The Pennsylvania State University
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USING FREQUENCY BUILDING TO A PERFORMANCE CRITERION WITH EARLY LITERACY SKILLS TO AFFECT ORAL READING FLUENCY WITH AT-RISK READERS IN FIRST GRADE

A Dissertation in
Special Education

by
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ABSTRACT

The current study used a multiple baseline, multiple probe single-case design to determine the effects of using Frequency Building to Performance Criterion (FBPC) with early reading skills (i.e., letter-sound correspondence, blending sounds into words, and repeated reading) on oral reading fluency. Teachers identified five first grade students at-risk for reading failure to participate in the research. The five students were identified by being in the lowest placement within the reading curriculum. Four students were provided with FBPC three to five times a week for a total of 30 sessions. After each session students were given novel decodable reading passages and timed for one minute. In addition, students were given weekly curriculum-based measures (CBM) grade-level reading probes. Overall, students demonstrated an increase in oral reading fluency, as measured by one minute passage reading, after the introduction of FBPC with early reading skills, demonstrating an experimental effect for teaching early reading skills to oral reading fluency. Students on average increased words read correctly per minute by 62-108% and decreased words read incorrectly per minute by 40-66% from baseline measures. Additionally, students decreased error congratulation and made modest gains with correct accel data. Implications for practice and future research are discussed.
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Chapter 1

Introduction

Instructing students to read begins as soon as children start their schooling because future academic success is dependent on students’ ability to effectively read. Students who struggle to read are at a greater disadvantage in school when compared to their peers (Carnine & Carnine, 2004; Rasinski et al., 2005; Slavin, Lake, Davis, & Madden, 2011). A higher risk for dropping out of secondary schooling is evident for primary grade students who fall behind in reading (Chambers et al., 2011). Almost two-thirds of fourth and eighth grade students struggle to read proficiently at their grade level (National Center for Educational Statistics, 2013). With the lack of reading skills comes the inability to access information from text that may result in students performing lower in other subject areas (i.e., math, science, history; Rasinski et al.; Slavin et al.). Students’ ability to become fluent readers is one of the main issues contributing to reading failure (National Reading Panel, 2000; Rasinski et al.).

At-risk readers usually lack basic literacy skills (e.g., phonological awareness, alphabetic principle, phonics) needed to become fluent readers (Hagans & Good, 2013). Basic literacy skills are essential for early reading progression and become the foundation for acquiring phonic skills needed for effective reading (Lane & Mercer, 1999). Research has established that students in secondary school who struggle with reading have a basic lack of phonological processes to decode words which, subsequently, effects fluency (Archer, Gleason, & Vachon, 2003; Bhat, Griffin, & Sindelar, 2003; MacDonald & Cornwall, 1995). Detection of limited early literacy skills in secondary school children who are at-risk does reading failure is important because it indicates that students who do not master critical early reading skills in the primary grades may receive little to no instruction and/or practice with early literacy skills as they
progress through school (Bhat et al.; MacDonald & Cornwall). Targeting mastery of early literacy skills is essential for students’ academic success.

Fluency with decoding skills serves as a foundation for early reading success. Decades of research have established that the most effective way to instruct students on early reading skills is to use a systematic and explicit approach with phonics (Carnine, Silbert, Kame’enui, & Tarver, 2009; Foorman & Torgesen, 2001; Hudson, Lane, & Pullen, 2005; Rupley, Blair, & Nichols, 2009). The instruction is centered on early reading skills that enable students to accurately identify letter-sounds, blend letter-sounds into words, and segment words into individual sounds (Stahl & Yaden, 2004). Unfortunately, fluency with early reading skills is not emphasized throughout the primary grades and is only concentrated on when students are reading connected text (Connor, Alberto, Compton, & O’Connor, 2014; National Reading Panel, 2000). The disconnect between fluency, phonemic awareness, and early reading skills is negatively related to later reading ability (Bhat et al., 2003; Connor et al.).

At-risk students acquire basic literacy skills, but do not effectively practice these skills; therefore, these students experience challenges associated with increasing their reading fluency. Students need to master early literacy skills to effectively progress from lower level reading skills to more complex reading skills (e.g., reading connected text); yet, at-risk students do not master lower level reading skills because they lack a major component of mastery, fluency (Binder, 2003; Kubina & Morrison, 2000).

Behavioral Fluency

Behavioral fluency research has provided empirically validated practices to increase academic performance for students receiving general and special education (Datchuk, Kubina, & Mason, 2015; Johnson & Street, 2013; McTiernan, Holloway, Healy, & Hogan, 2015; Ramey et
Fluency within the reading literature is defined by the accuracy, speed, and prosody of a student reading connected text (Kuhn, Schwanenflugel, & Meisinger, 2010; Martens, Werder, Hier, & Koening, 2013, National Reading Panel, 2000). Behavioral fluency considers accuracy and speed when defining reading fluency; however, reading fluency is also defined by certain critical outcomes associated with being a fluent reader (Binder, 1996; Kubina & Yurich, 2012; Lindsley, 1991). For example, fluent readers can retain their relative rate of reading without having engaged in the behavior for long periods of time, known as retention. In addition, fluent readers have endurance, or can engage in reading behaviors for long periods of time (e.g., 10, 20, 30 minutes) with little impact on their rate of reading (Moeller, 2012). Another outcome of being a fluent reader is the ability to apply reading ability to novel passages and/or more complex reading passages. Application refers to a beginning skill reaching a certain rate or frequency that is applied to a more complex skill (Binder; Johnson & Layng, 1992; Kubina & Yurich).

Within reading, application is demonstrated when students reach high frequencies with beginning reading skills (e.g., letter sound correspondences and blending sounds into words) and make rapid progress with complex reading skills (e.g., reading site words and connected text). Conversely, students who display low frequencies of beginning skills struggle with more complex skills (Bucklin, Dickinson, & Brethower, 2000; Haughton, 1972). During the beginning stages of reading being able to apply lower level or what is termed “element” skills to more complex or “compound” skills is critical to future reading achievement (Kubina & Yurich, 2012). While those students who are at-risk for reading failure may accurately identify their letter-sounds and blend sounds into words, they lack the speed needed to effectively apply element skills to reading connected text.
To effectively apply element skills to compound skills, students need to exhibit high frequencies of the element behaviors (Binder, 1993, 1996; Johnson & Layng, 1996; Johnson & Street, 2013). For instance, Kubina and colleagues (2009) established a direct relation between the element behaviors of decoding skills and oral reading fluency. By increasing the frequency using element skills (i.e., orally reading letter-sound and blending letter-sounds into words) students increased frequency of the compound skill (i.e., orally reading connected text) (Kubina, Commons, & Heckard, 2009). Students need to practice effectively and efficiently to increase their frequencies of early reading skills.

**Frequency Building to a Performance Criterion**

Mastering academic skills is one goal of formal education. Moving students from acquiring academic skills to mastering academic skills requires fluency (Kubina & Yurich, 2012). Within typical reading instruction students acquire element reading behaviors (e.g., letter-sounds, blending sounds into words, segmenting words into sounds) during the beginning stages of reading (Carnine et al., 2009). Once element reading behaviors are developed students practice the skills using a structured practice approach (i.e., Frequency Building to a Performance Criterion). Student’s frequencies of responding increase, becoming fluent with element reading behaviors. Fluent element reading behaviors can then be applied to compound reading behaviors.

Frequency Building to a Performance Criterion (FBPC) consists of students responding to specific stimuli quickly and accurately, over multiple timed trials, to increase their rate of responding to an identified criterion. Another key feature of FBPC is the use of performance/corrective feedback after each trial is completed (Kubina & Yurich, 2012). FBPC employs Skinner’s (1938) precise measurement of behavior, count per unit of time, also referred
to as behavior frequency (Binder, 2010). The behavior being targeted is raised to a specific frequency (performance criterion) that is based on local or national norms (Datchuk et al., 2015; Kubina & Yurich).

FBPC is a practice procedure that is not constrained by instructional/teacher-imposed limits on the number of responses students’ exhibit during a definite time period (Binder, 2010). During FBPC students respond in a free operant condition, where stimuli are presented all at once and students respond at their pace (Smyth & Keenan, 2002). The free operant condition increases students’ opportunities to respond, building their frequencies of behavior. The explicit, systematic approach using FBPC with element reading skills can increase the likelihood that students at-risk for reading failure will struggle less with reading fluency as they progress through school.

**Present Study**

The present study is a systematic replication of using frequency building to a performance criterion (FBPC) with first grade students who are at-risk for reading failure. Moeller and Kubina (under review) implemented FBPC with three first grade students who were struggling readers during the previous school year. The structured practice approach targets basic element reading skills that students have acquired, but lack fluency. Effects of increasing frequencies of students’ element reading skills are assessed by measuring students’ ability to orally read connected text. In addition, weekly growth rates of words read correctly per minute are compared to national norms.

During the previous study using FBPC with basic element reading skills to affect oral reading fluency with at-risk first graders demonstrated increases in words read correctly per minute and weekly growth rates (Moeller & Kubina, 2015). National norms demonstrate that
students increase words read correctly per minute by two words per week during first grade (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993); however, first grade students in the bottom 10\textsuperscript{th} percentile increase .6 words read correctly per week (Hasbrouck & Tindal, 2006). Students in the previous research displayed a weekly growth of words read correctly by .9 to 2.4 during 16 sessions, 2 – 3 sessions weekly. The present study explored the effects of a more intense FBPC intervention for 30 sessions, 4 – 5 sessions weekly.

