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Using Digital Performance Feedback to Increase Teacher Integrity of a Repeated Reading Intervention

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Using Digital Performance Feedback to Increase Teacher Integrity of a

Repeated Reading Intervention

by

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ABSTRACT

The National Assessment of Educational Progress reports 64% of 4th grade students and 66% of 8th grade students are less than proficient in reading despite the availability of evidence-based interventions in school settings (NAEP, 2015). It is important to implement reading interventions with struggling readers and because the role of the school psychologist has shifted from providing direct intervention services to students to providing consultative services to teachers, it is important to find various methods to promote teachers' adherence to these interventions. Treatment integrity has been defined as the degree to which an intervention is implemented as planned and its assessment is critical in the verification of treatment effects and experimental control. This study examined the effects of digital performance feedback (DPF) as a follow-up strategy for teachers to increase the integrity of a repeated reading intervention. A multiple baseline design was utilized to determine the effectiveness of this procedure. Results from this study expanded previous literature on ways to promote treatment integrity. Treatment integrity immediately increased with the provision of digital performance feedback. As treatment integrity increased, student outcomes also increased.

DEDICATION

I would like to thank the numerous individuals who have supported me throughout this process. First, I'd like to thank Cody, my soon to be husband, for always standing by my side. You have never doubted me even when I doubted myself. You continue to support my dreams and aspirations. When I was terrified about moving to Mississippi for graduate school, you were my rock. I had no idea that graduate school would have also led us to Baltimore, Maryland for internship. Still, you stood by me and supported every decision. You can always turn scary situations into fun adventures. I truly cannot wait until October 13th so I can finally marry my best friend.

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LIST OF ABBREVIATIONS

DPF   Digital Performance Feedback

BL   Baseline

RR   Repeated Reading

WCPM   Words Correct Per Minute

EPM   Errors Per Minute

CHAPTER I - INTRODUCTION

According to the National Assessment of Educational Progress (NAEP, 2015), 64% of fourth grade students and 66% of eighth grade students are reading below proficiency. Reading scores are categorized as basic, proficient, and advanced by NAEP. Although there have been interventions developed to target reading deficiencies in school children, there are still a large number of students experiencing difficulties in reading (Lee, Grigg, & Donahue, 2007). More specifically, reading deficits can manifest as difficulty in acquisition, fluency, comprehension, or generalization. This follows the instructional hierarchy model (Delay & Martens, 1994), which represents a model that focuses intervention efforts at each student's appropriate stage in learning. First, the student must acquire the academic skill, then become fluent with that skill. Next, the student learns to generalize the skill to novel contexts and finally, adapts the skill to make it fit within novel situations or demands (Delay, Lenz, & Boyer, 1996).

Reading fluency has been defined as an individual's ability to read with speed and accuracy (Samuels, 1979). The importance of reading fluency emerged in the literature as early as 1969 (Therrien, 2004). Two main theories regarding the origin of reading fluency issues have been described in the literature. First, reading fluency problems develop due to poor decoding skills (LaBerge & Samuels, 1974). In order for a student to be fluent, he or she must first be accurate; however, once accuracy is attained it is important to focus on fluency. Reading fluency is directly related to reading comprehension and overall reading ability; therefore, targeting reading fluency is critical to improve students' overall reading ability (Fuchs, Fuchs, Hosp, & Jenkins, 2001). An additional theory states that difficulties with reading fluency develop when readers fail to successfully transfer from

oral to written language regarding prosodic markings (i.e., dividing sentences intro meaningful phrases). Due to the number of struggling readers in schools and the importance of reading fluency, it is crucial to implement evidence-based interventions to help remediate these problems (Therrien, 2004).

