grade. The present research studied the efficacy of self-graphing procedures with students in kindergarten. It also looked at the effects of self-graphing on pre-reading skills. This type of intervention may be suitable as a Tier 1 or 2 intervention to increase the intensity of prior interventions and possibly as a Tier 3 intervention to promote maintenance and generalization through self-regulation. The length of the self-graphing intervention condition varied in previous studies with a range of 6 (Shimabakuro et al., 1999) to 24 (Gunter et al., 2003) data points in an intervention condition. The current study implemented the
self-graphing component twice a week for three weeks before commencing the intervention with a new student. Accordingly, students would have participated in the intervention across 6, 12, or 18 sessions if there were no missed sessions. Additionally, the majority of published studies were performed with students with disabilities whereas the participants in the current study did not have an IEP or 504 plan; rather, they were receiving interventions as part of their school’s RTI model.

*Early Literacy Challenges*

Difficulties with reading are currently a national problem. According to the National Center for Education Statistics (2003), 37% of fourth graders read below the basic level in 2003. Schools that serve children living in poverty, children who are members of a racial minority, and children whose native language is not English experience higher rates of reading failure than other schools (National Research Council, 1998). Greenwood, Hart, Walker, and Risley (1994) reported that the initial skill gap between children of low- and high-income families widens dramatically throughout the elementary school years in the absence of strong early intervention programs.

A student’s success in becoming a strong reader is determined substantially by early literacy experiences (Adams, 1990). In fact, longitudinal research studies have found that students who begin first grade with deficits in early literacy skills will likely continue to struggle to “catch up” with their peers through fourth grade and beyond (Juel, 1988). The kindergarten year is an important time to target literacy by working on mastering foundational skills such
as phonological awareness, alphabetic understanding, and accurate and fluent reading of connected text in order for a student to read fluently by the end of first grade (Casey & Howe, 2002). The International Reading Association (IRA), National Association for the Education of Young Children (NAEYC), and the National Institute of Child Health and Human Development (NICHD) issued position statements that described how developmentally appropriate practices emphasizing language should be implemented ideally even before kindergarten in order to achieve reading success (Casey & Howe, 2002). Perhaps if preschool were mandatory nationwide, the emphasis would have been even earlier; however, currently there are tools to identify and effectively intervene with at-risk students as they enter kindergarten (Casey & Howe, 2002).

The National Reading Panel (NRP; 2000) identified components (referred to as ‘Big Ideas’) that should be explicitly taught in order to have effective reading instruction: phonemic awareness (PA), phonics, fluency, vocabulary, and text comprehension. The tutoring program that was used with kindergarteners for the current study focused on two of the five ‘Big Ideas,’ PA and phonics.

*Phonemic awareness.* Phonological awareness is the ability to hear, identify, and manipulate individual sounds (phonemes) in spoken words (Yopp, 1992). PA includes a continuum of skills, including isolating, blending, and segmenting, which have been identified as being essential skills for later reading proficiency (Kame’enui, Good, & Harn, 2005). The NRP (2000) reported that instruction that includes PA significantly improves PA skills ($d = .86, n = 72$), reading outcomes ($d = .53, n = 90$), and spelling outcomes ($d = .59, n = 39$). PA
instruction is most effective when conducted in small groups. The mean effect size of teaching PA in a small group setting on reading outcomes was 0.81 (n = 42), versus an effect of 0.35 (n = 16) for individualized instruction and 0.45 (n = 32) for class-wide instruction. All of these effect sizes were significant at $p < .05$. Thus Casey and Howe (2002) recommend that placing students in homogenous groups, selected by specific reading needs, can be beneficial for increasing opportunities to respond with feedback and to help students learn to read.

**Phonics.** Instruction of phonics involves teaching reading in a manner that stresses the acquisition of letter-sound correspondence and its use in reading and spelling. Systematic synthetic phonics instruction has been reported to significantly ($p < .05$) improve oral reading fluency ($d = .35$, $n = 37$), comprehending text ($d = .27$, $n = 35$), and spelling ($d = .35$, $n = 37$) (NRP, 2000).

**Curriculum-Based Measurement and Early Literacy**

Curriculum-Based Measurement (CBM) includes a range of standardized procedures for assessing student performance related to long-term goals (Hosp & Hosp, 2003). It has been studied for reading, math, spelling, and writing (Shinn, 1989).

There are numerous benefits from using CBM. CBM requires little time (one to three minutes, once or twice a week) and is inexpensive and easy to administer (Hosp & Hosp, 2003). It provides a means for making comparisons across students, classrooms, and schools because each student takes the same assessment (Fuchs & Fuchs, 1991). Additionally, CBM can be used as an
objective, ongoing measurement system for measuring student progress (Deno, 1985). CBM has good treatment validity (Fuchs & Fuchs, 1991) and reliability (Marston, 1989) which means the results can be used to guide instruction and improve student performance (Witt & Gresham, 1985). Research has also shown that students enjoy self-monitoring their CBM data (Davis, Fuchs, Fuchs, & Winnery, 1995; Fuchs, Butterworth, & Fuchs, 1989).

School staff can use scores to create a database of a student, classroom, or school-wide response to a curriculum or an intervention (Deno, 1985). This database can be utilized for making decisions, such as monitoring student growth within an instructional program, dividing students into instructional groups, identifying skill deficits, screening to find which students are at risk, answering questions of eligibility, and evaluating whether or not a student should continue to receive special education services (Hosp & Hosp, 2003). CBM also allows educators to track a student’s overall skills across time and to make adjustments to curriculums as a result of data to meet the needs of each student (Hosp & Hosp, 2003).

Students of teachers who used CBM for decisions regarding instruction have achieved higher grades than other students (Fuchs & Fuchs, 1986). Educators can use the CBM data to communicate progress with parents and students (Hosp & Hosp, 2003). Parents have reported having better communication and more involvement in their student’s learning when presented with CBM data (Marston, Diment, Allen, & Allen, 1992). Educators also can use CBM scores to help students become more aware of their own learning by
allowing students to have ongoing access to progress monitoring data and sharing information about goal performance (Fuchs et al., 1989). CBM can additionally be used by students to self-graph their scores in order to monitor their own progress towards their goal. Fuchs et al. (1989) found self-graphing of CBM to be associated with an increase in students’ academic performance.

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) (Good & Kaminski, 2001) are a type of CBM used for assessing basic early literacy skills. DIBELS is an assessment system that breaks down reading performance into different tests in a family of tests. DIBELS has a schedule of assessments to be administered at different times of the school year to collect benchmark data.

**Self-Graphing Phoneme Segmentation Fluency (PSF) and Nonsense Word Fluency (NWF)**

The present research examined the efficacy of adding an assisted self-graphing supplemental intervention within a RTI model of service delivery. A self-graphing component was carried out with students already receiving an empirically-based Tier 2-level of early literacy intervention. The degree that self-graphing could be a targeted intervention to reduce later academic difficulties for young children was the major research question. The goal of the study was to better understand if self-graphing could be utilized to increase students’ success in early reading skills. More specifically, the present study addressed the effects of self-monitoring on PSF and NWF accuracy (a component of SMP) through the use of self-graphing.
The research was conducted with kindergartners, who, by selection, were relatively homogenous in terms of their skill needs, but who were already receiving an empirically-based group intervention for teaching early literacy skills. The self-graphing intervention occurred during this individualized progress monitoring time with the Phoneme Segmentation Fluency (PSF) and Nonsense Word Fluency (NWF) DIBELS measures to be studied as a supplemental intervention.

The effects of self-graphing were determined through the use of visual analysis of DIBELS PSF and NWF data. PSF functioned as the primary dependent variable measure because the benchmark goal for the end of kindergarten is 35 correct segments per minutes on PSF whereas the benchmark score for NWF is not expected to be met until the middle of first grade (Good, Simmons, Kame‘enui, Kaminski, & Wallin, 2002). Through the process of the student graphing his/her progress with the guided assistance of the tutor, the student received explanations of his/her goals for reading and feedback about his/her progress, which are both elements of a strong intervention (Lentz, Allen, & Ehrhardt, 1996). In summary, it was predicted that adding a self-graphing component to the early literacy group tutoring intervention would increase student learning.

Method

Selection Procedures

*DIBELS benchmarks*. The DIBELS assessments used in kindergarten include Letter Naming Fluency (LNF), Initial Sound Fluency (ISF), PSF, and
During the fall benchmark of kindergarten, the developers of DIBELS recommend administering ISF and LNF (Good & Kaminiski, 2002). During the winter benchmark, they recommend schools use the ISF, LNF, PSF, and NWF measures. Finally, for the spring benchmark, they recommend administering LNF, PSF, and NWF.

Good et al. (2002) established decision rules that utilize longitudinal predictive information to identify progressive benchmark goals for reaching subsequent early literacy goals and outcomes. They determined these goals from considering the data of all participants included in the DIBELS Data System. The levels were created so that a student is at “Low Risk” or “Established” if approximately 80% or more students with the score would achieve the goal for that measure. A categorization of “Some Risk” or “Emerging” is given if approximately 50% of students would achieve the goal. A student is considered to be in the “At Risk” or “Deficit” level if approximately 20% or fewer of the students with the score would achieve the goal.

In addition to reporting the above individual indicators per benchmark measure, the DIBELS Data System reports an overall recommendation, based on the student’s pattern of performance on all DIBELS Benchmark Assessments for that assessment period (Good et al., 2002). The pattern of performance is considered in terms of the odds for achieving subsequent goals. For example, during the benchmark assessment period at the beginning of kindergarten, the subsequent goals are 25 on ISF by the middle of kindergarten, 35 on PSF by the end of kindergarten, 50 on NWF by the middle of first grade, and a score of 40 or
more on Oral Reading Fluency (ORF) by the end of first grade. A recommendation of “Benchmark- At Grade Level” is given when approximately 80% or more of students with the specific pattern of data would achieve the following goals. A recommendation of “Strategic- Additional Intervention” is given when the pattern of performance is not sufficient to make a clear prediction for future goal attainment. Finally, a recommendation of “Intensive- Needs Substantial Intervention” is given when approximately 20% or fewer of students with the specific pattern of data would achieve the following goals.

Selection of children for tutoring. In order to determine which students would be included in the tutoring program, a team of personnel including the school psychologist, kindergarten teachers, third-year school psychology doctoral student, and present researcher considered the initial benchmark scores for DIBELS (Good & Kaminski, 2001) with ISF and LNF. The teachers thought that all the students in the “Intensive” range during the fall benchmark would be fitting candidates for tutoring. They thought the data aligned with what they observed while the students were in their class and none of the students had excessive behavior or attendance concerns. The team formed groups around similar needs with LNF. There were three groups of students all together, with each group consisting of three students. Two groups included students in the “At-Risk” category for LNF on the fall benchmark assessment. The third group included students in the “Some-Risk” category for LNF on the fall benchmark assessment. The rationale for this distinction was that the two lower performing groups could spend more time practicing letter names whereas the higher performing group
could spend more time practicing more advanced skills, such as phonemic segmentation and rhyming. However, these groupings were occasionally adjusted due to changes in students' instructional levels. For example, if a student that was in the “Strategic” range during the fall benchmark moved down to the “Intensive” range during the winter benchmark, he/she should receive additional support.