The present applied experiment asked four specific experimental questions for the first graders studied: (1) Does using FBPC with element reading skills increase student’s rate of correct responding with those skills? (2) Do students taught via FBPC apply fluent element reading skills to reading novel passages that are decodable? (3) Do students taught via FBPC increase their oral reading fluency during weekly Curriculum-Based Measurement (CBM)? And (4) Are weekly growth rates for words read correctly by students taught via FBPC greater than national norms of similar achieving first grade students?
Chapter 2

Method

Students

Five first grade students were recruited from a small rural school in Central Pennsylvania. Four first grade teachers identified each student that was in the lowest level of the reading curriculum as being in the bottom of the class with orally reading connected text. Students’ oral reading fluency was assessed using a grade-level reading passage to determine what percentile their current level or oral reading fluency is compared to national norms. Table 1 provides details of the students and their percentile ranking with oral reading fluency at the start of the study. Fred, Holly, Corey, and Lacy received the intervention while Brad served as the comparison student.

Setting

Students worked with the experimenter one-on-one in an empty classroom provided by the school. All the materials were printed on 8.5” x 11” white paper and placed in front of the student. A tablet was placed in front of the student to record all sessions. The experimenter sat adjacent to the student at the table to record all performance during the sessions.

Dependent Measures

The dependent variable consisted of students orally reading connected text. The measure was decodable reading passages from Reading Mastery I Rainbow Edition (Engelmann & Bruner, 1995). The decodable passages consist of regular words that can be sounded out and which the students encountered during the intervention. No irregular or compound words were incorporated into the decodable reading passages, thus providing students with a direct measure of applying decoding skills to reading connected text. Each decodable reading passage developed
had more than 100 words to ensure students did not finish reading the passage before time expired. Orally reading the passages was timed for one minute after each session.

**Curriculum-Based Measure (CBM)**

A weekly CBM taken from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) 6th Edition (Good, Kaminski, & Dill, 2007) was given to the students. First grade passages from the DIBELS Oral Reading Fluency Progress Monitoring were used. The DIBELS passages are considered a valid and reliable measure of student’s oral reading fluency achievement (Goffreda & DiPerna, 2010; Good, Kaminski, & Dill, 2002). DIBELS passages are standardized and calibrated to each grade level and are good indicators of students’ reading ability at their grade level (Good et al.).

**Independent variables**

Three independent variables comprised the intervention package, orally reading letter sounds, orally blending words and then saying the word fast (i.e., sounding out words), and repeated reading. Students worked with the experimenter one-on-one, 4 - 5 days a week for a total of 30 practice sessions throughout the experiment.

**Letter-sound FBPC.** At the beginning of each session students were given a 32 letter-sound sheet using the most common 32 letter-sounds (Carnine et al., 2010; Engelmann & Bruner, 1995). Ten different letter-sound sheets were developed for each time students reached their aim. Each letter-sound sheet consists of different sequences of the 32 letter-sounds to control for serial order effects. Students practiced letter-sound FBPC for three trials each session lasting 20 seconds a trial.

**Sounding out words FBPC.** During each FBPC session, students were given a list of CVC, CCVC, and CVCC words. The experimenter developed 15 lists of 12 words for students
to blend together and then say the word fast. Each list consists of different words. The words contain letters found in the letter-sound FBPC intervention. Sounding out words FBPC was practiced for three trials lasting 20 seconds a trial for each practice session.

**Repeated reading.** A reading passage was taken from Reading Mastery Level 1 Rainbow Edition (Engelmann & Bruner, 1995) that corresponded to passages they encountered during their decodable passage reading for the dependent variable. The words included letters and words practiced in the two previous conditions (i.e., letter sound FBPC and sounding out words FBPC). The passage consisted of over 100 words to ensure that students did not finish reading the passage before time expires. Students orally read the passage during the practice sessions for three 20-second trials.

**Experimental Design and Analysis**

A multiple baseline, multiple probe design (Gast, 2010; Horner & Baer, 1978) was used. The multiple baseline, multiple probe design enables measurement of “irreversible behavior.” In other words, behavior students learn would likely be maintained for long periods of time. The multiple baseline, multiple probe design demonstrates an effect by introducing the independent variable at different points in time for each student (Kazdin, 2011). Students’ behavior changes in conjunction with application of the independent variable. The systematic results minimize other explanations for behavior change. The multiple probe design does not require consistently repeated measurement during baseline, making it less likely that testing effects confound baseline data (Gast).

**Visual and quantitative analysis.** All data were displayed and analyzed using visual analysis and the quantitative functions of the daily Standard Celeration Chart (SCC). The daily SCC is a ratio chart where the horizontal axis corresponds to days of the week with equal
intervals between days and the vertical axis shows frequency count per minute of behavior using a ratio scale (Kubina & Yurich, 2012). The SCC shows relative change of behavior (acceleration and deceleration) and provides a balanced visual representation of student learning. Quantitative analysis was conducted within and between conditions.

**Within Condition Analysis.** Within condition analysis used four separate metrics: celeration value, level (found with geometric mean), Level Index, and Improvement Index. Celeration values were calculated for correct and incorrect responding during baseline and intervention conditions. The celeration metric represents rate of change during a condition; a multiplication sign (x) characterizes growth and a division sign (÷) indicates decay in learning (Kubina & Yurich, 2012). Level for baseline and for intervention conditions was calculated using the geometric mean of each condition. Level is the average response rate of behavior in a condition. The geometric mean has advantages over the arithmetic mean. Namely, extreme values in skewed data have a smaller effect on the geometric mean and it is the preferred measure for ratio data (Clark-Carter, 2005).

The Level Index indicates the degree to which an individual responds correctly vs. incorrectly for concurrent levels in a condition. The distance between two levels (i.e., correct and incorrect) within a condition is calculated and states how many more or less times a person emits a correct response vs. an incorrect response. The Level Index indicates accuracy of student response. The Improvement Index is used to analyze data within a condition between concurrent celerations (e.g., correct and incorrect performances). The numerical value of the Improvement Index states the degree of progress (Pennypacker, Koenig & Lindsley, 1972; Kubina & Yurich, 2012). Progress takes the form of improvement, worsening, or no change (i.e., maintenance) within a condition. For instance, a celeration value of ÷1.2 for incorrect responses and x2 for
correct responses yields an Index value of x2.4. The x2.4 means progress has improved 2.4 times, or 140 percent betterment in the condition.

**Between Condition Analysis.** Four metrics were used to analyze change in performance from baseline to intervention; the celeration multiplier, level change, Level Index change, and Improvement Index change (Kubina, Kostewicz, & Al-Shammari, 2016). The celeration multiplier quantitatively compares the celeration value for correct or incorrect performance in one condition with the celeration value for correct or incorrect performance in another condition (Kubina & Yurich, 2012; Pennypacker, Guiterrez, & Lindsley, 2003). The celeration multiplier offers quantification of changing speed of responding from one condition to another. Level change is the ratio distance between the two geometric means. As an example, a baseline level at 5 and an intervention level at 10 will show up as a x2 distance on the chart (i.e., same distance as 1 to 2 or 100 to 200). The x2.0 value represents a doubling in value or a 100% difference from the first to second data point. The Level Index change and Improvement Index change are calculated by taking the Index value for baseline and multiplying it by the Index value from the intervention condition. The Level Index change is the change of an individual’s responding (i.e., improve, worsen, maintain) correctly vs. incorrectly on average from one condition to the next. The Improvement Index change is the overall calculation of progress change from baseline through intervention.

Visual analysis was conducted by inspecting the celeration and level change of data between conditions (Horner et al., 2005; Kratochwill & Levin, 2010; Kratochwill et al., 2012). The celeration of data is the direction (e.g., ascending, descending) of the trend for correct and incorrect responding within each condition and visually inspected to determine if the direction of the celeration (i.e., trend) changes between conditions and is in the desired direction. The level
(average) of each condition was graphed and visually inspected to determine the level change between adjacent conditions. The distance between the level line in each condition was examined to determine the degree of change in level and if the level change was in the desired direction.

**Weekly growth rate.** At the conclusion of the study each student’s weekly growth rates for words read correctly was calculated. The median of the last three CBM data from the intervention condition was subtracted from the median of CBM data from baseline and then divided by the number of weeks of intervention to calculate the students’ weekly growth rate. For example, if a student read 20 words correct per minute in intervention and 4 words correct per minute during baseline and the intervention lasted 8 weeks; $20 - 4 / 8 = 2.0$ weekly increase with words read correctly per minute. The weekly growth rate was compared to national norms to determine if a student’s weekly growth rate was greater, lower, or equivalent to what is typically demonstrated by similar first grade students. Projected growth rates were calculated using the monthly celerations from the CBM data in order to estimate the relative growth over a 16-week (half a school year) time frame.

**Procedures**

A total of 45 decodable passages were developed to measure oral reading fluency. Each passage was assigned a number and then a random number generator was used to randomly select the sequence in which students received the passages. To control for ascending passage difficulty (i.e., later stories are more complex than earlier stories in the sequence), passages were assigned randomly. Students were given one decodable passage at the end of the session and instructed to put their finger under the first word in the passage. They were asked to read as good and as fast as they can; if they spent more than 3 seconds on a word they were told the
word and that word was counted as incorrect. Words read correctly and incorrectly were counted for each of the timings. Words orally read independently correct were counted as correct. Omissions, mispronunciations, or words told to the student were counted as incorrect. Corrective feedback was not given to students. All sessions were video recorded with the permission of student’s parents/guardians.

FBPC Sessions. The multiple baseline, multiple probe design dictated that each student start FBPC sessions in a staggered format. Once the first student started the FBPC session the next student did not start the practice sessions until at least one week after, depending on the celeration and stability of baseline. During each FBPC session the student was given a letter-sound sheet with four rows of eight letter sounds for the letter-sound FBPC trials.