Reading Interventions

Two popular fluency-based interventions that have been demonstrated as effective strategies to increase oral reading fluency include Listening Passage Preview (LPP; Rose, 1984a, 1984b, 1985c; Rose & Sherry, 1984) and Repeated Reading (RR; Skinner & Shapiro, 1989). LPP involves the student listening to another reader read a passage as he or she follows along then being asked to read the passage out loud themselves for assessment (Schreder, Hupp, Everett, and Krohn, 2012). Another variation of this approach is passage preview (Begeny, Krouse, Ross, & Mitchell, 2009). Passage preview (PP) is a modeling procedure and involves either silent PP, in which the student reads the passage silently, or oral PP, which involves the student reading the passage aloud first, or LPP, as described above.

RR is a different strategy in that it includes the student reading a short passage aloud multiple times (Begeny et al., 2009; Dahl, 1977; Dufrene et al., 2010; Freeland, Skinner, Jackson, McDaniel, & Smith, 2000; Samuels, 1979; Sindelar & Stoddard, 1991). Previous researchers have demonstrated increases in oral reading fluency after implementation of a RR intervention (National Institute, 2000; Therrien, 2004). The purpose of the RR intervention is to provide the student more opportunities to practice reading a passage (Freeland et al., 2000). Also, researchers have identified a link between the reading fluency gains made within RR and collateral gains in reading comprehension,

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suggesting the intervention may support learning within the context of the instructional hierarchy. For instance, Freeland et al. (2000) found that RR increased factual comprehension of text, but not performance on inference-based questions.

RR interventions typically involve the student reading the passage three or four times before the examiner assesses the performance with a 1-min probe. Therrien's (2004) meta-analysis analyzed the specific components within a RR intervention to determine which were essential. Although there are variations between RR intervention protocols, the results from the meta-analysis determined that all repeated readings should be read aloud to an adult, a cue should be provided to students (e.g., goal is to read the passage faster), the passage should be read 3-4 times, corrective feedback should be provided, and using a performance criterion is recommended (e.g., reading for a predetermined length of time). Results from the meta-analysis found mean effect sizes 30% larger when a passage was read 3 or 4 times compared to only 2 times. Reading more than 3 times was not necessary because comprehension gains between 3 and 4 times was only minimal.

Additionally, Schreder and colleagues (2012) conducted extended analyses to determine the most efficient and effective number of times a child should be required to read a passage before the examiner scores the number of words read correctly per minute (WCPM). Researchers demonstrated that participants read more words correctly after reading the passage four times compared to only two or three times. Participants read even more words correctly after five readings; however, it was not a substantial increase. Although researchers have demonstrated the effectiveness of these interventions to improve oral reading fluency, there are still issues regarding the implementation of these

strategies in a school setting. The role of school psychologists has shifted away from

direct service delivery and teachers are typically tasked with implementing interventions

to address the academic and behavioral needs of students (Gutkin & Curtis, 2009).

Shift in School Psychology

The role of school psychologists has shifted from providing direct services in

schools to providing services on a consultative basis (Gutkin & Curtis, 2009). Often

times, school psychologists provide teachers with support by developing intervention

plans for students and consulting with teachers on how to implement the intervention

plans. This is referred to as the "paradox of school psychology", (Gutkin & Curtis, 2009,

p. 592) which means to "serve children effectively school psychologists must, first and

foremost, concentrate their attention and professional expertise on adults" (Gutkin &

Curtis, 2009, p. 592). Thus, classroom teachers are often asked, and in some instances

required, to implement academic and behavioral interventions in their classrooms to

address student concerns; however, research has shown that the implementation of

interventions by teachers can be very poor (Wickstrom et al., 1998). Poor intervention

implementation means that there are problems with treatment integrity.

Treatment Integrity

Treatment integrity is defined as "the degree to which an intervention is

implemented as intended" (Gresham, 1989, p.37). There are two types of treatment

integrity delineated in the literature; consultation procedural integrity (CPI) and

intervention plan implementation (IPI; Noell, 2008). CPI refers to the integrity of the

consultation process and IPI refers to the integrity of the actual implementation of the

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intervention. Both types of integrity are important in school-based consultation. The second type of integrity, IPI, is of particular interest in the current study.