The tutors met with the school psychologist, graduate supervisors, and current researcher approximately every four weeks to discuss students' DIBELS data and behaviors during group. If there was ever a concern between meetings, the tutors could contact the team members to find solutions. During these discussions, the team decided to change which assessments were used with specific children contingent on goal attainment, modified the intervention to meet students' needs, adapted the structure of the groups according to students' levels of performance, and/or created behavior plans for students with interfering behaviors. The kindergarten teachers’ approval was sought prior to implementation of modifications to students' intervention services. The teachers could not attend the larger meetings due to time constraints.

Selection and demographics of children for self-graphing. The participants were collaboratively selected during one of the tutoring meetings (described above) after the students had already received tutoring for approximately two months. A protocol designed by the current researcher was used to determine which students might benefit from the self-graphing study (see Appendix A). The five students that received the fewest sums of points on the protocol were invited
to participate in the study. Considerations on the protocol included students’
current progress on the DIBELS assessments (PSF and NWF), apparent
motivation to participate during tutoring and progress monitoring, and attendance
(the intervention occurred frequently so students with strong attendance records
were preferred). No new students were added to the study after the initiation of
baseline.

The number of students was reduced from five to three for the following
reasons. One student transferred schools at the beginning of the study. Another
student refused to speak when the graduate supervisors were present. He also
exhibited interfering behaviors during the tutoring group and general instruction.
He was referred for more individualized interventions from school services.

Of the three students whom did participate in the self-graphing
intervention, one was male (33%) and two were female (67%). One of the
students was African-American (33%) and two were Caucasian (67%). The
median age was 5 years 11 months (5 years 11 months – 6 years 1 month) at
the initiation of baseline.

**Progress Monitoring Procedures**

*Progress monitoring for tutoring.* During the beginning of the academic
year, prior to the current study, students receiving tutoring were progress
monitored on ISF and PSF, consistent with school practice. From December
through the remainder of the school year, PSF and NWF were used for progress
monitoring. The study began in January. If a student had not yet met the goal for
ISF, progress monitoring on this measure continued until the goal was met.
Progress monitoring for self-graphing study. For the current study, only PSF and NWF were used because the majority of students had already mastered ISF. PSF was the primary dependent variable and was used when applying decision rules and judging the effectiveness of the self-graphing intervention. Students graphed their scores on PSF with tutors’ assistance. Students were also offered the opportunity to independently graph their scores on NWF. Students’ progress on NWF was monitored to determine generalization effects of assisted self-graphing.

Description of Tutors and Graduate Supervisors

Selection and demographics of tutors. The tutors that implemented the self-graphing intervention were both Caucasian females in their first year of a graduate program for School Psychology. They were tutoring and progress monitoring as a requirement for one of their graduate courses. They were asked to voluntarily add the self-graphing component during their progress monitoring sessions for research purposes.

Selection and demographics of graduate supervisors. Two doctoral students assisted with tutoring and the self-graphing study from a supervisory role. One of the graduate supervisors was in her second year of a graduate program in School Psychology and was working at the school as part of her practicum experience. The other graduate supervisor was in her third year of a graduate program in School Psychology and was working at the school as part of her advanced school experience. Both graduate supervisors were Caucasian females. They assisted with preparing tutoring materials, consulting with
teachers, facilitating some trainings and supervisory meetings, and conducting reliability and procedural adherence checks.

*Training of tutors.* Tutors were trained in DIBELS by graduate supervisors during a four-hour training at their university. Tutors were trained in the self-graphing procedures for this study about two months later during one of the tutors’ supervisory meetings. During the training, the researcher explained the purpose of using the self-graphing component, reviewed the procedures, modeled how it would be implemented, provided time for practice with feedback, and answered questions. The tutors also were specifically trained in the procedures for stopping a self-graphing session if a student was visibly frustrated or reported that he/she wanted to stop making graphs.

*Permissions and Consents*

Prior to implementation of the current research, permission was sought from the school’s kindergarten teachers and principal in order to carry out the study. Additionally, the study was approved by the Institutional Review Board (IRB) at the University of Cincinnati. The parents of the five selected students were invited to have their child participate in the self-graphing intervention. Permission was obtained from the parents of students participating in the present study prior to implementation. By signing the permission form, parents agreed to have their student’s data used for research purposes by faculty and students from the University of Cincinnati School Psychology graduate program. Two of the students whom returned the permission forms did not actually participate in
the study (explained above). The tutors and graduate supervisors were also given permission forms to sign, in order to report their demographic information.

Setting

_Tutoring setting._ Tutoring, progress monitoring, and self-graphing occurred in the cafeteria near the students’ classroom. The tutor and students sat at a round table.

_School characteristics._ The current study was conducted at an urban public school located in a Midwestern city. The average daily school enrollment during the prior academic year was 309 students, including students in kindergarten through sixth grade (Ohio Department of Education [ODE], 2005). According to the school’s report card during the 2004-2005 school year, 42.5% of students were “economically disadvantaged” (ODE, 2005). The school was composed of 82.5% white students, 10.8% African American students, 5.3% multi-racial students, and 1% of students were from other racial backgrounds (ODE, 2005). Thirteen and a half percent of the students had a disability (ODE, 2005). The school was a partner with a state grant designed to study educational interventions in line with science-based practice, innovations in progress monitoring, and intervention-based decision making (Barnett & Graden, 2002). As a result of this Educational Innovations grant, the school received assistance from graduate students in School Psychology at no cost to the school. The graduate students were involved with the school by collecting benchmark and progress monitoring data, administering interventions, conducting some
problem-solving meetings, and serving on school teams. Additionally, the faculty members from the University of Cincinnati were available for consultation with the school staff and for supervision of the graduate students.

**Materials**

*DIBELS measures.* Tutors used the paper-and-pencil version of the DIBELS measurements with the students. These materials were printed from the DIBELS website ([http://dibels.uoregon.edu](http://dibels.uoregon.edu)) by the school staff and provided for the tutors to use. There were 20 versions of both the PSF and NWF probes. The probes were administered sequentially. If a student completed all 20 probes, the tutor would return to the first probe and use the probes sequentially again. The DIBELS PSF and NWF progress monitoring data was entered into the DIBELS Data System to share the information collected through the research project with the students’ teachers and other relevant school personnel (i.e. school psychologist, intervention specialists).

*Self-graphing materials.* Tutors were given a binder holding all required materials for the self-graphing intervention. The tutors had a script (see Appendix B) to follow when doing the graphing with students and a checklist (see Appendix C) to use for assessing intervention adherence. The tutors were given colored pencils for the students to use when filling in the bars on the bar chart. They were also supplied with small stickers for the students to place on top of their bars, to make the intervention slightly more rewarding and fun. The kindergarten students charted their data on a simplified progress monitoring graph created by the researcher (see Figure 1 for a template of a bar chart). The graphs were
Figure 1: Template of bar charts. Note. These graphs were enlarged to 11” X 16” paper.
enlarged to 11” by 16” paper to make the information easier to read and to have more space for the stickers. For each student, there was a graph for PSF and another graph for NWF. Each graph included the pre-established DIBELS goals for the specific measure (University of Oregon, 2004). The tutors were also provided with a picture cue card that could be used to remind the students of the steps of self-graphing.

Social validity questionnaire. Tutors received a written questionnaire (see Appendix D) at the termination of the study. The advanced graduate students were provided with simplified questionnaires (see Appendix D) to use with the kindergarteners.

Dependent Variables

Phoneme segmentation fluency. The primary dependent variable was PSF (explained above). It assesses a child’s skill in segmenting words. A child is told a word (e.g., cat), and asked to say each of the sounds in that word (/c/ /a/ /t/). The child continues to be given words to segment for one minute. The number of correct segments per minute is recorded. The goal for this skill is 35 correct segments per minute by the end of kindergarten (Good & Kaminski, 2002).

The alternate form reliability for PSF is .88 (Good, Gruba, Kaminski, 2002). The multi-probe reliability of PSF, based on the mean of three probes, is .96 (Good et al., 2002). When the PSF probe and the Metropolitan Readiness Test were administered at essentially the same time, the concurrent
criterion-validity was $r = .65$. The relationship of PSF predicting future scores on the Stanford Diagnostic Reading Test, or the predictive validity, was $r = .68$ (Good et al., 2002). Progress with PSF was determined through visual analysis.

**Nonsense word fluency.** The secondary dependent variable was NWF. It was considered mostly in terms of generalization of self-graphing skills. NWF assesses a child’s skills with the alphabetic principle. The child is presented with make-believe words (e.g., kag) and asked to sound out each letter or read the whole word. The child is asked to read make-believe words for one minute. The number of correct letter sounds per minute is recorded. The goal for this skill is 50 correct letter sounds per minute, to be reached by the winter of first grade (Good & Kaminski, 2002).

The alternate form reliability for NWF is .92 (Good et al., 2002). The multi-probe reliability of NWF, based on the mean of three probes, is .98 (Good et al., 2002). When the NWF probe and the PSF probe were administered at essentially the same time, the concurrent criterion-validity was $r = .59$. The relationship of PSF predicting future scores on the Woodcock Johnson Psycho-Educational Battery Total Reading Test, or the predictive validity, was $r = .66$ (Good et al, 2002). Progress with NWF was determined through visual analysis.

**Self-graphing mastery.** An aspect of efficacy that was assessed in the current study was whether or not kindergarteners were capable of understanding and applying self-graphing concepts. Questions were included in the scripts to assess whether or not a student understood the concepts of graphing (see
Appendix B). For example, students had to find or read numbers on both axis and determine whether or not a test score was better than the one before it, to have attained the established goal. The responses to such questions were recorded on the script checklists (see Appendix C). If a student incorrectly answered more than one of the three questions during the introduction to self-graphing lesson, the lesson would have been repeated during the following session. Additionally, if a student incorrectly responded to the goal attainment question during three consecutive assisted self-graphing sessions, the introduction lesson would have been repeated with that student. If a student incorrectly answered more than one of the three questions during the introduction to self-graphing lesson three consecutive times, it would have been determined that the student did not understand graphing well-enough to benefit from the self-graphing intervention, and it would have no longer been administered with that student. It was decided to allow the students to miss one response because the task of reading the score might have been difficult for students with few number identification skills. This may have especially been true if a student scored in the double digits and did not yet know how to read these numbers. If a student met the criteria for not understanding graphing, he/she would have no longer been included in the study and the team would have reconsidered how to better serve the student. All students met the criteria for understanding graphing and no students required a review of the introductory self-graphing lesson.

*Independence with self-graphing.* Students were offered the chance to self-graph his/her scores on NWF independently. The script checklist (see
Appendix C) was used to record whether or not a student chose to make the graph. Additionally, the tutor noted the student’s degree of independence with creating the graphs and accuracy of completing procedures and interpreting results.

*Time estimates.* Another way to monitor the efficacy of teaching self-graphing to kindergartners was to monitor how long both the trainings and sessions actually lasted. The length of time was recorded on the script checklist by having tutors record the time they began and ended on each script checklist (see Appendix C). The reason for including this variable was that teaching young students self-graphing might have not been considered worthwhile if it took an excessive amount of time.