Students were instructed to read each letter-sound as fast as possible beginning from the top left corner and reading from left to right. Students were timed for 20 seconds for three separate trials. Corrective feedback was given after each trial for any incorrect letter-sounds using a model, prompt, and check procedure. During corrective feedback the experimenter modeled the correct letter-sound, prompted the student to say the letter-sound with the experimenter, and checked the student by having the student say the letter-sound independently. Correct and incorrect responses were calculated for each of the trials and the first trial was recorded on the SCC. The sequence of letter-sounds remained the same for each session until the student reached a performance criterion range of 33 – 40 letter-sounds correct with no more than one error in 20 seconds, which was different than previous research (Moeller & Kubina, 2015) that randomized the letter-sounds after each session. Once students reached performance criterion then a new sequence of letter-sounds was presented during the following session.
FBPC sessions were conducted three to five times a week for eight weeks, culminating in 30 sessions per student.

After three letter-sound FBPC trials students started sounding out words FBPC. Students were given a list of words and then taught to sound out the word and then say the word fast. Students worked independently with the experimenter on the task. Students were instructed to start at the top left of the sheet and sound out each word and then say the word fast from left to right. Students were timed for 20 seconds for three separate trials. After each trial the experimenter gave corrective feedback using a model, prompt, check procedure. When a student incorrectly said a letter sound or word the experimenter modeled blending the word and then saying the word fast, and then prompted the student to blend the word and say the word fast with the experimenter. The experimenter checked students learning by having students do the task independently. Corrects were calculated by adding all letter-sounds and words said correctly. For example, when a student had the word ‘sun’ a correct was given for saying each letter-sound /s/ /u/ /n/ and for saying the word ‘sun’ which is 3 letter-sounds + 1 word = 4 correct. Incorrect responding was calculated by adding any letter-sounds or words said incorrectly. The first trial of each practice session was recorded on the SCC. The list of words remained the same during each session until the student reached the performance criterion of 28 – 35 correct blends with no more than one error per 20 seconds, differing from previous research that changed the sequence of words after each trial (Moeller & Kubina, 2015).

The last frequency building intervention consisted of repeated reading. Each student was given the same reading passage for each session. Students were instructed to begin at the top left of the page and begin reading from left to right as well and as fast as they could. Students were timed for 20 seconds for three trials. After each trial, corrective feedback was given on any
incorrect words using a model, prompt, check procedure. The experimenter modeled orally reading the word, prompted students to orally read the word with the experimenter, and then checked to ensure students orally read the word independently. Correct and incorrect responding was calculated for each trial and the first trial of each practice session was recorded on the SCC. The same passage was used throughout the sessions until students met the performance criterion of 66 – 80 words read correctly with no more than one error per 20 seconds. Once students reached that criterion a new reading passage was given during the following session.

After the first session, the experimenter graphed the students’ performance on an SCC for each of the FBPC activities. An aim line was drawn to the performance criterion for each of the FBPC activities. Students were told that after each session their data point should be at or above the aim line. The experimenter throughout the study charted the students’ performance with the student to show them how they were doing compared to their aim line. When a performance criterion was met a condition change line was drawn and a new aim line was drawn with the next data point.

Accuracy

To calculate accuracy of the dependent measure the experimenter examined each video to determine the extent to which observed scores corresponded to the true value (Johnston & Pennypacker, 2010). The true value was the recorded video sessions and the scores derived from the videos. If the observed score was different from the true value then it was recorded as inaccurate. The percent of instances the experimenter was accurate with observed scores was 99.3%.

Procedural Integrity
Procedural integrity is the degree to which the intervention package is implemented as intended (Plavnick, Ferreri, & Maupin, 2010). An independent rater scored procedural integrity on 35% of the videos by using a checklist developed by the experimenter to ensure that implementation of all procedures was done correctly. The checklist consisted of the steps for implementing FBPC and corrective feedback procedures (Appendix E). The rater checked each step on the checklist when the experimenter exhibited the behavior in the video. The number of check marks was divided by the total number of steps available to check and multiplied by 100. Procedural integrity was calculated to be 99%.

Social Validity

At the end of the study the experimenter had the four teachers and students complete a social validity scale. Two main aspects were assessed to determine social validity, the acceptability of procedures used and the acceptability of results (Wolf, 1978). Wolf (1978) also stated that the social significance of the goals should be assessed. It was determined that prior to beginning the experiment that increasing students reading ability was socially significant. A 5-point Likert scale was used that required teachers were asked to rate statement from 1 to 5 where 1 = “I completely disagree with the statement” to 5 = “I completely agree with the statement”. Additional comments were asked and recorded on the sheet. The students were read the statements by the experimenter and then asked to circle one of the three face icons, a sad face, a neutral face, or a happy face, giving students a 3-point scale. Students were asked if there was anything that they really enjoyed about the FBPC intervention and if there was anything that they really did not enjoy.
Chapter 3

Results

Results are reported for the within condition analysis and the between condition analysis for the dependent measure. The within condition analysis includes the celerations, improvement index, level, and level index for each condition. The between condition analysis reports the changes between baseline and the FBPC condition with the celeration multiplier, improvement index change, and the level index change. Weekly curriculum-based measurements for grade-level text are reported. The CBM data includes celerations during the FBPC condition, words read correctly and incorrectly per minute during the 8-week intervention as well as a 16-week projection, and the average weekly growth. Figure 1 displays the data for decodable passages and the illustration of celeration lines and level change in the data. Figure 2 shows the weekly CBM data with the illustration of celeration lines.

Within Condition Analysis

Table 2 displays the within condition analyses for baseline and FBPC conditions. Celerations are reported for each student for correct and incorrect responding during each condition as well as their Improvement Index for each condition. Levels of correct and incorrect responding are given as the average using the geometric mean for each condition. Level Index is reported as the degree to which the student responded correctly versus incorrectly during a condition.

Celerations and Improvement Index. Celerations during baseline for Fred showed a slight deceleration with correct responding, ÷1.01 [7 days], and a 19% weekly acceleration for incorrect responding, x1.19 [7 days]. His responding resulted in an overall Improvement Index of ÷1.20 [7 days], or a 17% worsening of orally reading connected text. Holly had similar reading results during baseline with correct responding decelerating ÷1.09 [19 days], and
accelerating errors, x1.13 [19 days]. The deceleration in correct responding and acceleration in
events resulted in a deteriorating Improvement Index of ÷1.23 [19 days], which is a 19%
worsening in orally reading connected text. Corey’s responding remained stable during baseline
for correct, x1.04 [26 days], and incorrect, x1.04 [26 days], responding. Corey’s identical
celerations during baseline resulted in x1.0 Improvement Index or no change in progress when
orally reading connected text. Lacy was stable with correct responding during baseline with a
one percent weekly acceleration, x1.01 [33 days]. She decelerated her errors during baseline by
÷1.06 [33 days], which gave her an Improvement Index of x1.07 [33 days], a seven percent
improvement of progress with orally reading connected text.

During the FBPC condition all students increased their correct responding while
decreasing their incorrect responding. Fred had a nine percent weekly acceleration with correct
responding, a x1.09 [70 days], and a three percent weekly deceleration with incorrect
responding, a ÷1.03 [70 days]. His Improvement Index resulted in a 12% progress improvement
with orally reading connected text. Holly accelerated her weekly correct responding by seven
percent, x1.07 [58 days], and decelerated her weekly incorrect responding by seven percent,
÷1.08 [58 days], resulting in a 16% improvement change. Similarly, Corey’s correct responding
accelerated by 10% weekly, x1.10 [60 days], and incorrect responding decelerated by six percent
weekly, ÷1.07 [60 days]. Corey had an Improvement Index of x1.18 [60 days], an 18% progress
betterment with orally reading connected text during FBPC. Lacy had the smallest celeration for
correct responding with a x1.06 [53 days] and a ÷1.04 [53 days] for incorrect responding,
resulting in a 10% improvement in progress for orally reading connected text.

The comparison student, Brad, did not receive intervention during the duration of the
experiment. Brad accelerated his correct responding for the dependent measure by x1.05 [82
days], a five percent weekly increase. He also accelerated his incorrect responding by $x1.04$ [82 days], a four percent weekly increase. Brad’s resulting Improvement Index during the study was a $x1.01$ [82 days], or a one percent improvement with orally reading connected text.

**Level and Level Index.** Average responding for correct words and incorrect words during each condition was calculated. During baseline Fred on average read 8 words correct per minute (wcpm) and 9 words incorrect per minute (wicpm). His level index was a $÷1.13$, or on average Fred orally read 1.13 times less wcpm than wicpm during baseline measures. Holly and Corey had similar levels during baseline with 14 and 10 wcpm, respectively. They both orally read on average 7 wicpm. Holly orally read two times more ($x2.00$) wcpm than wicpm and Corey orally read 1.43 times more wcpm than wicpm during baseline. Lacy on average orally read 25 wcpm and 6 wicpm, a $x4.17$ level index, resulting in her orally reading over 4 times more wcpm than wicpm.

Each student increased their average amount of words read correctly per minute and decreased their average of words read incorrectly per minute during the FBPC condition. Fred on average read 13 wcpm and 5 wicpm, a 2.60 level index resulting in Fred orally reading more than 2 and half times more wcpm than wicpm. Holly orally read 5.25 times more wcpm than wicpm with an average of 21 wcpm and 4 wicpm. Similarly, Corey orally read 4 and a half times more wcpm than wicpm with an average of 18 wcpm and 4 wicpm. Lacy had the highest level index with orally reading 26 times more wcpm than wicpm with an average of 52 wcpm and 2 wicpm.