The assessment of treatment integrity is crucial for determining if a functional relationship exists between the implementation of a treatment and the changes in the target behavior (Gresham, 1989; Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). Changes in the dependent variable should only occur when the treatment, or independent variable, is added. When behavior changes occur in the absence of the treatment, some other extraneous variables may be responsible for the change (Baer, Wolf, & Risley, 1968; Gresham, 1989; Noell, 2014). Thus, it is important to eliminate threats to internal validity and maintain control over the manipulation of the independent variable. Therefore, measuring the extent to which an intervention is implemented as planned is important to promote internal validity and have more confidence in the data (Gresham et al., 2000; Gresham, Dart, & Collins, 2016).

How to Measure Treatment Integrity

Although it is clear that measuring treatment integrity is important, there is still much that needs to be researched regarding the construct of treatment integrity (Sanetti & Kratochwill, 2009). The measurement of treatment integrity should also be documented. Previous literature has indicated three primary ways in which treatment integrity is commonly measured. These methods include direct observation, self-report, and examination of permanent products generated from the implementation of the intervention (DiGennario Reed & Codding, 2014; Gresham et al., 2000; Noell & Gansle, 2014). Additionally, treatment integrity can be coded as either correct/incorrect or opportunity based. For instance, there may be a step in the intervention that could occur

multiple times (e.g., marked any incorrect words, provided praise for compliance). Rather than scoring this step as either correct or incorrect, it might be more important to look at the number of opportunities for implementation and score the number correct out of the total number of opportunities.

Direct Observation

Direct observations occur in the same way that systematic direct observation of student behavior would occur (Gresham et al., 2000). That is, direct observation of treatment integrity typically includes a checklist of the components of the intervention or rate-based measures (e.g., delivery of praise). The checklist of intervention components is completed by an individual observing intervention implementation. In order to use direct observation methods for assessing treatment integrity, the intervention steps must be clearly defined. One proposed limitation to using direct observations is observer reactivity (Gresham et al., 2000). This means that the teacher, or person responsible for implementation, implements the intervention with high integrity only in the presence of the observer to make themselves look good in front of the observer. Another drawback to direct observation is that the consultant must be present during the entire intervention implementation to measure teacher's treatment integrity; which is not always a feasible method for school consultants (Gresham et al., 2016). Due to the limited feasibility of daily direct observations of treatment integrity, more research needs to be conducted to demonstrate more feasible methods for measuring treatment integrity.

Self-Report

Self-report measures can be a very efficient way to measure treatment integrity. These measures include a checklist as well, but they are completed by the consultee or

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individual responsible for implementing the intervention. Self-reports can also take the form of a rating scale. The ratings could include something like a 5-ponit Likert scale ranging from *strongly disagree* to *strongly agree* to assess the degree to which an interventionist felt the components of an intervention were implemented. Although these measures may appear more practical than direct observation, there may be concerns with the validity of scores due to issues of memory or social desirability. These methods may not produce the most accurate measurement due to demand characteristics being placed on teachers, meaning that teachers may want to appear more competent (Gresham et al., 2000). Previous literature has found that these measures do not correlate well with more direct measures, such as direct observations, or other indirect measures (e.g., permanent products; Gresham et al., 2016).

Permanent Product

Finally, permanent products include evidence of implementation generated from the implementation process itself. For example, a permanent product of implementation of a reading intervention might include the tracking form used by a teacher to record the number of words read correctly in a 1-minute probe. This type of evidence is typically collected by an independent evaluator after implementation is complete. Permanent products are particularly useful in practical settings in which alternative assessment methods are not feasible (Schulte, Easton, & Parker, 2009). These methods are advantageous because they require less time, are more efficient, produce less reactivity, and are potentially more accurate that other methods because there is a physical product that is produced from the implementation (Gresham et al., 2000). One of the major drawbacks to permanent product as a form of measurement is that some components of

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the intervention do not generate a permanent product for analysis. For example, stating the Good Behavior Game (GBG) is starting or reading the directions to a CBM probe do not produce permanent products for review (Gresham et al., 2016; Sanetti & Kratochwill, 2007). In a study by Gresham and colleagues (2016), only three of seven components of the GBG were amenable to measurement through permanent product assessment.