*Social validity.* Social validity was evaluated on an ongoing basis through comparing the participants’ data with goals for the individual indicators and peers’ data during the winter and spring benchmark periods. Social validity was also assessed at the completion of the research study through satisfaction ratings. The tutors’ satisfaction and perceived effectiveness from using the self-graphing intervention was assessed through an anonymous written questionnaire (see Appendix D for questionnaires). Additionally, the graduate supervisors asked the kindergarten students questions regarding their enjoyment of self-graphing their data (see Appendix D for questionnaires).

*Procedures*

*Recommendations from DIBELS.* Kame’enui et al. (2005) recommend that students falling in the “Intensive” range receive a minimum of 90 minutes
allocated to early literacy skills daily and an additional 20 to 30 minutes per day to enhance essential skills within a small-group setting. Additionally, these students should be assessed two to four times per month (Kame’enui, 2005). The students in the current study received the suggested “dose” of intensive intervention; however, it was across four days rather than five. The participants were progress monitored more frequently than recommended, twice a week, in order to make better substantiated and more prompt decisions regarding the effectiveness of the intervention.

*Group tutoring without graphing condition (baseline).* The intervention program used for the group tutoring included components of various research-based interventions. The tutoring program focused on teaching important early reading skills such as phoneme segmentation, letter naming, sounds of letters, and reading simple books (see Appendix E for a sample script).

The first half of the tutoring time was spent learning and practicing letter names, letter sounds, rhyming, manipulating syllables, and identifying initial and ending sounds. The tutors began the group by having students practice segmenting words through clapping (Adams, Foorman, Lundberg, & Beeler, 1998, Murdoch, Lentz, & Strickler, 2001). Then, game sheets from the *Kindergarten Peer-Assisted Literacy Strategies* (K-PALS) program by Mathes, Clancy-Menchetti, and Torgesen (2001) were used as a reference for teaching letter names, rhyming, onset and rime recognition, and letter sounds, although the K-PALS scripts and suggested format were not used. Rather, the directions were similar to those included in the *Teacher-Directed Paths to Achieving*
The two interventions were combined in this manner because the school team thought that PALS was too advanced for the kindergarteners in the setting and the team sought an intervention for which an adult would be the group leader. The two intervention packages, K-PALS and PALS, had similar structures which made this modification of procedures feasible.

During the second half of the tutoring session, the tutor worked with the children on reading a simple children’s book. The format of the *Letters, Sounds, and Stories* “Story Reading” (Murdoch et al., 2001) was used with the kindergarten tutoring program. The “Story Reading” activity was designed around dialogic reading, to allow students to be active participants in shared reading (Whitehurst, Epstein, Angell, Payne, Crone, & Fischel, 1994). The purpose of the activity was to facilitate print awareness (i.e. identifying the title, author, and illustrator, reading from left to right, reading words), teach oral language skills (i.e. making predictions, expressing opinions and ideas, and summarizing stories), reinforce letters and sounds, and foster enjoyment of reading (Murdoch et al., 2001). The books were selected from a list generated by Murdoch et al. (2001) which was collaboratively formed by two veteran kindergarten teachers with their masters in Literacy, another experienced kindergarten teacher, a school psychologist, and a school psychology intern. They selected books that reinforced letter names and sounds, included rhyming and/or alliteration, were relatively short in length, and were popular with kindergarteners.
If groups of students continuously struggled or excelled with a certain activity, activities were modified to meet the students’ needs. For example, a group of students continued to struggle with identifying initial sounds after having received the group intervention program for a sufficient amount of time. Hence, the tutoring team decided to supplement the intervention with another empirically-based activity, the “Guess Who Game” to practice initial sound skills (Adams et al., 1998) (see Appendix F for a sample supplemental activity).

Twice a week, following the completion of two sessions of the three tutoring groups, the tutors progress monitored participants with the PSF and NWF measures. The tutors took the students out of their classroom one-by-one to do their assessments in the cafeteria.

Considering that the study used a multiple baseline across participants design, the duration of the baseline condition varied across participants. The briefest baseline condition lasted three weeks and the longest baseline condition lasted nine weeks.

Self-graphing conditions. Although there are likely to be wide variations in terms of children’s skills with graphing, many preschool and kindergarten students do achieve appropriate concepts of graphic representations (Moomaw & Hieronymus, 1995). Therefore, it was anticipated that kindergarten students would be capable of understanding graphing well enough to benefit from a self-graphing intervention. In order to ensure that students using the graphs understood graphing, aforementioned decisions rules were created to select which children should continually receive the self-graphing intervention.
The self-graphing script for the current study was based on information in textbooks and supplemental materials for students in preschool through first grade (Charles, Chancellor, Harcourt, Moore, Schielack, Van de Walle et al., 1999; Harcourt, 2004; Jackson, Johnson, Leinwand, Lodholz, Musser, & Secada, 1994; Moomaw & Hieronymus, 1995). During the development of the script, it was evaluated by kindergarten teachers \((n = 2)\) and tutors \((n = 4)\), field-tested with young children not included in any study \((n = 3)\), and extensively reviewed by a parent of a kindergarten student. Additionally, information was collected from tutors that implemented self-graphing in a previous study (Magnan, 2006) and modifications were made to the script accordingly. For instance, the goal was simplified to increase the chances of students understanding the concept and to increase the probability of students attaining their goal. If the intervention resulted in decreased scores after three to five weeks, it would have been terminated. Additionally, the explanation of graphing was to be continued until the student mastered the necessary concepts, or the student would have been removed from the study if he/she continued to lack understanding after three explanations.

All students receiving the supplemental self-graphing intervention also received the tutoring described in the previous condition. The self-graphing condition occurred following the completion of all three tutoring groups, twice a week. The tutors pulled each student out of the classroom one-at-a-time to do the progress monitoring and self-graphing. It took place in the same area as tutoring. The only difference between the self-graphing condition and the
baseline condition occurred while students were being progress monitored on PSF and NWF by their tutor. During the self-graphing condition, the kindergarteners were told their scores on the DIBELS assessments and they used a graph for goal-setting and to self-monitor their progress on the assessments.

*Initial training in self-graphing.* During the initial self-graphing session(s), while working one-on-one with the kindergartners, the tutors explained the purpose and procedures for graphing. This was done using explanations, models, and feedback. The tutors modeled how to create and read a bar graph and then used gestural and model prompts (Snell & Brown, 2000) to assist the students in learning how to correctly use a bar graph. The tutors continued practicing the necessary skills for reading a graph until the children identified the necessary information competently. This was monitored by the tutors asking the students to find specific information on their graph and the tutors recording responses on the script checklist (see Appendix C).

*Protocol for ongoing assisted self-graphing.* During the actual self-graphing intervention, which occurred twice a week, the tutor began by discussing the student’s goals and past progress. After this discussion, the tutor administered the DIBELS PSF probe and informed the student of his/her score. The tutor always plotted the student’s data on his/her bar graph by outlining the bar and then allowing the student to color in the bar. The tutor helped the student analyze whether or not he/she met the daily goal and gave him/her a sticker to put on top of the day’s bar only if he/she reached the goal. Finally, the tutor
offered individualized encouragement for how the student might improve his/her score next time or congratulated the student on his/her performance.

*Protocol for ongoing independent self-graphing.* Following the assisted self-graphing of PSF data, students were offered the option to graph their NWF data and to do it on their own (see Appendix B for script). If a student decided to independently self-graph his/her results on NWF, the tutor would prompt the student to review past NWF scores, administer the NWF probe, tell the student his/her score, and then provide the student with a picture cue card to remind the student of the tutoring procedures (i.e., find test number, find score number, draw new bar, sticker). The tutor also prompted the student to discuss his/her progress on NWF and recorded the student’s accuracy in creating the graph and analyzing goal attainment and progress (see Appendix C for checklist).

*Interfering behaviors.* If a student would have refused to do the self-graphing intervention, been visibly frustrated with the self-graphing procedures, or exhibited interfering behaviors that prohibited the administration of DIBELS and self-graphing, the tutor would have stopped the session, maintained positive affect throughout the time the student was with her, returned the student to the classroom, and she would have reported the occurrence to the primary researcher and graduate supervisors. If this situation occurred, the tutor would have recorded the number of steps that were completed and provided an explanation for discontinuing the self-graphing session under the “comments” section on the script checklist (See Appendix C). No interfering behaviors were observed.
Goal setting. For the present study, the students’ goal was to receive a higher score than their previous assessment. This goal was determined due to tutors’ feedback in a previous self-graphing study (Magnan, 2005). Previously, students’ aimlines were used for goal setting. However, the tutors thought the intervention had a punishing effect for some students because it served as a constant reminder that they were below expectations, despite improvements. Having students “beat” their previous score seemed like an achievable goal for all students, irrespective of their baseline level. Therefore, the students should be positively reinforced by reaching their goal on a more frequent basis. When a student did reach his/her goal, the tutor would allow the student to put a small sticker over his/her bar for that day. Therefore, the intervention utilized differential reinforcement for increasing rates of fluency. The kindergarten benchmark goal (Good et al., 2002) for each skill was also represented on the students’ graphs and the tutors referred to it by commenting on progress towards the “big goal” (see Appendix B).

Procedural Adherence and Reliability

Procedural adherence and reliability of DIBELS administration and scoring. A reliability score of at least 85% and a procedural adherence score of at least 80% was achieved by all graduate students on DIBELS LNF, ISF, PSF, and NWF measures prior to the start of tutoring. Reliability and procedural adherence for LNF and ISF were necessary because these measures were used for screening which students would be included in tutoring. The PSF and NWF measures were used for progress monitoring the tutoring and self-graphing.
Self-Graphing

interventions. The Assessment Integrity Checklists from the DIBELS Administration and Scoring Guide was utilized for determining procedural adherence (Good & Kaminski, 2002). The number of steps completed was divided by the number of possible steps and the resulting quotient was multiplied by 100 to calculate the percentage of steps completed, which was the procedural adherence score. In order to calculate the reliability (agreement) score, the number of agreements on a single probe was divided by the sum of agreements and disagreements on that probe and the resulting quotient was multiplied by 100 to calculate the percentage of agreement, which is the reliability score.

Procedural adherence and agreement data were collected by the graduate supervisors. Tutors’ reliability and adherence to procedures on DIBELS measures was also monitored during the observations of the self-graphing intervention; therefore, each tutor was monitored approximately every other week for PSF and NWF.

Tutoring program. The tutors’ intervention adherence with performing the early literacy group intervention was collected by the graduate supervisors. The graduate supervisors used a checklist that included the main components of the group intervention, in order to calculate the percentage of steps completed, and they gave the tutors feedback regarding how they might improve their tutoring performance (see Appendix G for checklist). This was achieved approximately every other week with both tutors for the first few months of tutoring and about once a month thereafter.
Baseline procedures. The graduate supervisors observed a sample of 27% \((n = 8)\) of the baseline progress monitoring sessions \((sessions \, N = 30)\). This was accomplished to ensure that the tutors did not unintentionally add any components of the self-graphing intervention prior to the time they were scheduled to begin with a student, according to the multiple baseline design.

Intervention procedures. As the tutors conducted the self-graphing intervention, they collected their own intervention adherence data through the form of a self-checklist (see Appendix C). Additionally, the pair of graduate supervisors observed the self-graphing intervention and independently completed the script checklists according to their observations. When a graduate student was unavailable for a scheduled observation, the primary researcher substituted in her position.

Every week the observers observed one tutor as she worked with all of her assigned participants. Therefore, the graduate supervisors collected intervention adherence data on 33% \((n = 10)\) of the self-graphing sessions \((sessions \, N = 30)\).