**Between Condition Analysis**

Table 3 displays the results from the between condition analysis. The celeration multiplier and level change was calculated for correct and incorrect responding for each student.
The change in the Improvement Index and the Level Index from baseline condition to FBPC condition was also calculated.

**Celeration Multipliers and Improvement Index Change.** All students’ correct responding increased at an increasing rate from baseline to intervention. Each students’ incorrect responding decreased at an increasing rate from baseline to intervention. Free, Holly, and Corey exhibited “counterturns.” In other words, their incorrects accelerated during baseline and then turned in a counter direction (i.e., deceleration) during intervention. Lacey incorrects decelerated in baseline and the intervention condition.

Fred’s celeration multiplier for correct responding was a x1.10, a 10% weekly speed change (i.e., faster) in correct responding from baseline through intervention. He decreased errors by ÷1.23, a 19% weekly deceleration. Fred’s Improvement Index Change was a x1.34, a 34% improvement with orally reading connected text from baseline through intervention. Holly increased her celeration of correct responding from baseline to intervention by x1.17, a 17% weekly growth with an 18% (÷1.22) weekly error deceleration. Overall, Holly improved by 43% with an Improvement Index of x1.43. Corey had a slight speed change with correct responding from baseline to intervention with a x1.06 (6% weekly acceleration). Corey decelerated incorrect responding by 10% weekly (÷1.11). Corey’s Improvement Index Change demonstrated an 18% progress improvement, a x1.18. Lacy had the smallest amount of speed change for correct responding according to her celeration multiplier, x1.05, a 5% weekly acceleration. Also, Lacy increased the speed or incorrect responding from baseline to intervention by 2% weekly (x1.02). Lacy’s Improvement Index was stable from baseline to intervention with a 3% progress improvement.
**Level Change and Level Index Change.** The level change for each student increased for average wcpm and average wicpm from baseline to intervention. Students increased their average wcpm by 62 – 108% and decreased their wicpm by 40 – 66%. Holly and Fred increased their average wcpm by 62 and 63%, respectively. Corey and Lacy had larger gains with average wcpm resulting in an 80 and 108% increase, respectively. Both Holly and Corey decreased their wicpm by 40% while Fred decreased his average wicpm by 42%. Lacy saw a significant decrease in her average wicpm by 66% (−3.00).

In addition to levels changing for wcpm and wicpm, all students increased their Level Index from baseline to intervention as represented by the Level Index Change. Fred increased by x2.94; he orally read on average almost three times more wcpm than wicpm during intervention as compared to baseline. Holly increased orally reading by 2.63 times more wcpm than wicpm during intervention over baseline performance while Corey increased by x3.15, over three times more wcpm than wicpm during intervention compared to baseline. Lacy increased the most by x6.24, meaning that Lacy on average orally read over six times more wcpm than wicpm during the intervention condition when compared to her baseline performance.

**Curriculum-Based Measurement**

Students were assessed weekly on grade-level text to illustrate growth during intervention on curriculum-based measurements (CBM). Table 4 displays the celerations for correct and incorrect responding and the Improvement Index for the weekly CBM’s. During the FBPC intervention condition all students accelerated their correct responding while decelerating their incorrect responding. Students accelerated correct responding on CBM’s by 39 – 64% monthly increases as demonstrated by correct celerations. In addition, students decelerated incorrect responding by 18 – 28% monthly decreases. Students overall progress during the study
demonstrated a 70-117\% gain with orally reading grade-level text as indicated by student’s Improvement Index.

Brad, the comparison student, who did not receive intervention, showed similar gains with correct responding. He accelerated his correct responding on the CBM’s with a 34\% monthly increase; however, in contrast to the other students he also accelerated his incorrect responding with a 13\% monthly increase. The accelerations for both correct and incorrect responding resulted in an overall 19\% progress improvement for orally reading grade-level text.

**Growth Rates.** Weekly growth rates were calculated for the students for correct and incorrect responding over the 8-week intervention. Table 5 contains the growth rates for the 8-week intervention and projected growth rates for 16 weeks (half a school year). CBM celerations were used to project out the wcpm and wicpm students would have achieved after 16 weeks. On average students gained .88 - 4 wcpm per week during the 8-week intervention. The rate per week increased to 1.20 – 5.13 wcpm per week during 16 weeks if celerations remained stable for the additional 8 weeks. Student’s also decreased wicpm by .38 - .75 words per week during intervention. The 16-week projection indicated that student’s rates would continue to decrease by .25 - .44 wicpm per week.

Curriculum-based measures for Brad were taken over a 12-week period. Brad on average gained 1.25 wcpm per week during this time, indicating similar results to intervention students. However, Brad also increased his weekly rate of wicpm by .50 words per week. Sixteen-week projections for Brad indicated an average gain with wcpm at 1.56 words per week, with a stable .50 wicpm increase per week.

**Social Validity**
The teachers and students had favorable comments concerning the FBPC intervention procedures. The teachers had a mean rating of 4.5 for acceptability of the procedures used. One teacher stated, “I like how quick the intervention was, it seemed like the students did not waste time or get bored.” Most of the teachers stated the students increased their oral reading fluency because of the FBPC intervention with a mean rating of 3.75. A teacher commented, “I can really tell that my student is getting better at reading, he is participating more in class and is willing to read aloud.” Students reported that the procedures were beneficial rating FBPC intervention 2.75 out of a possible high of 3. They all reported that they were getting better with their reading because of FBPC by rating the acceptability of the results at a 3. Most students reported that they really enjoyed monitoring their progress with the SCC. One student stated, “My favorite thing was looking at my graphs every day and seeing if I was above the [aim] line.”
Chapter Four

Discussion

Fluently reading connected text is directly related to better academic outcomes for students throughout their schooling (Chamber et al., 2011; National Reading Panel, 2000; Slavin et al., 2011). The National Reading Panel (2000) recommends practicing to fluency when students have the ability to read connected text. In addition, research has focused on the early skills students need to become fluent readers (Archer et al., 2003; Bhat et al., 2003; MacDonald & Cornwall, 1995). However, at-risk readers fail to apply early reading skills to becoming fluent readers because they lack fluent decoding skills (Speece & Ritchey, 2005). While reading fluency and the importance of early reading skills has been highlighted throughout the research, a discrepancy exists with studies demonstrating how to build fluency with early reading skills.

The current study examined whether increasing student’s frequencies with basic element reading skills would increase the rate at which the students orally read connected text. Specifically, the applied experiment assessed whether FBPC accelerated the frequency of correct responding and decelerated the frequency of incorrect responding with basic element reading skills and the subsequent effects on orally reading connected text. Overall results indicate that using FBPC for 30 sessions with early reading skills positively, and systematically, increased students’ ability to orally read connected text.

Intervention Effects

To determine if an intervention effect occurs using a multiple baseline design across students there are four main factors to consider; (1) stable or descending celerations during baseline performance, (2) immediacy of effects after the introduction of the independent variable, (3) the level (mean) change from baseline to intervention conditions, and (4) a change in slope (celeration) from baseline to intervention (Kazdin, 2011). For a student’s baseline to be
considered stable the Improvement Index must have been below a x1.10 before the intervention was introduced. An Improvement Index below x1.10 indicates little to no change in progress with learning (Kubina & Yurich, 2012). During baseline performance with the dependent variable, Fred and Holly continually declined in their performance of orally reading connected text demonstrated by visual (Figure 1) and quantitative analysis (Table 2). Corey had no change in progress during baseline and Lacy’s Improvement Index was less than x1.10 (x1.07). All students showed minimal improvement despite attending their typical reading classes.

During their typical reading classes, Fred, Holly, and Corey received extra instruction weekly by a retired teacher. The students worked one-on-one with the retired teacher reading sight words using a phonics-based reading curriculum that focused on phonological skills and word structure. Despite the extra weekly help the students were not progressing with their reading, as indicated by their baseline performance. In addition, the study took place five months after the school year had started. The students had already received over half a school year of instruction with little improvement.

Following introduction of the FBPC package, visual analysis shows all students had immediate performance improvements indicated by elevated frequencies with words read correctly per minute. For example, Lacy immediately increased her frequencies of corrects by a substantial 148%, while other students increased by 13, 27, and 58%. Similarly, all students immediately decreased the number of words read incorrectly per minute when the FBPC was introduced. The amount of immediate change with decreasing errors ranged from 22-67%. The movement of decreasing errors was the biggest difference from the previous study conducted (Moeller & Kubina, 2015). The effect on errors may be in part due to using the same sequence of letter-sounds and the same words during blending until they reached their aim. It ultimately
gave the students more words to blend correctly over time compared to previous research that changed the letter-sound sequence and words blended after each session (Moeller & Kubina, 2015). The effect that FBPC had on orally reading connected text was immediate for all students, demonstrating the combined influence of building fluency with three element behaviors (i.e., letter sounds, sounding out words, and repeated reading) had on reading decodable passages. As noted “The more rapid (or immediate) the effect, the more convincing the inference that change in the outcome measure was due to manipulation of the independent variable” (Kratochwill et. al., 2012, p. 31).

Intervention effects were also demonstrated by the change in celeration (i.e., speed) from baseline to intervention. All students changed the direction of their celerations for words read correctly and incorrectly during the decodable passage readings with a 5-17% weekly growth in learning and a 10-19% weekly decrease with errors as reported in Table 3 and seen in Figure 1. The change of celeration demonstrates that FBPC with early reading skills changed the trajectory of orally reading connected text. The celeration multiplier (slope change) precisely demonstrates the behavior change from baseline to intervention through direct implementation of the independent variable (Datchuk & Kubina, 2011; Kratochwill et al., 2012). However, the changes in slope for corrects were not dramatic for all students. The FBPC package concentrated on element literacy skills and not directly on oral reading fluency, so each student had varying slope changes dependent on their amount of fluency with the element literacy skills and their ability to apply those skills to orally reading connected text. Slope change from baseline to intervention is only one factor related to overall student progress.