Differences between methods

Gresham and colleagues (2016) conducted a study examining the dependability of the three methods of assessing treatment integrity of the Good Behavior Game (GBG; Barrish, Saunders, & Wolf, 1969). Researchers collected different forms for each measure of treatment integrity for each treatment day so the various methods could be directly compared. As part of the study, researchers assessed the correlation between the three methods and found that treatment integrity assessed by permanent product had the lowest mean score ($M = 62\%$), direct observation of integrity had a mean score of 79%, and self-report assessment resulted in the highest integrity ($M = 97\%$). The only significant correlation found was a moderate and statistically significant correlation between the direct observation and permanent product methods ($r = .425$). There were no correlations between the self-report method and the other two methods, which means that self-report measures may not be an accurate measurement for assessing treatment integrity. As previously stated, the measurement of treatment integrity is critical to demonstrate functional relationships; therefore, it is also important to determine the factors that may affect the treatment integrity so that it can be maximized in implementation settings.

Factors Affecting Treatment Integrity

Researchers have evaluated several factors that may be related to treatment integrity. It is important to consider these factors when developing strategies to promote integrity. Gresham (1989) proposed six factors that are hypothesized to influence treatment integrity, which include: (a) the complexity of the intervention, (b) the time required to implement the intervention, (c) the materials required, (d) the number of people required to implement the intervention, (e) the perceived and actual effectiveness of the intervention, and (f) the motivation of individuals implementing the intervention. Practitioners should consider all the factors that may be associated with treatment integrity to find the best methods to promote integrity because the majority of the time, practitioners will serve as the consultants and the teachers will serve as the change agents. For instance, if a teacher's motive is to remove a student from his or her classroom then the implementation of the recommended intervention may be poor.

Treatment acceptability is another factor that has been proposed as an influence of treatment integrity (Witt & Elliott, 1985). For instance, if a teacher views an intervention as feasible and likes the recommendation, it is proposed that that teacher would implement the intervention with higher integrity. Allinder and Oates (1997) conducted a study to investigate this concept. The purpose of their study was to determine if teachers who found curriculum-based measurement (CBM) more acceptable would implement a treatment protocol using CBM with higher integrity compared to teachers who did not find CBM acceptable. Participants included 22 teachers who were responsible for 2 students each. Teachers were trained how to conduct CBM's and given the CBM Acceptability Scale (CBM-AS). Teachers were divided into two groups, teachers who

had a mean score of 5 or more on the CBM-AS (i.e., more acceptable) and teachers who had a mean score below 5 on the CBM-AS (i.e., less acceptable). Researchers found that teachers who found CBM more acceptable implemented more probes compared to teachers who found it less acceptable ($F[1, 19] = 7.75, p < .01$). They also reported a large effect size for student outcomes for high acceptability compared to low acceptability teachers ($ES = 1.11$).

A more recent study conducted by Dart, Cook, Collins, Gresham, and Chenier (2012) evaluated the effects of a test-drive procedure on teachers' integrity. This procedure allowed teachers to try a few interventions and determine which intervention she found more acceptable, or feasible. The participants in this study included four teacher-student dyads who were referred for behavioral consultation and teachers had to implement a prescribed intervention with less than 50% integrity. The consultant selected an intervention from four evidenced-based interventions (i.e., self-monitoring, modified Check-in/Check-out, response cost system, and behavior specific praise). Next, teachers participated in the test-drive phase, in which teachers were instructed to implement the remaining three observations for two days then rank order the interventions. Two teachers began implementing the intervention selected from the test-drive procedures while the other teachers were instructed to implement the same interventions selected by their paired teacher. This was done to control for the effects of the test-drive procedures. Finally, the two remaining teachers participated in the test-drive procedures and then implemented the intervention they rated as most acceptable. Dart and colleagues (2012) found that this procedure was effective, not only for promoting treatment integrity, but also improving student outcomes.