A co-observation agreement score was calculated by dividing the number of agreements by the sum of agreements and disagreements and then multiplying the resulting quotient by 100 for a percentage. A co-observation agreement score of at least 85% was sought. If observers were below this level, the procedures would have been reviewed to ensure a shared understanding. Additionally, if a tutor’s intervention adherence with implementing the tutoring procedures or the self-graphing intervention was below 80%, the graduate
supervisors would consult with the tutor and offer recommendations for improvement. If low intervention adherence became a repeated issue, the procedures would have been reviewed during a supervision meeting. However, this was never a problem.

**Data Analysis**

*Multiple baseline across participants.* The current study used a multiple baseline across participants design. The function of the independent variable in a multiple baseline design can be inferred by the lack of change in the untreated behavior/ setting/ person(s) compared to the change in the treated condition (within series, Cooper, Heron, & Heward, 1987). Evidence for internal validity is documented through replications of effects across participants, as the independent variable is introduced at different times (between series). Therefore, the present study had components of both a within-series and between-series design because results of a multiple baseline design can be analyzed by considering the intervention effects on each child and across children. Separate multiple baseline designs were used for both measures. The function of a behavior can be verified by the multiple opportunities to replicate the effects of the independent variable (Cooper, et al., 1987).

Cooper et al. (1987) discussed how an ideal multiple baseline design would only apply the independent variable to a behavior after achievement of fully stable responses. Despite research advocating for steady state logic (Sidman, 1960), this study utilized fixed time intervals for scheduling the duration of the self-graphing component in order to come closer to school-based decision
making and to make the research plans fit within the limitations of the school calendar. Therefore, implementation of the self-graphing intervention commenced with a new student on a predetermined schedule, regardless of stability. Three week time intervals was chosen because it was aligned with other multiple baseline design studies with the goal of increasing literacy skills (i.e. De la Colina, Parker, Hasbrouck, & Lara-Alecio, 2001), multiple baseline designs studying the effects of self-graphing (i.e. Shimabakuro et al., 1999), and past research on the effects of self-graphing on early literacy skills (Magnan, 2005).

De la Colina et al. (2001) analyzed the effects of a repeated reading intervention on oral reading fluency and comprehension with Spanish-speaking students in first and second grade. They implemented a multiple baseline design with a three week intervention condition and then a five week intervention condition.

The Shimabakuro et al. (1999) study (described in Introduction) used a multiple baseline design with intervals of six data points to assess the effects of self-graphing on reading comprehension, math, and written expression skills. Considering that the self-graphing intervention in the current study was delivered twice a week for three weeks in each condition, the intervention was also scheduled with intervals of six data points.

The current study is an extension of the Magnan (2006) research on the effects of self-graphing on basic early literacy skills. Both studies used a multiple baseline design with three week intervals.
Three week intervals also logistically worked well for allowing time for all students to demonstrate a response to the intervention, compared to baseline data. By using fixed time intervals, it could additionally be determined whether or not three weeks was long enough for younger students to display a response to self-graphing.

Within the multiple baseline across participants design, condition A, the baseline condition, included as contextual background the systematic group tutoring which consisted of teaching letter identification, phonological awareness, and phonemic awareness. During this time period, students received tutoring four days a week for approximately 25 minutes per day in a group consisting of a total of three students. Condition B consisted of the systematic tutoring along with the supplemental self-graphing intervention. During condition B, the intervention condition, the student discussed graphing and goal setting with his/her tutor, looked at a graph of his/her PSF scores, took the PSF assessment, plotted the new score on his/her bar graph with the tutor’s assistance, discussed goal attainment, and placed a sticker on the day’s bar only if the goal was achieved (see Appendix B for scripts). Thus self-graphing would need to show changes in performance beyond the background intervention. Following the assisted self-graphing of PSF, the student was offered the opportunity to independently self-graph his/her scores on NWF, take that assessment, and then complete the self-graphing procedures (see Appendix B for scripts).

If at any point a student met the criteria for not understanding
self-graphing well enough to benefit from the intervention, was repeatedly visibly frustrated with the self-graphing procedures, exhibited behaviors that inhibited the self-graphing intervention from being completed on numerous occasions, or his/her data were decreasing after six PSF data points of receiving the intervention, the self-graphing intervention would have been stopped with that student and he/she would have returned to baseline. Therefore, an A-B-A design was possible if a student met the criteria for early termination of the self-graphing intervention. However, this situation did not occur.

*Visual analysis.* Visual analysis was conducted by attending to the level, trend, and variability of data within the intervention conditions and in comparison to the baseline conditions. The level consists of the mean performance across conditions (i.e., baseline and intervention) (Horner et al., 2005). Trend refers to the rate of increase or decrease of the data, which can be determined by creating a best-fit straight line, or a slope, of the dependent variable (Horner, et al., 2005). Trend is typically evaluated within phases and between adjacent phases (Parsonson & Baer, 1986). The variability is the degree to which the data fluctuates around the mean (Horner, et al., 2005). Variability is also assessed within phases and between adjacent phases (Parsonson & Baer, 1986). Some other qualities of graphic data that can be assessed visually include the stability of baseline data, the overlap of adjacent phases, the number of data points in each phase, the analysis of data across similar phases, variability in slope estimates, and the evaluation of the overall pattern of data (Parsonson & Baer,
Results

Procedural Adherence and Reliability

Procedural adherence and reliability of DIBELS administration and scoring. Prior to beginning tutoring or independently collecting progress monitoring data, both tutors scored above the recommended 80% procedural adherence score for administration of DIBELS and the 85% reliability when co-scoring DIBELS probes. More specifically, the co-observation agreement score between the tutors and the graduate supervisors for PSF was 86% for both tutors and the median procedural adherence score for administration of PSF was 96% (sessions = n = 2, range = 91% - 100%). The median co-observation agreement score for NWF was 93% (n = 2, 91% - 94%) and the procedural adherence score for administration of NWF was 100% for both tutors. The tutors and graduate supervisors additionally scored the reliability probes within two points of each other on both measures.

During the self-graphing condition, the median co-observation agreement score between the tutor and the graduate supervisor for administering the DIBELS PSF measure was 86% (sessions, n = 19, range = 55% - 100%) and the median procedural adherence score for administration of PSF was 100% (n = 19, 89% - 100%). The median co-observation agreement score for administering the DIBELS NWF measure was 96% (n = 18, 79% - 100%) and the median procedural adherence score for administration of NWF was 97% (n = 19, 78% -
100%). Typically, when the co-observation agreement score was lower (i.e., < 90%) the graduate supervisor noted that the student was difficult to hear or understand.

Tutoring program. According to the graduate supervisors’ observations, the median percentage of steps completed for administration of the tutoring intervention was 85% (sessions, n = 10, range = 74% - 100%). The primary cause of steps not occurring was the tutor running out of time with a group of students and omitting an activity (typically the story reading component).

Baseline procedures. During the baseline sessions, the graduate supervisors did not observe the tutors implementing any self-graphing steps, other than administration of the DIBELS measures. However, one of the tutors explained to the research team that she did give Student #2 guidance and feedback regarding his performance on the PSF measure during week #5 (noted on Figure 2).

Intervention procedures. According to the graduate supervisors’ observations, the introduction to the self-graphing lesson was completed with a median of 100% administration accuracy (sessions, n = 3, range = all were 100%). The tutors completed a median of 100% (n = 10, all were 100%) of the PSF self-graphing administration steps and a median of 100% (n = 10, 81% - 100%) of the NWF administration self-graphing steps.

Co-observation agreement was calculated between the graduate supervisors when they observed the tutors. While observing the introduction to
**Figure 2:** PSF multiple baseline across participants.
self-graphing lessons, the graduate supervisors had a median co-observation agreement score of 100% (sessions, n = 3, range = all were 100%). When observing the actual self-graphing sessions, the graduate supervisors had a median co-observation agreement score of 100% for the PSF activity (n = 10, all were 100%) and the NWF activity (n = 10, 88% - 100%).

Data Analysis

Visual analysis of phoneme segmentation fluency. The results for PSF are displayed on Figure 2. According to analyses within-series and across students, positive results were found among the three students following the initiation of the self-graphing intervention components, but internal validity arguments have several threats, discussed below.

Student #1 showed great progress on the PSF measure during the study (see Figure 2). Her data during the self-graphing condition were at a considerably higher level than during the baseline condition. However, the last data point during baseline shows an increasing trend which causes difficulties in associating the improvements in performance to the self-graphing intervention. Yet there is an immediate level change and an upward trend with the introduction of the intervention.

The tutor who worked with Student #2 implemented aspects of the self-graphing intervention prior to the intended start date. More specifically, she gave the student feedback about his performance and gave him a more detailed explanation of the procedures for the assessment. She had observed that he was correctly segmenting words during their tutoring group but did not respond when
she administered the PSF measure. Therefore, she made the relationship
between the intervention and assessment activities apparent for the student.
After receiving the individualized feedback, the student demonstrated a large
increase in the level of his performance on the PSF measure and achieved the
goal of 35 correct sounds per minute (see Figure 2). When he began
self-graphing, his scores continued to rise initially, exceeding the goal, and then
showed a downward trend. Yet, all self-graphing data points remained above the
goal.

The data for Student #3 displayed a slight increase in level after the
initiation of the self-graphing intervention (see Figure 2). However, while the
increase was slight, baseline data were at or below the goal, and following
intervention implementation, five out of five progress monitoring checks were at
or above the goal. She did not have clear positive or negative trends within either
the baseline or intervention conditions.

Students #2 and #3 displayed relatively stable baseline data paths at the
time that their peer(s) experienced a positive change. The data within both the
baseline and intervention conditions and across conditions had a fairly low
amount of variability across students which made trends more visible. Student #1
had no overlap of scores between the baseline and intervention conditions and
Students #2 and #3 had little overlap of scores between conditions. Although
students missed some days of tutoring and self-graphing, there did appear to be
enough data points to witness trends in conditions for all students. Overall, the
results show some evidence to support arguments for internal validity of the assisted self-graphing of PSF.

Visual analysis of nonsense word fluency. The results for NWF are displayed on Figure 3. Due to the fact that students frequently chose not to graph their NWF scores and the use of graphing was inconsistent, relationships could not be verified between self-graphing and performance on the NWF measure. According to analysis within-series and across students, there were no strong positive or negative relationships between the students’ data paths and the initiation of the intervention condition.

Student #1 did reach the goal of 25 correct sounds per minute more frequently and consistently during the intervention condition than during the baseline condition (see Figure 3). However, she chose not to use the graph for the majority of the sessions which makes analysis of the intervention data impossible.

The last three baseline data points for Student #2 were increasing and the last two points were above the kindergarten benchmark goal (see Figure 3). There were no clear changes in trends when he chose to use the NWF graph.

Student #3 only chose to use the NWF graph for the final two sessions which was not enough data to interpret (see Figure 3). In addition to having few self-graphing data points, her NWF data remained relatively variable throughout the study and she did not exhibit any noticeably meaningful changes during the baseline or intervention condition. She did not reach the NWF kindergarten
Figure 3: NWF multiple baseline across participants.
benchmark goal during the entirety of the current study.