The final indicator of an intervention effect was the visual analysis (Figure 1) and quantitative analysis (Table 4) of the level (mean) change from baseline to intervention. The
level change during decodable passage reading was substantial with students reading, on average, between 66-108% more words correctly. Similarly, all students decreased level of words read incorrectly per minute from baseline to intervention by 40-66%. Change in level from baseline to intervention was consistent for all students contributing to the analysis of intervention effects. Immediacy of effect, celeration changes from baseline to intervention, and robust level changes give a clear demonstration of intervention effects (Kazdin, 2011).

Another indicator of the FBPC effect was the comparison student, Brad. Brad was similar to the other students and was at the same reading level. Because of the similarities between Brad and other students, he was considered a representation of what typically happens to similar students without receiving the FBPC intervention package. During the same amount of time, Brad had the slowest celeration for correct responding with the dependent variable (x1.05), a 5% weekly increase for correct responding. Brad increased his incorrect responding over the study period, which is the biggest difference between Brad and other students. Brad made no meaningful gains with orally reading connected text even though he received classroom instruction.

Use of FBPC to increase frequencies with early literacy skills and application of those skills to oral reading fluency demonstrates that practitioners can use FBPC with their students after the acquisition of early reading skills. The current study highlights that students’ lack of progression in reading may be due to a lack of practicing skills needed to become better readers. Using FBPC procedures, teachers can readily identify deficiencies of behavioral fluency with early reading skills and attenuate those deficiencies. The current study also demonstrated that when using the SCC the quantification of learning is easily obtained. Teachers using the SCC
with the FBPC procedures can quantify their student’s learning, making decision making about student progress quickly and accurately.

Grade-Level Reading Passages

To assess implications that using FBPC would have on grade-level text, a weekly CBM was given to each student. CBM’s are a valid and reliable measure of student’s overall oral reading fluency achievement (Goffreda & DiPerna, 2010; Hasbrouck & Tindal, 2006). Also, weekly CBM’s of oral reading fluency are a reliable indicator of student’s grade-level reading competence (Fuchs, Fuchs, Hosp, & Jenkins, 2001). All students increased their words read correctly per minute and decreased their words read incorrectly per minute during the intervention condition. Brad, the comparison student, also increased the amount of words read correctly per minute over the study period.

Within the reading literature student’s words correct per minute are tracked as an indicator of oral reading fluency, with words incorrect only used as an accuracy measure (Fuchs et al., 2001; Hasbrouck & Tindal, 2006). Tracking and graphing only words correct per minute indicates that Brad was getting better with his oral reading fluency; however, as seen visually in Figure 2 and quantitatively in Table 4, Brad was increasing with his words incorrect per minute as well, making his gains in oral reading fluency less substantive. Brad’s minimal gains with the CBM’s as indicated by his Improvement Index further demonstrate that maturity and the present classroom instruction did not account for considerable gains made by all students who received FBPC.

Efficiency of FBPC

Before the study began, students were reading between the 10th and 25th percentile (Hasbrouck & Tindal, 2006) with oral reading fluency for their grade level. According to the
norms developed by Hasbrouck and Tindal (2006) students in the first grade during the second half of the school year (16 weeks) who are between the 10th and 25th percentile gain between 0.6 and 1 word correct per week with typical reading instruction. Students during the 8-week intervention gained between .88 and 4 words correct per week on grade-level CBM probes. To compare normal growth rate of first grade students within these percentiles the CBM celerations were used to project out where students would have been if they were receiving 16 weeks of FBPC. Sixteen-week projections indicated that students would have increased their words correct per minute between 1.2 to 5.13 words per week, far greater than the 0.6 to 1 word correct increase per week.

In addition to having greater increases in words read correctly per week, each student moved up in percentile ranking with orally reading grade-level connected text based on the 16-week projections. Fred, Holly, and Corey moved from the 10th percentile to between the 25th and 50th percentile for first grade reading fluency. Lacy moved from the 25th percentile to above the 75th percentile based on the 16 week projections. During the 8-week intervention each student received a total of 90 minutes of practice, 3 minutes per session for 30 sessions. On average students gained 1 word correct and decreased 0.5 words incorrect for every 8 minutes of practice (FBPC), indicating that oral reading fluency improved with small amounts of highly structured practice.

**Frequency Building and Behavioral Fluency**

The current study replicates and extends existing research within the behavioral fluency literature that using FBPC with early reading skills increases element behavior fluency and is applied to compound behaviors in reading (Cavallini & Perini, 2009; Cavallini, Berardo, & Perini, 2010; Hughes, Beverley, & Whitehead, 2007; Kubina et al., 2009; Moeller & Kubina,
By increasing rate of correct responding with early reading skills the students readily applied those skills to reading connected text, a critical outcome of behavioral fluency (Binder, 1993, 1996, 2005; Johnson & Layng, 1996; Johnson & Street, 2013). Another aspect of the current study is the incorporation of tracking and attenuating incorrect responding to increase student’s oral reading fluency.

One feature of the current study that differentiates it from previous studies within the reading literature is tracking and graphing both words correct and incorrect per minute. By tracking and graphing both distinct behaviors a more reliable and valid picture is represented (Calkin, 2005; Kubina & Yurich, 2012) showing the overall effects that FBPC with early reading skills has on oral reading fluency. This is illustrated with Brad’s data as display in Figures 1 and 2. By tracking and graphing both correct and incorrect responding we get a clear picture that his overall performance is not changing. By only tracking and graphing his correct data a practitioner or researcher might conclude that Brad was improving over time. According to existing research, multiple characteristics of the independent variable contributed to an increase with orally reading connected text.

Research demonstrates that increasing student’s opportunities to respond they increase their learning (Haydon, Mancil, & Van Loan, 2009; Stichter et al., 2008). Each student responded multiple times within a free operant condition during each component of the independent variable. By increasing student’s opportunities to respond they increased active engaged time with the task. The increase in student’s active engaged time is a strong predictor of their achievement (Gettinger & Walter, 2012). Students reached their aim with letter-sound fluency between 1 and 5 times during the intervention (Figures 3-6). They reached their aim with blending letter-sounds into words 3 to 11 times (Figures 7-10). Reaching their aims assisted
them in moving more quickly through each successive letter-sound and blending tasks. The increase in frequencies with the element reading skills made it easier for students to apply those element reading skills to orally reading connected text.

Another characteristic of the independent variable that contributed to the effectiveness of FBPC was the immediate corrective feedback given after each trial. Immediate corrective feedback during multiple trials increases fluency and learning (Carnine et al., 2009; Miller, Hall, & Heward, 1995). FBPC goes beyond typical practice that is implemented within schools by utilizing immediate corrective feedback after each trial. Typical practice in schools is done independently at home or school and feedback, if given, is done at a later time with little explanation. FBPC increased rate of correct responding and decreased rate of incorrect responding for at-risk readers with every task targeted. The increase in the frequencies of the element reading behaviors was applied to the compound reading behavior of orally reading connected text.

Students who are at-risk for reading failure practiced their basic skills to high frequencies enabling them to transfer basic skills to reading decodable passages and grade level passages more efficiently. The lack of fluency with basic reading skills contributed to a lack of reading progress within their regular education classroom, which put them at-risk for continued academic struggles. Through short timed practice students can make considerable gains with reading achievement. While the reading literature is clear that early literacy skills are imperative to subsequent reading achievement (Chard & Dickson, 1999; Connor et al., 2014; Lane & Mercer, 1999), fluency with these skills has not been emphasized. By combining evidence from the reading literature on how students learn to read and evidence from the behavioral fluency literature on how students increase learning, FBPC is a viable option for teachers to implement.
Implementing FBPC took a minimal amount of time with easily accessible resources. The current study indicates that if teachers include FBPC procedures within their classrooms their students can attain higher levels of oral reading fluency.

Throughout the study a few limitations need to be addressed. First, the experimenter had no control over reading instruction in the general education classroom, so the instruction students received at the time of intervention may have confounded results. However, the lack of progress from the comparison student provides support that instructional confounds did not occur; however, such confounds cannot be ruled out. Second, direct experimental effects cannot be concluded with the CBM grade-level data. Only one student had the required number of baseline data points to demonstrate any experimental effects; however, students did increase their oral reading fluency with the CBM’s that coincided with intervention implementation.

Future research should incorporate FBPC into existing evidence-based reading programs (e.g., Direct Instruction) and with existing tiered programs for struggling readers (e.g., Response to Intervention). In addition, future research should investigate if similar results can be obtained when teachers incorporate FBPC within their reading instruction time. Future research should also include measures of reading comprehension to investigate the impact that FBPC may have on all reading achievement. Students receiving highly structured practice can acquire fluency in skills they need to succeed in schools.

The current study and previous research (Moeller & Kubina, 2015) have demonstrated that using FBPC with early literacy skills improves oral reading fluency. Incorporating FBPC into current reading practices is essential for all students to become better readers, especially during the beginning stages of reading. Behavioral fluency with early literacy skills should be emphasized within our classrooms and schools in order for student to truly obtain the fluency
that they need to become the best readers and students possible. Without fluency of basic skills that students need to succeed then the trend of struggling readers will continue.
References


Appendix A

Tables

Table 1. Student Characteristics

<table>
<thead>
<tr>
<th>Student</th>
<th>Grade</th>
<th>Age</th>
<th>Gender</th>
<th>Winter Grade-Level WCPM</th>
<th>Percentile Ranking for Reading Fluency*</th>
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<tbody>
<tr>
<td>Fred</td>
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<td>Male</td>
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<td>10-25</td>
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<td>10</td>
<td>10-25</td>
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</table>

* Taken from Hasbrouck and Tindal (2006).