Link to Intervention Effectiveness

Assessment of treatment integrity is not only important to demonstrate experimental control in research, but also for making accurate evaluations of treatment outcomes. If an intervention is not being implemented with integrity then it may appear to be unsuccessful when perhaps the issue is with the integrity of the intervention (Durlak & DuPre, 2008; Witt & Elliott, 1985). This makes intuitive sense; however, there is little research conducted where treatment integrity is treated as the primary dependent variable and this type of work is needed in order to assess this relationship fully. Durlak and DuPre (2008) examined 542 intervention studies to assess the impact of treatment implementation on overall program outcomes. A secondary goal of this study was to assess which factors influence the implementation process. Of these studies, 483 came from previously conducted meta-analyses and 59 were individual studies assessing the link between intervention implementation and outcomes. Researchers found that interventions with higher integrity resulted in significant mean differences in various outcome variables compared to interventions with poor integrity. When looking only at the 59 individual studies, they found that 76% demonstrated a significant positive relationship between integrity and at least half of all the outcome variables measured. This means that there is some evidence to suggest that higher levels of integrity lead to better outcomes. Some studies include multiple outcome variables and the majority of studies demonstrated that at least half of these variables improved with higher levels of integrity.

Researchers have also manipulated the levels of treatment integrity of a computerized academic math intervention (i.e., 100% integrity, 67% integrity, and 33%

integrity) and demonstrated that lower levels of integrity resulted in poorer student outcomes compared to higher levels of integrity with the same intervention (Noell, Gresham, & Gansle, 2002). Additionally, Noell et al. (2005) conducted the first randomized trial assessing different follow-up strategies to promote integrity on student outcomes. Researchers demonstrated that teachers who implemented the intervention with higher integrity produced the most behavior change in students compared to teachers with lower integrity. Other researchers have found similar results in that lower levels of treatment integrity were associated with decreases in student appropriate behavior (Reinke, Lewis-Palmer, & Merrell, 2008).

<center>Ways to Increase Treatment Integrity</center>

The importance of assessing and promoting treatment integrity has been reviewed in the previous sections. Previous research has indicated that implementation of interventions by classrooms teachers has been very low (e.g., Wickstrom et al., 1998). There are several different methods available in the literature to promote integrity. These methods include training procedures, video modeling, negative reinforcement, performance feedback, and digital performance feedback (Noell et al., 2014; Whipple, 2016).

Training

Training procedures have been used as an antecedent strategy for promoting treatment integrity (Dufrene et al., 2012; Dufrene, Lestremau, & Zoder-Martell, 2014; Sterling-Watson, & Moore, 2002). There are two distinct training procedures, direct and indirect methods, delineated in the literature. Indirect methods include more didactic instruction; whereas direct methods utilize procedures such as modeling, role-playing,

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rehearsal and feedback (Sterling-Turner, Watson & Moore, 2002). A review of the literature demonstrates more favorable results in treatment integrity with direct methods of training compared to indirect methods. For example, Sterling-Turner and colleagues (2002) examined the differences between indirect and direct training procedures. Following indirect training procedures, three of the four teachers did not implement with higher than 50% integrity. Once direct training methods were implemented, integrity increased for all teachers.

Similar results were found for Stormont et al. (2007) and Dufrene et al. (2012). Both studies demonstrated that large, in-service trainings may be an ineffective training method to promote the use of praise and effective instruction delivery (EID). Dufrene et al. (2012) included four Head Start teachers who were referred for consultative services by the center director. All four teachers had participated in a large, group training, but did not implement praise and EID components in their classrooms. Researchers first provided didactic training sessions in which the consultant provided the teacher with rationale for praise and EID. The consultant provided examples and had the teacher practice while providing feedback. The direct training phase included the consultant providing the teacher with prompts using a one-way radio device and teachers were instructed to repeat the statements verbatim. The researchers demonstrated that more direct training approaches were associated with increased rates of praise and implementation of EID components. Results maintained during maintenance and a one-month follow-up.