It was difficult to interpret intervention results due to the high absolute amounts of variability in baseline, especially for Students #1 and #3. The data within the intervention condition were also variable across students. Some overlap of scores between the baseline and intervention conditions existed for all students. As was previously mentioned, the self-graphing procedures were not regularly utilized during the NWF intervention condition so there were too few data points within the self-graphing intervention condition to interpret effects. Additionally, students did not receive as much assistance with their NWF graph as they did with their PSF graph. Therefore, the strength of making associations between the independent self-graphing intervention and the NWF results was low due to poor internal validity.

Self-Graphing Mastery

There were no students whom needed to review the introduction to self-graphing lesson; they all met the criteria for understanding self-graphing on the first trial, and continued to demonstrate an understanding of the goal attainment concept during further sessions. Additionally, no students receiving the self-graphing intervention displayed cause to terminate the self-graphing intervention due to interfering behaviors.

Overall, the kindergarten participants demonstrated an ability to accurately interpret whether or not they attained their goal through visual analysis of their bar chart according to both the graduate supervisors’ observations and the tutors’ records. During the introductory lesson, all students correctly identified the test
number on the x-axis. The students showed difficulties reading their scores on the y-axis, most likely because they were not practicing double digit numbers in their classroom instruction yet. One of the students correctly read the score attained on the y-axis. All students correctly interpreted whether they met their goal during the introductory lesson.

During the actual self-graphing intervention activities, students correctly discussed their progress on PSF according to their goals during 90% (sessions, n = 9) of the graduate supervisors’ observations. The students “very accurately” discussed their progress on NWF according to their goals during 100% (n = 4) of the graduate supervisors’ observations. When students filled in their own graphs, they placed the bar in the correct location on the x-axis during 80% (n = 4) of observations and they were “somewhat accurate” for the other 20% (n = 1) of observations. They drew the top of the bar in the correct location according to the y-axis during 40% (n = 2) of observations; they were “somewhat accurate” for 20% (n = 1) of observations; and they were “not accurate” for 40% (n = 2) of observations. When graphing NWF, students correctly identified whether or not they reached their goal and were accurate in whether they earned their sticker during 100% of observations (n = 5).

The tutors also recorded students’ responses and had similar findings. During the actual self-graphing activities, students correctly discussed their progress on PSF according to their goals during 83% (sessions, n = 25) of the sessions. The students “very accurately” discussed their progress on NWF according to their goals during 100% (n = 15) of the sessions. When students
filled in their own graphs, they placed the bar in the correct location on the x-axis during 94% \((n = 17)\) of observations and they were “somewhat accurate” for the other 6% \((n = 1)\) of observations. They drew the top of the bar in the correct location according to the y-axis during 81% \((n = 13)\) of observations; they were “somewhat accurate” for 6% \((n = 1)\) of observations; and they were “not accurate” for 13% \((n = 2)\) of observations. When graphing NWF, students “very accurately” identified whether or not they earned their sticker during 89% \((n = 16)\) of sessions and were incorrect during 11% \((n = 2)\) of sessions. Students were “very accurate” in terms of their discussion of progress on NWF according to the goal during 92% \((n = 11)\) of sessions and were “not accurate” for 8% \((n = 1)\) of sessions.

**Independence with Self-Graphing**

According to the data reported by the graduate supervisors from their observations, students chose to use their graph for NWF, following use of their PSF graph, during 50% \((sessions, n = 5)\) of the observations. There were no apparent patterns to this decision across the group of students. The tutors noted that the students were less likely to choose to use the NWF graph when they were doing a fun activity in class. When students did use the NWF graph they chose to do it independently during 60% \((n = 3)\) of the observed sessions.

The data reported by the tutors on the script checklists were similar to that reported by the graduate supervisors. According to the tutors’ data, students chose to use their graph for NWF following use of their PSF graph during
57% (sessions, n = 17) of the observations. When students did use the NWF graph they chose to do it independently during 56% (n = 10) of the observed sessions.

**Time Estimates**

According to the graduate supervisors’ observations, the introductory lesson took a median of 5 min (sessions, n = 3, range = 5 – 7 min, 30 sec) across students. Administering and graphing PSF with assistance took a median of 5 min 15 sec (n = 10, 3 – 8 min) across students. Administering NWF and allowing students to independently graph their score took a median of 4 min 30 sec (n = 6, 3 – 5 min) across students. There was no apparent difference in the amount of time it took between students or tutors. The medians of the tutors’ recorded times were within a minute of those recorded by the graduate supervisors. Therefore, a practitioner can expect to spend approximately 5 min per introductory script with each child and approximately 5 min administering each DIBELS measure and allowing students to self-graph their scores. Hence, after the initial training, self-graphing takes an additional 3 to 4 min per DIBELS measure per child.

**Social Validity**

*Child questionnaire.* The questionnaires were summarized by coding the frowning faces as “1,” the neutral faces as “2,” and the three smiling faces as “3.” All of the students reported enjoying looking at their graphs (see Table 1). Two of the students reported they did not understand what the bars were representing while another student reported that he/she understood the bars “a lot.” Each
Table 1

Child Self-Graphing Questionnaire Results

<table>
<thead>
<tr>
<th>Item (N = 3)</th>
<th>“A Lot” (three smiling faces)</th>
<th>“Some” (neutral face)</th>
<th>“No” (frowning face)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you like looking at your graphs of scores?</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Do you understand what the bars on the graphs are for?</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Do you like the reading tests now more than before you made graphs with your tutor?</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Do you think using the graphs has helped you become a better reader?</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Would you like to use more graphs at school?</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. Comments: “Teach me more about the graphs.” “It was fun. Tell (my tutor) how good I am doing.”

Student reported a different rating for liking the reading tests more after using the graphs. All students reported thinking graphing made them better readers and that they would like to do more graphs at school. When asked for comments, one student reported wanting to know more about graphs.

Tutor questionnaire. Overall, the tutors reported enjoying the self-graphing intervention, perceiving the students to have understood the graphing, and believing the students enjoyed the self-graphing, too (see Table 2). The tutors differed in their perceptions of students enjoying reading activities more after having participated in the self-graphing intervention and of self-graphing being connected with increases in early literacy skills and motivation. The tutors agreed that the self-graphing intervention resulted in their students paying attention
Table 2

*Tutor Graphing Questionnaire*

<table>
<thead>
<tr>
<th>Item (N=4)</th>
<th>Median (1= Strongly Disagree – 5= Strongly Agree)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoyed doing the self-graphing intervention with my students.</td>
<td>4.5</td>
<td>4 – 5</td>
</tr>
<tr>
<td>My students understood how to use the graphs.</td>
<td>4.5</td>
<td>4 – 5</td>
</tr>
<tr>
<td>My students enjoyed using the graphs.</td>
<td>4</td>
<td>4 – 4</td>
</tr>
<tr>
<td>My students are generally more interested in reading activities now than before using the graphs.</td>
<td>3.5</td>
<td>2 – 5</td>
</tr>
<tr>
<td>My students’ early literacy skills have improved since we began the intervention.</td>
<td>4</td>
<td>3 – 5</td>
</tr>
<tr>
<td>My students seem more motivated to learn as a result of using the graphs.</td>
<td>4</td>
<td>3 – 5</td>
</tr>
<tr>
<td>My students pay attention during the assessments better as a result of the graphs.</td>
<td>4</td>
<td>4 – 4</td>
</tr>
<tr>
<td>I would consider using the self-graphing intervention again in the future.</td>
<td>4.5</td>
<td>4 – 5</td>
</tr>
<tr>
<td>This intervention was easy to implement.</td>
<td>4</td>
<td>4 – 4</td>
</tr>
<tr>
<td>This intervention takes little time to carry out with each student.</td>
<td>4</td>
<td>4 – 4</td>
</tr>
</tbody>
</table>

Note. Comments: None offered.

better while being assessed with DIBELS, that they would consider using the self-graphing intervention again in the future, that it was easy to implement, and that it took little time. The tutors did not provide any comments.

Discussion

The assisted self-graphing intervention was implemented with high intervention adherence and produced increases in students’ performance on the
primary measure, PSF, to varying degrees. With the PSF measure, one of the three students displayed clearly interpretable baseline data and showed unequivocal evidence that was not procedurally corrupted (Student #3). However, this student showed modest effects. Self-graphing was not associated with increases on NWF.

While there was evidence of positive level changes for PSF, threats to internal validity for PSF included possibly biasing data points or trends in baseline (Student #1) and unplanned changes in procedures during the time period intended for baseline (Student #2). Additionally, Student #3 displayed a baseline level that was already near the goal and only a small absolute change was observed.

The foremost threat to internal validity for NWF was the fact that students only chose to self-graph their progress during half of the sessions. Other threats included high absolute amounts of variability in baseline data (Students #1 and #3) and intervention data (Student #3), possibly biasing data points or trends in baseline (Student #2), and too few self-graphing data points to interpret (Student #3). Additionally, results could have been impacted by order of association effects because students were always presented with the assisted self-graphing of PSF condition and then the independent self-graphing of NWF condition. Future researchers should counterbalance the conditions to control for order effects.

Despite these problems, arguments could be made for some internal validity evidence based on the multiple baseline design for one of the dependent
variables (PSF) but not the other (NWF). The results for PSF did include enough
data points from implementation of self-graphing to make interpretations.
Additionally, students not receiving the self-graphing intervention displayed
relatively stable data paths (Students #2 and #3).

This project demonstrated that kindergarteners were capable of
self-graphing their early literacy progress with adult assistance. It took relatively
little time to have kindergarteners self-graph their scores on a simple bar chart,
and, based on responses to social validity questionnaires, students and
educators both enjoyed the self-graphing process.

The results of the current study have implications for research in the areas
of RTI, early literacy, and self-monitoring. Furthermore, there are some
limitations to the results of the current study that indicate areas where future
research is needed.

Implications

Despite the equivocal overall results for self-graphing, the kindergarten
students proved capable of using their graph and interpreting whether or not they
attained their goal. They were able to explain their DIBELS performance in terms
of their past performance and the benchmark goal. Additionally, they accurately
provided themselves with positive tangible reinforcement contingent on goal
attainment.

The introductory self-graphing lesson took approximately 5 min and
appeared to be sufficient for kindergarteners to comprehend the concepts of
graphing and goal-setting. This amount of time is minimal in terms of the
potential benefits of students using graphing to self-monitor accuracy and/or performance.

Limitations and the Need for Further Research

The fact that this research took place in an actual school setting using an RTI model caused some limitations. Considering that the participants were simultaneously receiving reading instruction in their regular education classrooms, the early literacy tutoring group, and the self-graphing intervention, the results would have had to be clear to completely separate effects of the intervention from classwide instruction and tutoring. We attempted to control for this issue by employing a multiple baseline design; however, there was too much variability for results to be made apparent in most cases.

An important limitation of the current study was that some of the students selected for the intervention reached or surpassed the end of year DIBELS goals close to the onset of self-graphing. According to this information, the students no longer displayed a need for an early literacy intervention. A source of this circumstance was that participants were selected in early December and the baseline condition began in early January, after winter break. The students whom had been lowest performing at the time of selection were not necessarily the lowest performing students at the initiation of data collection for the study.