Table 2. Within Condition Analysis

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<th>Students</th>
<th>Baseline</th>
<th>FBPC</th>
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<tr>
<td></td>
<td>Celeration</td>
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<tr>
<td>Fred</td>
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<td>Corey</td>
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<td>1.04</td>
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<td>Lacy</td>
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<td>1.06</td>
</tr>
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<td>1.04</td>
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</table>

*Level was calculated by the geometric mean; I.I. = Improvement Index; L.I. = Level Index
### Table 3. Between Condition Analysis

<table>
<thead>
<tr>
<th>Students</th>
<th>Celeration Multiplier</th>
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<th>L.I. Change</th>
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<td>Correct</td>
<td>Incorrect</td>
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<td>x1.11</td>
<td>x1.80</td>
<td>x1.75</td>
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### Table 4. Curriculum-Based Measurement

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<th>Students</th>
<th>Celerations (FBPC)</th>
<th>I.I.</th>
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<td>x1.39</td>
</tr>
<tr>
<td>Lacy</td>
<td>x1.64</td>
<td>x1.33</td>
</tr>
<tr>
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<td>x1.34</td>
<td>x1.13</td>
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Table 5. Curriculum-Based Measurement Growth Rates

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<th>Students</th>
<th>Baseline CBM</th>
<th>Growth Rate (8 Weeks)</th>
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<tr>
<td></td>
<td>Correct</td>
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<td>WCPM Rate/Week Increase</td>
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<tr>
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*Brad’s growth rate was determined by 12 weeks of CBM data; **Increase instead of a decrease for WICPM; WCPM = Words Correct Per Minute; WICPM = Words Incorrect Per Minute
Appendix B

Figures

Figure 1. Decodable Passage Reading. The SCC graph on the left displays the experimental data with celeration lines for correct and incorrect responding. The SCC graph on the right displays the geometric means during baseline and intervention for correct and incorrect responding.
Figure 2. CBM Grade-Level Passage Reading. SCC Weekly Chart
Figure 3. Fred’s See/Say Reads
Letter-Sounds
Figure 4. Holly’s See/Say Reads
Letter-Sounds

Letter-Sounds #2
Letter-Sounds #3

See-Say reads letter-sounds
COUNTED

Holly
PERFORMER
AGE
21 2 2016
20 3 2016
17 4 2016
15 5 2016
12 6 2016
10 7 2016

SUCCESSIVE
CALENDAR
WEEKS

COUNT PER MINUTE
SUCCESSIVE CALENDAR DAYS

Rick
ADVISOR
Penn State University
ORGANIZATION

Jeremy
MANAGER
SUPERVISOR
COUNTER
CHARTER

Jeremy
DIVISION
ROOM
TIMER

Jeremy
Jeremy
Jeremy
Figure 5. Corey’s See/Say Reads Letter-Sounds
Figure 6. Lacy’s See/Say Reads
Letter-Sounds
Figure 7. Fred’s See/Say Sounds
Out/Say Fast CVC, CCVC, CVCC Words
Figure 8. Holly’s See/Say Sounds
Out/Say Fast CVC, CCVC, CVCC
Words
Figure 9. Corey’s See/Say Sounds Out/Say Fast CVC, CCVC, CVCC Words
Figure 10. Lacy’s See/Say Sounds
Out/Say Fast CVC, CCVC, CVCC
Words
Figure 11. Fred’s See/Say Reads
Connected Text Repeated Reading
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![Graph showing Holly’s See/Say Reads Connected Text Repeated Reading](image)

Figure 12. Holly’s See/Say Reads Connected Text Repeated Reading
Figure 13. Corey’s See/Say Reads
Connected Text Repeated Reading
Figure 14. Lacy’s See/Say Reads
Connected Text Repeated Reading
Appendix C

Review of the Relevant Literature

Reading fluency literature reviews usually concentrate on direct interventions to increase oral reading fluency (e.g., Chard, Vaughn, & Tyler, 2002; Therrien, 2004). The current review differs by concentrating on fluency with element behavior literacy skills (e.g., letter-sound correspondences, segmenting and blending sounds into words) and the subsequent impact on compound behavior literacy skills (e.g., sight word reading and reading connected text). The present review is guided by two aims. First, the review seeks to explore and critically examine the current body of literature on the independent variable of using frequency building to performance criteria (FBPC) with literacy skills. Second, the review will determine if using FBPC with element behavior literacy skills affects more complex compound behavior literacy skills.

In order to address the previously stated aims, the present review investigates the concept of application in the context of behavioral fluency of literacy skills. Specifically, there are two research questions: (1) Does using FBPC with element behavior literacy skills affect complex compound literacy skills (application), and (2) what similarities and differences were there with the type of feedback used, performance criteria established, and the intensity of the FBPC intervention throughout the literature?

Behavioral Fluency

As a term, fluency occurs often in the reading literature. One specific framework of fluency is called behavioral fluency. Behavioral fluency is functionally defined as the blending of accuracy and speed (Binder, 1993, 1996; Johnson & Layng, 1996). Behavioral fluency facilitates an individual functioning within their environment effectively and efficiently (Binder,
1996). More specifically, within the context of reading behavioral fluency refers to an individual performing a behavior with high accuracy or quality at a quick pace or speed (Kubina & Starlin, 2005).

One of the major developments of behavioral fluency came with the identification of several critical learning outcomes (Binder, 1996; Kubina & Yurich, 2012; Lindsley, 1991). When students reach a certain rate or frequency range of behavior, called a performance standard, certain critical learning outcomes are produced (Binder, 1996). The critical learning outcomes discovered were: (1) long-term retention or the ability to retain information for long periods of time after instruction has ended, (2) endurance or the lack of fatigue when performing a behavior over some time interval, and (3) application or extension of one skill to a compound behavior.

**Application.** One critical learning outcome with many implications for reading is application. Application refers to an element behavior reaching a certain rate or frequency and is applied to a compound behavior (Binder, 1996; Johnson & Layng, 1992; Kubina & Yurich, 2012). Application is seen when students reach high frequencies with element behaviors (e.g., letter sound correspondences and blending sounds into words) and make rapid progress with a compound behavior (e.g., reading site words). Conversely, students who display low frequencies of element behaviors struggle with more complex behaviors (Bucklin, Dickinson, & Brethower, 2000; Haughton, 1972). As an example, students with autism were taught specific fine motor skills (e.g., reach, pull, squeeze, grasp, release) as element behaviors for functional gross motor skills of putting on socks and t-shirts (Twarek, Cihon, & Eshleman, 2010). One student who could not complete any task-analyzed steps for putting on socks during baseline was able to complete 100% of task-analyzed steps after the frequencies for reach and grab fine motor skills
reached high frequencies. Building fluency with the element behaviors demonstrated application to a compound behavior (Twarek et al., 2010).

Performance standards (rate or frequency range of behavior) are set in order to determine when element behaviors will affect a compound behavior (Binder, 1993; 1996; Binder & Watkins, 2013; Johnson & Street, 2013). Rate or frequency of performance is the count of behavior in time (Kubina & Lin, 2008). In order for students to reach performance standards they need to increase or build their frequencies of behavior. FBPC is one way that students can achieve performance standards of behaviors (Kubina & Yurich, 2012). FBPC is a more specific method than “practice” which sometimes does not have a goal or performance feedback. Performance standards are set for a particular behavior and students systematically build their frequencies of the skill until they reach the performance standard; an indicator of behavioral fluency (Binder, 1993; 1996; Binder & Watkins, 2013; Johnson & Street, 2013). Building frequencies of behavior to a high enough degree would increase the likelihood that the student would become fluent and would be able to retain, endure, and apply the behavior (Binder, 1996; Johnson & Layng, 1992; Johnson & Street, 2013).

**Effects on Reading Connected Text**

Studies have compared the use of FBPC with element behavior literacy skills and the compound behavior of reading grade level connected text (oral reading fluency; Cavallini & Perini, 2009; Cavallini, Berardo, & Perini, 2010; Hudson, Isakson, Richman, Lane, & Arriaza-Allen, 2011; Hughes, Beverley, & Whitehead, 2007; Kubina, Commons, & Heckard, 2009). Overall, students using the FBPC intervention with element behavior literacy skills accelerated the rate at which they orally read connected text (Cavellini & Perini, 2009; Cavellin et al., 2010; Hughes et al., 2007; Kubina et al., 2009). For example, students using FBPC with seeing and
saying sight words increased the rate at which they were orally reading connected text as measured by syllables correct per minute (scpm; Cavellini & Perini, 2009; Cavellini et al., 2010) and number of targeted and non-targeted words read correctly and incorrectly (Hughes et al., 2007). During the frequency building intervention the students were able to meet the performance criteria of 80-110 words correct per minute (wcpm; Cavellini & Perini, 2009), 60-100 syllables correct per minute (scpm; Cavellini et al., 2010), and 80-120 wcpm (Hughes et al., 2007) on the literacy skill of seeing and saying sight words.