Video Modeling

Traditional forms of training teachers may be time consuming (Moore & Fisher, 2007). Video modeling has been used as an antecedent strategy (Catania, Almeida, Liu-

Constant, & DiGennaro Reed, 2009; Collins, Higbee, & Salzbert, 2009; DiGennaro-Reed, Codding, Catania, & Maguire, 2010) and as a consequent procedure (Whipple, 2016). Video modeling is a tool used to demonstrate accurate skill implementation for the viewer to imitate.

Collins, Higbee, and Salzbert (2009) conducted a study to evaluate the effects of video modeling of a problem-solving intervention on staff implementation of that intervention. Didactic training took place prior to the start of the study. Staff were trained on the steps of the intervention and then modeling of the intervention as well as role-playing with staff took place. Staff had access to written procedures during baseline. During the video modeling component, staff watched a video model prior to engaging in a role-play exercise. Integrity increased from 38% of intervention steps implemented to a mean of 91% implemented during video modeling. This study provides support for the use of video modeling as an effective and efficient method for training.

More recently, DiGennaro-Reed and colleagues (2010) conducted a similar study evaluating the effects of video modeling training on the treatment integrity of various behavioral interventions. This study examined the use of video modeling and video modeling plus performance feedback on teachers' implementation of behavioral interventions. Didactic training occurred prior to the start of study, which included a verbal overview of the protocol, as well as a test to ensure teachers had an understanding of the protocol. During baseline, feedback was not provided to teachers. During the individualized video-modeling phase, teachers viewed a model demonstrating accurate implementation of the intervention. The individualized video-modeling plus performance feedback package was identical to the previous phase, except teachers were given

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feedback about previous sessions prior to viewing the video model. Mean treatment integrity went from 41% in baseline to 84% in the individualized video modeling condition. Integrity increased substantially from baseline once video-modeling procedures were added; however, integrity did not reach 100% until the performance feedback procedure was added.

Negative Reinforcement

This concept is a relatively new approach used to promote integrity. Negative reinforcement is a contingency in which the occurrence of a response results in the removal or termination in a stimulus, which in turn increases the future occurrence of that response (Cooper, Heron, Heward, 2007). Some researchers have applied this contingency to increase adherence to treatment protocols (DiGennaro, Martens, & McIntyre, 2005; DiGennaro, Martens, & Kleinman, 2007). DiGennaro, Martens, and McIntyre (2005) conducted a study evaluating the effects of performance feedback and negative reinforcement on teachers' integrity of a 12-step reinforcement–based intervention plan; two classes only used 11 steps.

During this study, teachers were trained on the protocol utilizing didactic instruction, modeling, coaching, and immediate corrective feedback prior to implementation baseline. During implementation baseline, teachers were required to implement the intervention without further assistance from the consultant. During the performance feedback/negative reinforcement phase, consultants provided teachers with daily written feedback as well as a graphic display of their implementation integrity and students' behaviors. If integrity was less than 100%, consultants met with teachers prior

to the next day's implementation to practice the missed steps three times. Perfect integrity resulted in avoidance of those meetings.

Researchers demonstrated performance feedback/negative reinforcement was an effective strategy. Teachers' integrity dropped to 20% and 30% following training procedures with mean integrity of 12.75% at the end of implementation baseline. With the provision of performance feedback/negative reinforcement, integrity increased for all but one teacher to an average of 86.2%. These results demonstrate the effectiveness of utilizing a negative reinforcement contingency. Teachers' behavior was maintained by avoidance of meetings with the consultant, meaning daily meetings might be unnecessary to promote integrity.