Due to the initial high scores being above the kindergarten goals, participants found it difficult at times to reach their goal of surpassing their previous score. There is a ceiling effect for how many correct items can be answered in one minute probes, which affects the amount of improvement that
can be achieved within a measure. It appears that Students #1 and #2 may have reached their ceiling level on PSF, which is why they struggled to improve upon their previous scores (see Figure 2). This may have also been the case for Student #1 with NWF (see Figure 3). Ceiling effects could be better controlled for with the use of lower performing students.

Witt and Beck (1999) described different hypotheses for academic problems and differentiated between students that “can’t” complete their work from students that “won’t” do their work. Self-monitoring, or self-graphing, may help motivate students who “won’t” do their work to work harder at a task, but it will likely not influence students who “can’t” do their work because it does not involve direct teaching (Gunter et al., 2003). If a student “can’t” execute a certain skill, he/she will need other individualized interventions, but self-graphing may interact positively with these interventions (Moxley, 1989). Therefore, a researcher or practitioner may expect to find a self-graphing intervention to be related to skill attainment for some students, but not all students. If self-graphing is not found to be effective, another instructional modification may have to be considered in order to maximize the child’s learning.

Student #3 did not show much gain when receiving the self-graphing intervention (see Figures 2-3). This lack of change may have been due to a skill deficit, as opposed to a performance deficit, which could not be remediated through a motivational intervention. This student did continue to receive some additional early literacy services following the study.

Another limitation of the current study was that aspects of the
self-graphing intervention took place with one student prior to the scheduled start date. According to the results of Student #2, individualized feedback may have been the key factor in the effectiveness of self-graphing at improving scores on PSF. Future researchers may consider the differences in results if students receive individualized feedback from an adult only, are provided with a graph and an explanation of self-graphing only, versus receiving individualized feedback from an adult while self-graphing their progress.

All participants were expected to self-graph their PSF scores; it was not presented as an option. However, they were given a choice as to whether or not they self-graphed their NWF progress. When given a choice, the participants chose to use their graph for the NWF measure during about half of the opportunities. Some potential rationales for them to decline self-graphing are that they did not feel comfortable being observed, there was a more reinforcing activity competing for their attention, or they found aspects of the graphing to be difficult or frustrating.

The performance of kindergartners can be highly variable, especially in the presence of unfamiliar individuals. During intervention adherence checks, the students occasionally exhibited reactivity to the presence of additional observers and responded atypically with others in the vicinity. Participants frequently opted not to self-graph NWF when observed. A strong rapport between the participant and tutor seemed to have an impact on the data that was obtained. Future researchers may control for this reactivity by video taping the sessions to obtain intervention adherence data rather than having observers attend the tutoring and
assessment sessions. If video taping is not possible, it may be beneficial for the observers to build rapport with all participants prior to conducting observations.

Some students were reluctant to participate at times because they were pulled from activities in which they were engaged during regular classroom instruction. This competing situation may have caused their scores to be lower than expected at times, as they were rushing to return to class and were not as concerned with attaining their personal goal.

Most likely due to the young age of the participants, they demonstrated a need for assistance in identifying their score on the y-axis. They were inexperienced with reading large double digit numbers. When asked how high they should color the new bar for that day’s score, many participants had to be prompted and helped with determining the height of the bar. Future researchers or practitioners should consider using graphing formats that are developmentally appropriate for their students. For example, with young children, they may try visually representing the scores by having the students color in objects of interest to them (i.e. racing cars, puppies, stars) rather than using a more formal bar chart format.

Some of the participants frequently obtained scores that far exceeded the scores listed on their personal bar graphs they were using to monitor their own progress. The range on the y-axis of the graph was 0 to 40 and students scored well above 40. This caused many of the bars on the graph to be colored out of the range of squares which was not as concrete as coloring in squares on a graph. It was decided not to replace the existing graphs with graphs with wider
ranges because students enjoyed the fact that they were performing out of the range and were accustomed to the graphs they were using. We did not want to disappoint or further confuse them by changing graphs mid-study. However, future graphing projects should use a larger scale.

Research in the area of early literacy self-monitoring interventions is promising and is in need of further contributions. This study was conducted on a sample size of three participants. The effects of self-graphing on the performance of kindergarten students may be more clearly understood with a wide range of participants or across various single-case design studies.

Conclusion

Despite the students’ social validity ratings (two students reported not knowing the purpose of the bars on the graphs), self-monitoring through the form of a simple bar chart can be efficiently taught to children as young as kindergarten to improve their early literacy skills, according to students’ responses to prompts embedded in the self-graphing process and tutors’ observations. Kindergarten students may require, or appreciate, some assistance with number recognition and placement of data. However, many are capable of interpreting their own goal attainment and providing themselves with contingent positive reinforcement. Assisted self-graphing can be a functional and perhaps effective supplemental motivational component to increase the intensity of existing empirically-based interventions within an RTI model of service delivery. According to results from the current study, three week time periods may be a
sufficient amount of time to deliver the self-graphing intervention and determine effects, if students are assisted twice a week.

In order to better understand the efficacy of self-graphing and to establish reliability and generalization of the current findings, future researchers should systematically replicate the current study and explore variations in methods; such as students' age and/or grade, the dependent variable selection, and aspects of the procedures. Prior to implementing the self-graphing intervention, future researchers should employ clear decision rules for participant selection, including criteria for selecting students with data that is consistently discrepant from the targeted goal at the initiation of the intervention condition. Perhaps more clear and successful results would be found through these replications.
References


**Instructional recommendations in kindergarten through third grade**


*Individuals with Disabilities Education Act of 2004* (PL 108-446).


No Child Left Behind Act of 2001 (PL 107-110).


Student’s Name________________________  Sum of Points_______

Directions: Circle the number that corresponds to the most fitting response. Record the total number of points earned for the student above.

A. Describe the student’s level of performance on PSF according to the goal:
   1) Has never reached the goal
   2) Has reached the goal at least once
   3) Has reached the goal 3 consecutive times

B. Describe the student’s level of performance on NWF according to the goal:
   1) Has never reached the goal
   2) Has reached the goal at least once
   3) Has reached the goal 3 consecutive times

C. Describe the student’s progress with PSF according to his/her aimline (from the first data point to the goal):
   1) All points below the aimline
   2) Some points below the aimline, some points above the aimline
   3) All points above the aimline

D. Describe the student’s progress with NWF according to his/her aimline (from the first data point to the goal):
   1) All points below the aimline
   2) Some points below the aimline, some points above the aimline
   3) All points above the aimline

E. How would you describe the variability of this student’s PSF data?
   1) Highly variable
   2) Somewhat variable
   3) Stable

F. How would you describe the variability of this student’s NWF data?
   1) Highly variable
   2) Somewhat variable
   3) Stable

G. How would you describe this student’s apparent motivation to participate during tutoring?
   1) A complete lack of motivation to participate
   2) Motivated to participate some of the time
   3) Always motivated to participate

H. How would you describe this student’s apparent motivation to participate during progress monitoring?
   1) A complete lack of motivation to participate
   2) Motivated to participate some of the time
   3) Always motivated to participate

I. How would you describe this student’s attendance history?
   1) Never absent
   2) Occasionally absent
   3) Frequently absent
Appendix B: Scripts for self-graphing.

Script for Introduction of Self-Graphing

1. (For initial session only). Before beginning progress monitoring, let the student know you will be doing something a little different during his/her testing time.

   a. “Starting today, I will let you know how you do on the reading test where you tell me the sounds in a word and the test where you read make-believe words. Then, we’ll make a graph of your test scores.”

2. Introduce graphing to the student, show the student his/her PSF graph, & model the concepts.

   a. “A graph is like a picture that shows us information. The information we will be using is how well you are doing on your reading tests.”

   b. Show student his/her PSF graph. “This is your graph for the reading test we do where you tell me the sounds in a word. (Point to the x-axis.) This line down here shows us what test number we are looking at. (Point to the y-axis.) This line over here shows us how high your score is.”

   c. Point to previously recorded data. “We can tell how well you are doing by these colored bars. Watch me. I want to know your score for test one (point to test 1) so I look at the top of the bar (point to top of bar) and go across to the numbers on the side to find your score (point to y-axis). It is a score of ___ (tell student his/her score). So, that means you took reading test one and got a score of__. Do you have any questions?”

   d. “Let’s practice together with another bar. This time, I want to know your score for test two (point to test 2) so I look at the top of the bar (point to top of bar) and go across to the numbers on the side to find your score (point to y-axis). It is a score of ___ (tell student his/her score). So, that means you took reading test two and got a score of__. Any questions?”

3. Assess student’s understanding of concepts & provide feedback with prompting.

   a. “This time, I want you to try it with me. Let’s find your score for test three. Look down here (point to the X-axis) and point to test three.”

      i. If the student correctly points to test three, say, “Good job (name), that is test three.” Record this as correct on the script.

      ii. If the student answers incorrectly or does not know the answer, say, “Remember, we look down on this line (point to the x-axis) for the three. Here it is (point to the 3). Now you try. Point to test three.” Continue this
until the student answers correct and then say “Good job (name), that is test three.” Record this as incorrect on the script.

b. “Now we’ll look at the top of the bar (point to the top of the bar for test 3) and go across to the numbers on the side to find your score (point to the score on the y-axis). Can you tell me what score you got?”

i. If the student says the appropriate score, say, “Great. It is a score of ____ (tell student his/her score). So, that means you took reading test three and got a score of ___.” Record this as correct on the script.

ii. If the student answers incorrectly or does not know the answer, say, “It is a score of ____ (tell student his/her score). So, that means you took reading test three and got a score of ___.” Record this as incorrect on the script.

4. Discuss goals.

a. “Each time we use the graph, your goal will be to beat your last score. You’ll be able to tell whether or not you made your goal by seeing if your new bar is bigger than the bar before it.”

i. “Let’s practice. I want to know if you made your goal for test two. So, I find your bar for test two (point to test two bar), and look to see if it is bigger than the bar before it (point to test one bar). It looks like test two (is/is not) higher so you (did/did not) make your goal for test two.”

ii. “This time I want you to try it. Look at the graph (point to the graph). Is your bar for test three (point to test three bar) bigger than the bar before it (point to test two bar)?”

1. If the student answers correctly, say, “Yes. It looks like test three (is/is not) bigger than the bar before it so you (did/did not) make your goal for test three.” Record this as correct on the script.

2. If the student answers incorrectly or does not know the answer, say, “It looks like test three (is/is not) bigger than the bar before it so you (did/did not) make your goal for test three.” Record this as incorrect on the script.

b. Point to the bold goal line. “See this black line here? This is the ‘big goal.’ That means that you should try to get your bars to reach this high before the end of kindergarten.”

5. Discuss how you will use the graphs.
a. “When we use the graph for the test where you tell me the sounds in words, we will look at how high you want to score on the reading test before you do it. Then, you will take the test. I will tell you your score, draw a new bar of scores on your graphs, and let you color it in. If you get your goal, I’ll let you pick out a sticker to put on your bar. After that, we will talk about how well you did. For the reading test where you read make-believe words, I’ll let you make the graph all by your self, if you’d like. Do you have any questions before we get started for today?”
Script for Assisted Self-Graphing of PSF

A. Review previous scores and goal for PSF.

1. “Before we do the reading test where you tell me the sounds in a word, let’s look at your graph and see how high you should try to get for today.”