Students applied the skill of seeing and saying sight words to the more complex literacy skill of seeing and saying connected text as demonstrated by increasing the range of 17-60 scpm during baseline to 52-100 scpm after intervention (Cavellini & Perini, 2009; Cavellini et al., 2010). Five students were able to read targeted words in three reading passages with only one error as compared to two students who did not receive the FBPC who read 370 of the targeted words incorrectly during the three reading passages (Hughes et al., 2007). When non-targeted words were assessed in the three reading passages the students receiving the FBPC intervention had 15 times less errors than the two students who did not receive the FBPC intervention. The increase of seeing and saying connected text was achieved without any additional instruction (Cavellini & Perini, 2009; Cavellini et al., 2010; Hughes et al., 2007).

Others (Hudson et al., 2010; Kubina et al., 2009) used FBPC on two element literacy skills in order to affect the rate of reading connected text in students at-risk for reading problems. Decoding skills of seeing and saying letter sounds (100-120 letter sounds correct per minute; lscpm) and see-say blending words (80-100 wcpm) through the use of repeated measures analysis of variance (ANOVA) were measured (Kubina et al., 2009). Pre-post fluency means were calculated for each of the element literacy skills. Pretest fluency means and standard
deviations for letter sounds and blending words were 42.40 (15.80) and 58.38 (24.26), respectively. After the FBPC intervention letter sound fluency increased to 64.20 (24.98), with an effect size of .513. Blending words increased to 103.47 (42.86), with an effect size of .60 (Kubina et al., 2009). The average gain of 45 letter sounds translated to a 9-11 word increase. Pretest fluency mean and standard deviation for the compound skill of see-say connected text was 69.31 (32.29). At the end of the intervention see-say connected text was assessed again with a mean wcpm 86.15 (40.96), with an effect size of .401. An average gain of 17 words read correctly after intervention was demonstrated (Kubina et al., 2009).

Similarly, students baseline decoding skills of seeing and saying letter sounds (35-60 lscpm) and seeing and saying sight words (25-100 wcpm) were measured through the use of the phonemic decoding efficiency (PDE) subtest of the Test of Word Reading Efficiency (TOWRE; Torgesen, Wagner, & Rashotte, 1999) and a sheet of complex nonsense words. Pre-post test scores were compared to an accuracy-only group which demonstrated that the FBPC group scored 4.55 items higher on the TOWRE PDE ($d = .88$) and scored 3.76 items higher on the complex nonsense words ($d = .80$) (Hudson et al., 2011). However, no differences were found between the accuracy-only group and the FBPC group on decoding accuracy and on more complex compound skills of oral reading fluency and reading comprehension as measured by DIBELS ORF and the Reading Comprehension subtest of the WJ III (2006), respectively.

**Effects on Reading and Writing Sight Words**

Three studies examined using FBPC with element behavior literacy skills and subsequent effects on reading and writing sight words (Kubina, Young, & Kilwein, 2004; McDowell & Keenan, 2002; Smyth & Keenan, 2002). A multiple baseline across behaviors design was used to assess whether starting frequency building with the element skills of see-say letter sounds (60-
80 lscpm) and seeing and saying two letter syllable sounds (60-80 scpm) or starting frequency building with the compound skill of hearing, seeing, and pointing to isolated key words (40-50 wcpm) would produce faster results to reach fluency aims for each skill (McDowell & Keenan, 2002). Two students started frequency building with element behaviors and reached their aims on both element skills (12-24 teaching sessions) and the compound skill (0-3 teaching sessions) when compared to the student who began frequency building with the compound skill (28 teaching sessions). The student did not reach his fluency aim for the two element skills after reaching the fluency aim with his compound skill (McDowell & Keenan, 2002). Effects of using free versus controlled operant conditions on fluency with consonant-vowel (CV) blends, consonant-consonant (CC) blends (element skills) and the subsequent effect on fluency with words that contain consonant-vowel-consonant-consonant (CVCC) blends (compound skill) was assessed (Smyth & Kennan, 2002).

Three students were assigned to the free operant responding condition, where student responding to stimuli was not controlled, for the element skill of see-say CV blends with a fluency aim range of 80-100 wcpm, while the other two students were put in the controlled operant responding condition, where student responding to stimuli was contingent on hearing a beep, for the element skill of see-say CV blends with a paced aim range of 40-45 wcpm. Students in the free operant condition were instructed to read as fast as they could and the students under the controlled operant condition were instructed to read each blend only when they heard a beep. Data was collected and graphed on a Standard Celeration Chart (SCC) and celeration (acceleration or deceleration) lines were constructed and measured to display the rate of behavior over time. For example, each student reached their respective aim on CV blends with corrects celerating by x3 - x4 [4-12 sessions], or an increase by 200-300 percent weekly.
Students switched conditions for FBPC with element skill of CC blends, so students previously in the free operant condition were now under the controlled operant condition and vice versa (Smyth & Keenan, 2002). Each student reached their respective aim on CC blends with corrects celerating by x1.4 – x2.0 [5-12 sessions]. The compound skill of see-say CVCC blends was assessed with students ranging in 41-62 wcpm, which was an improvement from baseline scores of 10-28 wcpm on the same task. No students reached the fluency aim range of 80-100 wcpm (Smyth & Keenan, 2002). Each student was then brought to fluency aim range on element skills that were under the controlled operant condition, student’s corrects celerated by x1.3 – x4.0 [5-9 sessions]. The compound skill was again assessed with students ranging with 50-90 wcpm, which was x1.3 increase from the previous compound skill assessment (Smyth & Kennan, 2002). When both element skills were brought to fluency aim range, two out of the five students were able to reach fluency with the compound skill.

Similarly, Kubina and colleagues (2004) used FBPC with the element literacy skills of writing letter sounds (30 lscp) and orally segmenting words (20 wcpm). The subsequent compound skill of spelling real and nonsense words was assessed once per week during the intervention without any instruction. Overall, all students were able to reach their aim on element skills of writing letter sounds with an increase in corrects accelerating by x1.7 – x3.5 [1-3 weeks], with incorrects decelerating by ÷1.7 - ÷4.5 and orally segmenting words with an increase in corrects accelerating by x1.45 – x5.0 [1-3 weeks], with incorrects decelerating by ÷1.4 - ÷3.0 (Kubina et al., 2004). The subsequent effect that FBPC intervention had on writing real and nonsense words was all students were able to write all words with 100% accuracy by the end of the intervention without any type of instruction (Kubina et al., 2004).

**Frequency Building Components**
Frequency Building to a Performance Criterion has certain components that when
changed could result in effecting the outcome. Three main components were assessed
throughout the literature to ascertain the consistencies and differences within the independent
variable. The three components assessed included: (1) type of feedback used during frequency
building trials, (2) how the performance criteria was established for each of the element skills,
and (3) the intensity of using frequency building per week throughout the intervention.

**Type of Feedback.** Throughout the literature all of the studies included some type of
feedback for the students. Feedback was delivered in different forms; however, all of the studies
implemented immediate feedback performance after each of the timings. Most of the research
articles did not specify the precise feedback procedures used during the intervention (Hudson et
al., 2011; Kubina et al., 2004; Kubina et al., 2009; McDowell & Keenan, 2002; Smyth &
Keenan, 2002). For instance, after each of the timings of the FBPC intervention corrects and
incorrects were calculated and students received corrective feedback on their performance
(Kubina et al., 2004; McDowell & Keenan, 2002; Smyth & Keenan, 2002). Peer feedback was
used immediately following performance on corrects and incorrects (Kubina et al., 2004).
Hudson et al. (2011) used modeling and feedback after each performance.

Three of the studies reported on the specific type of feedback procedures that were
implemented during intervention (Cavallini & Perini; 2009; Cavallini et al., 2010; Hughes et al.,
2007). During performance of the frequency building intervention the scorer would write down
each word or syllable read incorrectly on flash cards. The students would then be instructed to
sound out each of the words or syllables said incorrectly with the teaching assistant (Cavallini &
Perini, 2009; Cavallini et al., 2010). Feedback on performance was given with error corrections
immediately following each trial. Errors were recorded by the teaching assistant and students
practiced decoding their errors several times orally for regular words and for irregular words they would spell and write the word on the board and read it aloud (Hughes et al., 2007). Regardless of the form of feedback given to students all of the FBPC interventions incorporated feedback for both correct and incorrect responding.

**Establish Performance Criteria.** There were two main ways that researchers established the performance criteria for a given skill: (1) through established fluency aims from prior research or (2) assessment of typical peers on the same skill. Most of the studies used prior research that already established fluency aims for a given skill (Cavallini & Perini, 2009; Cavallini et al., 2010; Hudson et al., 2011; Hughes et al., 2007; Kubina et al., 2004; Kubina et al., 2009). Using fluency criteria set by White (1985), Cavallini et al. (2010) and Cavallini and Perini (2009) established the performance criteria of wcpm at 80-110 and scpm at 150-200. Similarly, Kubina et al. (2009) established a performance criterion for letter sounds fluency at 100-120 lscpm from Freeman and Haughton (1993).

While using prior research that has established fluency criteria for certain skills there are other skills where no research has been conducted to establish fluency criteria. Therefore, letter sound writing performance criteria was set at 30 letters per minute after observing student’s frequency of letter writing (Kubina et al., 2009). Others established performance criteria through their own research experience. Hudson et al. (2011) set their letter sound performance criteria starting with 35 lscpm and moved the students up to a performance criterion of 60 lscpm. Only two of the studies did not give a rationale for how they established their performance criteria of skills assessed (McDowell & Keenan, 2002; Smyth & Keenan, 2002).