2. Present student with PSF graph and point to past bars. “Here are your bars of scores for the past weeks of tutoring.”

   a. Have a discussion with the student about the patterns of his/her scores and his/her goal. Keep a positive outlook about the scores. For example, “So far, your scores have been going up and down a lot. Hopefully today you can have it be an up day.” Or “So far, your scores have all been around this level (pointing to the level of scores across the page). Let’s see if you can get the bar to go a little higher today so that you can make your goal.”

   b. Encourage the student to try his/her best on the reading tests. For example, “I think if you listen very carefully to the sounds in the words, you can do it. Just do your best work.” Or “All you need to do is try your best on the tests and I will be happy with your score.”

B. Conduct the PSF progress monitoring.

C. Help student self-graph.

1. Review graphing as you feel necessary.

2. “Let’s put a new bar of scores on your graphs. This is test ___ so point to test ___ on the graph. You got a score of ___ today. I will go across to find the score (point to the number on the y-axis). So, the top of your bar of scores goes here (draw the outline of the bar for the student on his/her graph). Now you can color in your bar of scores.”

3. After the student places the sticker on the bar, discuss progress. “Your bar goes up this high today (point to the top of the bar) and the bar before it goes this high (point to the previous bar). Did you reach your goal for this test today?”

   a. If the student answers correctly, say, “Yes. It looks like today’s bar (is/ is not) bigger than the bar before it so you (did/ did not) make your goal for today.” Record this as correct on the script.

   b. If the student answers incorrectly or does not know the answer, say, “It looks like today’s bar (is/ is not) bigger than the bar before it so you
(did/ did not) **make your goal for today.**” Record this as incorrect on the script.

c. If the student reached the goal, allow him/her to choose a sticker and put it on top of the bar for that day. **“Since you made your goal for today, you get to pick out a sticker and put it on today’s bar.”**

d. Give the student verbal positive reinforcement and/or encouragement. For example, **“Your bar of scores didn’t quite make it as high as the bar before it. Maybe you can reach it next time. Nice try.”** Or... **“That is great that you beat your last score. Nice work.”** Or... **“Not only did you make your goal for today, but you are also getting closer to the black line, your end goal. Good job.”**
Script for Independent Self-Graphing of NWF

A. Determine whether student would like to make a graph for NWF and if he/she wants to do it on his/her own.

   1. “Would you like to use your graph for the test where you read make-believe words?” Record “yes” or “no.”

   2. “Would you like to make the graph all by yourself?” Record “yes” or “no.”

B. Prompt student to review previous scores and goal for NWF.

   1. “Before we do the reading test where you read make-believe words, let’s look at your graph and you can tell me about how high you should try to get for today.” Record accuracy of description.

C. Conduct the NWF progress monitoring.

D. Tell student his/her NWF score.

E. Give student his/her graph, colored pencils, stickers, and the picture cue card.

F. Prompt student to fill in his/her graph.

   1. “Here is your picture card to give you reminders about how you make your graph.”

   2. Help student self-graph only if he/she asks for your help. Make notes of assistance under “comments” section on checklist.

   3. Record the accuracy of student’s placement of the bar and use of stickers on the checklist.

G. Prompt student to discuss progress on NWF.

   1. “Tell me about how you did today and whether you got your goal.”

   2. Record accuracy of description.
Further Explanations (when necessary)

A. Bar Graphs: “There are some different kinds of graphs. You and I will be using what’s called a bar graph. A bar graph is a graph that shows scores by using different sizes of bars. We can use a bar graph to know how good your reading scores are each time you take the reading test.”

B. Score: “A score is how many points you get on something. For example, in basketball each time you throw the ball through the hoop, you get a point. All of the points during the game together are the score for that game. For the reading tests, each time you answer a question right, you get a point. All of the points during the test together are the score for the test.”

C. Goal: “A goal is something you plan to do. For example, during recess you may decide you want to play on the swings and the slide, so that is your goal. If you do play on the swings and the slide, you will meet your goal. If you do something else during recess, you will not meet your goal. For reading, your goal is to get a score of 25 or more. So, if you get a score of 25 or more, you will meet your goal. If you get a score less than 25, you will not meet your goal.”

D. High Numbers: “We are looking for week eleven. So, look for a one and one.” “It is week twenty. So, look for a two and a zero.”
Appendix C: Script checklists for self-graphing.

Student’s Name:_____________________ Tutor’s Name:_____________________

Date:_______ Time Began:______ Time Ended:______ Total Time:______

Script Checklist for Introduction of Self-Graphing

☐ Inform student of change in testing procedures (initial session only).
☐ Define graph (picture showing information).
☐ Discuss x-axis (test number).
☐ Discuss y-axis (scores).
☐ Model how to read a bar chart.
☐ Use prompting to have the student practice finding the test number.
   ______ Correct ______ Incorrect
☐ Use prompting to have the student practice reading his/her score.
   ______ Correct ______ Incorrect
☐ Discuss beating your last score.
   ______ Correct ______ Incorrect
☐ Discuss “big goal” (black goal-line).
☐ Discuss how you will use the graphs (share procedures for self-graphing).

_______ = Percentage of steps completed (Total/ 10 or 9)

Comments:
Student’s Name:______________  Tutor’s Name:___________  Date: ______

Time Began:______  Time Ended:______  Total Time:______

Script Checklist for Assisted Self-Graphing of PSF

☐ Review past scores on the PSF graph.
☐ Administer PSF.
☐ Discuss and place the new PSF bar on the graph.
☐ Allow student to color in his/her PSF bar.
☐ Discuss progress in PSF according to the goals.
       _____ Correct       _____ Incorrect
☐ If student reaches the goal, allow him/her to put a sticker on the bar
☐ Offer positive reinforcement/ encouragement about PSF skills.

_______ = Percentage of steps completed (Total/ 6-7)

Comments:

Time Began:______  Time Ended:______  Total Time:______

Script Checklist for Independent Self-Graphing of NWF

☐ Does student want to graph NWF?
       ____ Yes  ____ No
☐ Does student want to graph NWF by his/herself?
       ____ Yes  ____ No
☐ If yes, ask student to review past scores on the NWF graph.
       _____ Very Accurate  _____ Somewhat Accurate  _____ Not Accurate
☐ Administer NWF.
☐ Tell student his/her score.
☐ Give student his/her graph, colored pencils, stickers, and picture cues.
☐ Prompt student to fill in his/her graph.
       Location on x-axis (test #) is…
           _____ Very Accurate  _____ Somewhat Accurate  _____ Not Accurate
       Location on y-axis (actual score/ top of bar) is…
           _____ Very Accurate  _____ Somewhat Accurate  _____ Not Accurate
       Use of sticker is…
           _____ Very Accurate  _____ Somewhat Accurate  _____ Not Accurate
☐ Prompt student to discuss progress in NWF according to the goals.
           _____ Very Accurate  _____ Somewhat Accurate  _____ Not Accurate

_______ = Percentage of steps completed (Total/ 8)

Comments (may continue on back):
Appendix D: Social validity questionnaires.

**Tutor Graphing Questionnaire**

Please rate the following statements from 1 (strongly disagree) to 5 (strongly agree). Consider whether or not the statements are true for the majority of your students. Circle your response.

1. I enjoyed doing the self-graphing intervention with my students:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

2. My students understood how to use the graphs:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

3. My students enjoyed using the graphs:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

4. My students are generally more interested in reading activities now than before using the graphs:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

5. My students’ early literacy skills have improved since we began the intervention:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

6. My students seem more motivated to learn as a result of using the graphs:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

7. My students pay attention during the assessments better as a result of the graphs:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

8. I would consider using the self-graphing intervention again in the future:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

9. This intervention was easy to implement:
   1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

10. This intervention takes little time to carry out with each student:
    1 (strongly disagree)… 2 (disagree)… 3 (no opinion)… 4 (agree)… 5 (strongly agree)

Comments:
Child Self-Graphing Questionnaire

Please read the questions to the student and have him/her answer these questions with “a lot” (smiley faces), “some” (neutral face), or “no” (frowning face). They can circle the corresponding face. Directions for students: “I’m going to ask you some questions about the graphs you make of your reading test scores with ________ (tutor’s name). If your answer to the question is ‘a lot’, circle the three smiling faces (point). If your answer is ‘some’, circle the plain face (point). If your answer is ‘no’, circle the frowning face (point). Do you have any questions?”

1. Did you like looking at your graphs of scores?

2. Do you understand what the bars on the graphs are for?

3. Do you like the reading tests now more than before you made graphs with your tutor?

4. Do you think using the graphs has helped you become a better reader?

5. Would you like to use more graphs at school?

6. Do you have any other thoughts about the graphs? (Please record their responses the best you can, you may use the back of the page.)
Syllables Script

1. Introduction to Clapping Names Syllables Game
   a. Tell the children that: “Today we are going to play a game where we will clap the syllables in each person’s name.”
   b. Demonstrate by clapping the syllables in your name and have the children practice your name. “My name is Amy. My name has 2 syllables. Listen A-me (clap the syllables as you say them). Let’s all try clapping my name ready? A-me. (clap) How many syllables did we clap (signal to answer together)? Great Job!”
   c. Go around the circle and have the group clap each child’s name. The first time around the circle, you clap first and then have the group of children repeat you.
   d. “Now we are going to all work together to find out how many syllables are in each of your names. Let’s start with Tanya. I’ll clap it first and then you clap it with me. Tan-ya (clap the syllables as you say it). Now let’s all do it together Tan-ya (clap with the children). How many syllables does her name have?”
   e. Go around the circle again and ask each child to clap their own name, and then ask the group how many syllables were in the child’s name. If they appear to need more support you clap the name first and have them repeat you.

2. Making Corrections
   a. When the children make a mistake with a given name. Be sure to correct their mistakes by
      i. Demonstrating the correct way to do it. “Watch me do it. Tan-ya.” (clap)
      ii. Having the children practice. “Now you try.”
      iii. Providing Corrective feedback. “Great Job!” OR “That’s not quite right watch me again” (go back through i – ii)

3. Each lesson, change the theme of the words you will use to clap syllables.
   a. Possible theme ideas:
      i. Animals
      ii. Colors
      iii. Jobs
      iv. Fruits
      v. Vegetables
      vi. Months
      vii. Sports
      viii. Emotions
      ix. Family members
Letter Naming Script

1. Introduction to letter names.
   a. Tell the children they will be learning about letter names.
      i. “Today we will be learning the names of some letters. Each time we meet we will learn the name of a new letter in the alphabet. In this game, there are two small boxes, each with a letter in it. The first box is the way we write the capital form of the new letter. The second box is the way we write the lowercase form of the new letter.”
   b. Practice new letter names with group.
      i. “This is the letter M. What letter everyone?”
         1. if correct say, “Good.”
         2. if incorrect say, “Let’s try it again. This is the letter M. What letter?”
      ii. “This letter is m. What letter everyone?”
         1. if correct say, “Good.”
         2. if incorrect say, “Let’s try it again. This is the letter m. What letter?”
   c. Practice new letter names individually.
      i. Use same script as above, but call on each group member individually.

2. Letter naming activity.
   a. Use the Game Sheet from KPALS. Refer to the script above to introduce the new letter located in the box. Go across the page asking the group to name each letter. Make sure each member of the group names the letter correctly. If the group gets the letter name incorrect, tell them the correct name of the letter. Then ask them to repeat the correct letter name. Finally, go back to the beginning of the line and start again. Move on to the next line only when the group names every letter correctly.
   b. Now go across the page asking each group member individually to name each letter. Make sure each member of the group names the letter correctly. If the student gets the letter name incorrect, tell them the correct name of the letter. Then ask them to repeat the correct letter name. Finally, go back to the beginning of the line and start again. Move on to the next letter only when the student names the letter correctly.

   a. This review is used when there are no new letters introduced on the Game Sheet. Say, “Let’s see if you can remember all of these letter names. Remember, when I touch a letter you say its name.”
   b. Place your finger under the first letter and say: “Everybody, what is the name of this letter?”
      i. if correct, say “Good.”
ii. if incorrect, say “This is the letter ____. What is the name of this letter (point to the letter)?”

c. After the group says all the sounds correctly say, “Now I will call on you one at a time to say the names of some letters.”

d. In random order, ask individual students to say three to five names. Follow the script above for asking each child and making corrections. If two or more mistakes occur, make corrections and repeat all the names with the group again, then return to individual practice.

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**Rhyming Script**

1. Introduction to rhyming
   a. Tell the children they will be learning about rhyming words.
      i. “Rhyming words are different words that end with the same sound.”
         1. “Man and pan end with the sound, -an. Listen: m- an, p- an. Let’s say the rhyming words together: man, pan. Good!!!”
         2. “Fish and dish end with the same sound, -ish. Listen: F- ish and d-ish. Let’s say the rhyming words together: fish, dish.”
         3. “Man and fish end with different sounds. Listen: m- an, f- ish. Do man and fish rhyme (as you shake your head ‘no’)? No, good!!!”
   b. Practice rhyming.
      i. Ask them “what words rhyme (ends in the same sound) with ran?”
         1. if they give a correct answer, praise them, “good job.”

2. Rhyming activity with pictures.
   a. There will be six sets of pictures paired together in a box. Tell the children the name of the objects and ask if they rhyme. (“This is a can and this is a man. Does ‘can’ rhyme with ‘man’?”)
   b. If the students’ answer is correct, praise them and have them repeat the words. (“Good. ‘Can’ does rhyme with ‘man’. Let’s say the rhyming words together: ‘can’, ‘man’.”)
   c. If the students’ answer is not correct, point out the ending sounds of the words and emphasize the sounds as you speak. (“Let’s look at our words again, ‘c-an’ and ‘m-an’. ‘Can’ ends in ‘an’ and ‘man’ end in ‘an’.”) Tell the child to try again. (“So, does ‘can’ rhyme with ‘man’?”) Praise the correct response.
   i. Do this activity as a group then randomly pick individuals students and ask them about randomly chosen pictures.
**Initial Sounds Script**

1. Introduction to initial sounds.
2. Tell the children they will be learning about first sounds.
   a. “Today we will be learning about first sounds. First sounds are the first sounds that you hear in a word. The first sound in dog is /d/. Listen…. /d/og. Now let’s try a word together. I will say a word and you tell me the first sound you hear. /fff/ish. What is the first sound in fish?”
      i. if correct, say “Good. /fff/ is the first sound in fish.”
      ii. if incorrect, say “/fff/ is the first sound in fish. Let’s try it again. What is the first sound in fish?”
3. Practice initial sounds.
   a. “What are some other words that begin with the first sound /fff/?”
      i. Praise the group if they correctly name other words beginning with the sound. (“Good. Feather also begins with /fff/.”)
      ii. Correct the group if they name words that begin with other letters. (“Dog begins with /d/. Feather is another word that begins with /fff/.”)
4. Initial sounds activity with pictures
   a. Introduce the rules.
      i. “For this activity, I will say the name of the picture and ask, ‘What is the first sound?’ Then everyone will answer together. The first word is /fff/ an. What’s the first sound everyone?”
         1. if correct, say “Good. /fff/ is the first sound in fan.”
         2. if incorrect, say “/fff/ is the first sound in fan. Let’s try it again. What is the first sound in fan?”
   b. Use the game sheet from KPALS. Point to the first picture on the game sheet in the initial sounds section, and ask the group what the first sound of the picture is. (Refer to the above script.) Go across the page. Say each word and ask the group to identify the first sound. Make sure each member of the group says the sound correctly. If someone gets the first sound incorrect, tell him or her the correct first sound. Then ask them to repeat the correct first sound. Finally, go back to the beginning of the line and start again. Move on to the next line only when the group says the first sound of each word correctly.
   c. Now go across the page, say each word, and ask an individual to identify the first sound. Make sure each member gets a turn at identifying the first sound of a word. If someone gets the first sound incorrect, tell him or her the correct first sound. Then ask them to repeat the correct first sound. Finally, go back to the beginning of the line and start again. Move on to the next line only when the group says the first sound of each word correctly.
Letter-Sounds

1. Introduction to letter-sounds
   a. The new letter sounds will be the same as the new letter identified that day in the “new sound” box above the list.
   b. If there is no new sound, begin the lesson with cumulative Letter-Sound Review.
   c. Tell the children they will be learning about letter-sounds.
      i. “Now we are going to be learning about letter-sounds. You already know that each letter of the alphabet has its own name. Each letter also stands for a sound, so every letter has both a name and a sound. We have already learned the name of this letter (point to the letter) now we are going to practice saying the sound of letter.”

2. Practice letter-sounds
   a. Point to new sound and say, “This is the letter m it’s name is m and its sound is mmmmmmmmm.”
   b. Point to the letter and say, “Everyone, what sound?”
      i. If correct say, “Good”
      ii. If incorrect say, “Let’s try it again. The letter m makes the sound mmmmmmmmm. What sound?”
   c. Go through each letter as a group and ask, “What sound?”
   d. Next, randomly point to the letters and ask each child “what sound?” the specific letter makes. Ask the children at random to identify about three or four letter sounds.
      i. If correct say, “Good” and move on to the next child.
      ii. If incorrect, say, “Let’s try it again. The letter ___ makes the sound _____. What sound?” Once the child answers correctly move on the next child.
      iii. Correct and repeat as necessary.

3. Cumulative Letter-Sound Review
   a. “Let’s see if you can remember all these sounds. Remember, when I touch a letter you say its sound, and keep saying its sound as long as I touch it.”
   b. Place your finger under the first sound and say: “Everybody, what sound does this letter make?”
      i. If correct say, “Good” and go on to the next letter, repeating with each letter.
      ii. If incorrect say, “the letter ___, makes the sound ______. What sound?”
   c. Remember to point to continuous sounds for about two seconds, but lift up to stop sounds quickly.
   d. After the group says all the sounds correctly say “Now I will call on you one at a time to say the names of some sounds.”
e. In random order, ask individual students to say three to five sounds. Follow the script above for asking each child and making corrections. If two or more mistakes occur, make corrections and repeat all the sounds with the group again, then return to individual practice.

**Story Reading Script**

1. Look at the cover of the book together and point out…
   a. The title of the book.
   b. The author of the book (tell them what this person does).
   c. The illustrator (tell them what this person does.)
   d. Make a positive comment to generate excitement about reading the book.

2. Read the book
   a. Point to where you begin to read. On the first page point as you read the words. Throughout the book occasionally point to the words as you read (as much as is natural). Point out the words on at least 3 pages.
   b. Read with expression and excitement.
      i. Vary the loudness, softness and pitch of your voice.
      ii. Vary your pacing by reading both fast and slow, as appropriate.
      iii. Express emotions in the story, such as happiness, sadness, fear, and others, through the use of your voice, your facial expressions, and your body actions.
      iv. Involve the children in reading the book.
      v. Point out the letter(s) you worked on during group on at least 3 pages. See if the children can name the letter.

3. Story Discussion:
   a. Ask the children if they liked the book, if they had a favorite part, and if their predictions were correct.
   b. Involve the children in retelling the story.
      ii. Ask if someone can tell you what happened first, next, etc. As they tell it, repeat them and put in any phrases they say into complete sentences.
      iii. Repeat the entire summary.

4. Reinforcement
   a. Compliment the children on their listening, asking/answering of questions, sharing of opinions, and expressing feelings. When possible, give specific examples of behaviors.
Appendix F: Sample Supplemental Activity Script

Guess Who
Skill: Initial Sounds
Materials needed: None
Adapted From: Adams, Foorman, Lundberg, & Beeler, 1998

1. Explain the rules to the student. “Today we are going to practice the beginning sounds in our names. I am going to say a beginning sound in someone’s name and then I want you to tell me all together whose name begins with that sound.”

2. Say the first sound in the child’s name, repeating or sustaining the phoneme. “Whose name begins with the sound /ssssss – ssssss – sssss/?”

3. Have the children guess the name.
   Correction Procedure. Tell, repeat, and ask. For example, “Listen to the name /fff/ Frank. Say it with me /fff/ Frank. Does Frank begin with /ssss/?

4. After the name is correctly guessed, have all of the children say the 1st sound in the name as a group, and then call on individual children to say the sound by themselves.

5. Repeat the steps with different names.

*You may also complete this activity with categories such as:
- Animals
- Colors
- Toys
- Pet/Family Names
- Sports
- Foods
- Cartoons
Appendix G: Checklist for Tutoring Script (Lessons 1-15)

Place a check mark in the box next to each component implemented correctly. Write n/a if there was no opportunity to implement the component (i.e. no reason for error correction)

**MATERIALS**

☐ Tutor has all materials: Lesson sheet, mastery monitoring form, and storybook

**ACTIVITY 1: Syllables**

☐ Models procedures for students

☐ Asks group to clap syllables in the demonstration word

☐ Has each student select a word and the group clap syllables

☐ Asks students how many syllables

☐ Has each student clap a self-selected word individually

☐ Asks group how many syllables

☐ Uses error correction (tell, ask, start again)

**ACTIVITY 2: Letter Naming**

☐ Introduces new letter according to script (if there is a new letter to introduce)

☐ Asks group to name the letter

☐ Asks each student individually to say letter

☐ Completes “Cumulative Letter Review” according to script

☐ Asks group to say letter name

☐ Asks each student individually to say letter name

☐ Uses error correction (tell, ask, start again)

**ACTIVITY 3: Rhyming**

☐ Provides models according to script

☐ Has students practice rhyming according to script

☐ Labels pictures for students

☐ Asks students as a group if pictures rhyme
☐ Gives each student an opportunity to respond individually
☐ Uses error correction (tell, ask, start again)

**ACTIVITY 4 : Initial Sounds**

☐ Provides models according to script
☐ Has students practice identifying words that begin with target sound according to script
☐ Has group identify initial sounds for pictured items
☐ Gives each student an opportunity to respond individually
☐ Uses error correction (tell, ask, start again)

**ACTIVITY 5: Letter-Sounds**

☐ Introduces new letter-sound according to script (if there is a new letter-sound to introduce)
☐ Asks group to say the sound
☐ Gives each student an opportunity to respond individually
☐ Completes “Cumulative Letter-Sound Review” according to script
☐ Asks group to say sounds
☐ Gives each student an opportunity to respond individually
☐ Uses error correction (tell, ask, start again)

**ACTIVITY 6: Story Reading**

☐ Shows students important features of the book (author, title, etc.)
☐ Reads book to students
☐ Points out words on at least 3 pages
☐ Points out target letter on at least 3 pages
☐ Gives students an opportunity to talk about book
☐ Has students summarize