**Intensity of Frequency Building.** Throughout the literature the number of times FBPC was implemented per week was reported. FBPC was implemented between 2-4 times weekly for
each of the students. Three out of the eight studies reported that the FBPC intervention was implemented consistently two times a week (Cavallini & Perini, 2009; Cavallini et al., 2010; McDowell & Keenan, 2002). Two studies reported conducting the FBPC intervention between 2-3 times weekly (Hughes et al., 2007; Smyth & Keenan, 2002). The other three studies reported conducting the most FBPC interventions per week, usually between 2-4 (Hudson et al., 2011; Kubina et al., 2004); however, Kubina et al. (2009) consistently implemented the FBPC intervention four times per week. While the number of times per week FBPC was implemented was relatively consistent throughout the literature the duration of the studies varied.

**Element Reading Skills and the Effects on Compound Reading Skills**

Overall, results from the current literature indicate using FBPC with element behavior literacy skills improves fluency with compound behavior literacy skills (Cavallini & Perini, 2009; Cavallini et al., 2010; Hughes et al., 2007; Kubina et al., 2004; Kubina et al., 2009; McDowell & Keenan, 2002; Smyth & Keenan, 2002). Students who reached high frequencies of reading sight-words (80-120 wcpm) were able to effectively apply the sight-word reading skill to the more complex literacy skill of reading connected text (Cavellini & Perini, 2009; Cavellini et al., 2010; Hughes et al., 2007). Moreover, students receiving the intervention were able to demonstrate fewer errors while reading connected text compared to students who did not receive the intervention (Hughes et al., 2007). The increased accuracy is especially significant because no practice or feedback was given to students with reading connected text.

Increasing the frequencies of element behavior literacy skills demonstrated a decrease in the time it took students to reach performance standards or fluency aims with identifying sight-words (compound skill) when compared to students who did not increase their frequencies of element behavior literacy skills (McDowell & Kennan, 2002). Students who began frequency
building with element literacy skills (i.e., letter-sound correspondences and two-letter syllable sounds) were able to reach frequency aims for both element literacy skills and the compound literacy skills faster than the students who began frequency building with the compound literacy skill.

Furthermore, students who began frequency building with the compound literacy skill did not reach frequency aims for the element literacy skills (McDowell & Kennan, 2002). Students were able to attain fluency more rapidly when the element behaviors reached their frequency aims. In other words, frequency building with element skills in a sequential design appears to affect compound skills effectively and efficiently. In addition, educators using reading programs that sequence instruction will be able to incorporate frequency building activities with element behaviors at the time of acquisition (Binder & Watkins, 2013).

**Frequency Aims and Effects on Compound Behavior**

Frequency, or count per time, is the unit of measurement most widely used to establish behavioral fluency with reading (Berens, Boyce, Berens, Doney, & Kenzer, 2003). However, differences occur between frequency aims used within the behavioral fluency literature and those used within the reading literature. Hudson et al. (2011) compared students receiving FBPC with letter-sound correspondences and sight-words with students in an accuracy-only condition. After intervention, the FBPC group and accuracy-only group did not significantly differ on oral reading fluency probes. In contrast, Kubina et al. (2009) using the same element behavior literacy skills of letter-sound correspondences and sight words during the FBPC intervention demonstrated significant results on oral reading fluency.

One factor that was substantially different between the two studies was the established frequency aims for the element behaviors. Hudson et al. (2011) established their letter-sound
correspondence performance criteria from their past experience working with struggling students at 35-60 lscpm, while Kubina et al. (2009) established their criteria for the same behavior at 100-120 lscpm from prior research (i.e., Freeman & Haughton, 1993). Similarly, the performance criteria set for reading sight-words from Hudson et al. and Kubina et al. was 25-100 wcpm and 80-100 wcpm, respectively. The conflicted results found by Kubina et al. and Hudson et al. may be attributed to the FBPC component of establishing frequency aims, demonstrating a relationship between frequencies attained on element behavior literacy skills and their application to compound behavior literacy skills. Besides the previously mentioned differences found in established frequency aims, no other components of FBPC differed enough to effect outcomes suggesting frequency aims may contribute more to fluency than the intensity of FBPC or the type of feedback used.

Frequencies of behavior assist with determining fluent performance, however, specific definitions of fluent performance vary. For example, within the behavioral fluency literature, fluent performance is defined by critical learning outcomes such as retention, endurance, and application (Binder, 1996; Johnson & Lanyg, 1991; Lindsley, 1991). Conversely, fluent performance within the reading literature is usually defined by class averages or normed samples, so fluent performers would be students who display frequencies at or above the mean (Hasbrouck & Tindal, 2006; Hintze, Shapiro, Conte, & Basile, 1997). Therefore, the behavioral fluency literature based on individual learning outcomes contrasts with the broader field of reading literature that derive fluency based on normative data. Both sets of literature agree that frequencies of reading behavior are directly related to achieving fluency; however, the specific purposes of frequencies of reading behaviors have important differences. Namely, the difference
between having students achieve certain critical outcomes versus assessing whether students will likely learn to read.
References


## Sample Letter-Sound Sheet

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<td>n/a/p</td>
<td>h/a/n/d</td>
<td>n/u/t</td>
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The duck and the mean pig

A mother duck and her nine little ducks went for a walk. A big mean pig met them on the road. She told the mother duck, “I am a mean pig. I eat cans and I eat beans. I eat cars and I eat toys. I eat beds and I eat bugs.” The mother duck said, “I am not a can or a bean or a car or a toy. I am a duck. And I bite pigs that are mean.” So the pig ran. Then the mother duck and her nine little ducks went to the pond. The end
The cow on the road
Lots of men went in a little car. The men went down a road. A cow sat on the road.
The cow did not get up. So the men ran to the cow. The men said, “We will lift this cow.” The men did not lift the cow. “This cow is so fat we can not lift it.”
The cow said, “I am not so fat. I can lift me.” The cow went in the car. The men said, “Now we can not get in the car.” So the men sat on the road and the cow went home in the car.
The Ant Hill

Dad and I took a hike in the woods. We walked for a long time and stopped to take a rest. We sat down on a log and had a drink of water. A big hill was nearby.

Dad said, “Look, there’s an ant hill.”

I walked up to the hill and took a closer peek. At first it looked just like a dirt hill. Then I noticed a few ants running around. I looked closer. I saw little ants carrying pieces of mushroom. The pieces were almost as big as the ants.

“What are they doing, Dad?” I asked.

“They’re taking food inside the hill. They probably have thousands of ants to feed inside.” Dad said, “Watch this.” He gently poked a twig into a small hole on the hill. All of a sudden, many ants came out.

“The ants are on alert, trying to protect their hill,” he said.

I bent down to look closer. Some ants climbed on my shoes.

“We should leave now,” Dad said. Dad and I walked and walked until we were home. Now whenever I see one ant, I stop and think about the city of ants they might be feeding and protecting.
Procedural Integrity Checklist

1. Letter-Sound Procedures
   - Placed letter-sound sheet in front of student
   - Read directions
   - Said, “Get ready and begin”
   - Timed for 20 seconds
   - Conducted model, prompt, check feedback
   - Repeated procedures 2 more times
   - Graphed correct and incorrect with student

2. Blending Sounds/Saying Words Fast
   - Placed blending sheet in front of student
   - Read directions
   - Said, “Get ready and begin”
   - Timed for 20 seconds
   - Conducted model, prompt, check feedback
   - Repeated procedures 2 more times
   - Graphed correct and incorrect with student

3. Repeated Reading
   - Placed passage in front of student
   - Read directions
   - Said, “Get ready and begin”
   - Timed for 20 seconds
   - Conducted model, prompt, check feedback
   - Repeated procedures 2 more times
   - Graphed correct and incorrect with student

4. Decodable Passages (Daily)
   - Placed passage in front of student
   - Read directions
   - Said, “Get ready and begin”
   - Timed for 1 minute

5. CBM Probes (Weekly)
   - Placed passage in front of student
   - Read directions
   - Said, “Get ready and begin”
   - Timed for 1 minute
Social Validity Teacher Questionnaire

Directions: Please rate your agreement with the following statements about the FBPC intervention, with 1 = “completely disagree” and 5 = “completely agree.” Make any comments in the space provided about how you think the FBPC intervention went for your student.

1. The FBPC procedures used were appropriate for my students.
   
   1  2  3  4  5

2. The FBPC procedures used were age and grade level appropriate for my students.
   
   1  2  3  4  5

3. I believe I could implement the FBPC procedures in my classroom.
   
   1  2  3  4  5

4. I feel the FBPC help my students to increase their oral reading fluency.
   
   1  2  3  4  5

5. I feel that my students are better reader after receiving FBPC.
   
   1  2  3  4  5

Comments:  

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Social Validity Student Questionnaire

Directions: I will read a statement about the reading we have done together. I want you to circle either the frowny face if you disagree with the statement, circle the neutral face if you neither disagree or agree with the statement, and circle the smiley face if you agree with the statement.

1. I thought that the reading letter-sounds, blending, and repeated reading was fun.

   😞 😞 😊

2. I would like to continue to do the timed reading practice.

   😞 😞 😊

3. I feel that my reading has improved since doing the timed reading practice.

   😞 😞 😊

4. I feel that I am a more confident reader because of the timed reading practice.

   😞 😞 😊

5. Was there anything about the timed reading practice that you really enjoyed?

   ____________________________________________________________
   ____________________________________________________________

6. Was there anything about the timed reading practice that you did not enjoy?

   ____________________________________________________________
   ____________________________________________________________
Vita
Jeremy D Moeller

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*Doctor of Philosophy*, Special Education, Pennsylvania State University, August 2016.


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2011-2013 *Research Associate*, Clearinghouse for Military Family Readiness, Pennsylvania State University, University Park, PA.

2010-2011 *Substitute Special Education Teacher*, State College Area School District, State College, PA.

2009-2010 *Direct Support Specialist*, Community Services Group, State College, PA.

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