Performance Feedback

Performance feedback is a consequent strategy that has the most literature of all the discussed strategies to support its use to promote integrity. Performance feedback is a follow-up strategy that includes providing data on previous implementation performance and student outcomes associated with integrity. This procedure has been found to be the most effective strategy to increase treatment integrity (Noell et al., 2005, 2014; Reinke et al., 2008). Performance feedback has been delivered in various forms. For instance, feedback has been provided daily (Noell, Witt, Gibertson, Ranier, & Freeland, 1997), weekly (Mortenson & Witt, 1998), biweekly (Codding, Feinburg, Dunn, & Pace, 2005), face-to-face, and electronically (Hemmeter, Snyder, Kinder, & Artman, 2011).

Noell et al. (2000) compared two follow-up procedures to determine the effects on treatment integrity. Teachers in this study were trained on a peer tutoring intervention. Consultants conducted follow-up meetings when teacher integrity of peer tutoring was

low and stable or demonstrating a decreasing trend. These meetings were short in duration and asked for the teacher's perception of the intervention. During the performance feedback condition, the consultant met with the teacher to provide data on their performance as well as graphic displays of the data. The consultant would address any issues with implementation. Integrity increased from a mean of 41% during baseline to 87% during performance feedback.

Noell et al. (2005) was the first study to conduct a randomized field trial to investigate various performance feedback procedures. This study consisted of 45 teachers and 45 general education children from kindergarten to fifth grade. Consultants generally followed the behavioral consultation (BC) model (Bergan & Kratochwill, 1990). Teachers were randomly assigned to one of three follow-up conditions (weekly follow-up, commitment emphasis, and performance feedback). Treatment integrity was the primary dependent variable, which was assessed through permanent products. The weekly follow-up condition included brief weekly meetings with the teacher to discuss improvements and answer any questions. The commitment emphasis condition included the same procedures, but also consisted of a social influence message. The social influence message reviewed potential barriers, stressed the importance of treatment integrity, and negative consequences associated with poor implementation. The purpose of these messages was to increase similarity between commitment to implement the intervention with the actual implementation of the intervention. Performance feedback included the consultant reviewing the permanent product data with the teacher as well as showing graphic representations of the student data and integrity data. Results indicated a significant main effect for condition (CE, weekly, and PFB) with a large effect size ($\eta^2 =$

0.81). The results indicated that performance feedback produced the greatest change in treatment integrity. The data also indicated that students' outcomes were higher for the performance feedback group. This research further supports performance feedback as an effective strategy to substantially increase treatment integrity following consultation.

One study examined how performance feedback was delivered (verbally or graphically) and the effects delivery modality has on integrity of interventions (Hagermoser-Sanetti, Luiselli, & Handler, 2007). Hagermoser-Sanetti, Luiselli, and Handler (2007) compared verbal performance feedback alone to verbal and graphic performance feedback and found that graphic feedback resulted in improved integrity levels. More specifically, integrity averaged 72.3% in baseline, 42.9% in verbal feedback only, and 91% in verbal and graphic feedback. Integrity dropped once the graphic component was removed to an average of 49.2%; however, integrity increased once graphic feedback was reintroduced to 87.2%. This study also found support for the link to intervention effectiveness in that students' appropriate behavior was highest when teachers' integrity was highest.

A more recent study examined the durability of performance feedback (Gross, Duhon, & Doerksen-Klopp, 2014). Gross and colleagues examined the effects of performance feedback on integrity of the check-in/check-out intervention. The consultant first met with the teacher to provide direct training, in which the teacher and consultant practiced the steps until treatment integrity reached 100%. Next, teachers were instructed to implement the procedures in their classrooms without further support from the consultant during the implementation baseline phase. This phase is important to determine how well the teacher could implement the intervention after only receiving

direct training procedures. If integrity was low (i.e., below 80%), consultants provided

teachers with performance feedback with direct rehearsal. Teachers were also provided

with a visual graph of integrity. During the direct rehearsal portion, teachers practiced the

entire intervention until he or she was able to demonstrate 100% integrity during roleplay

with the consultant. This phase continued until the teacher demonstrated 100% integrity

for two consecutive days. Performance feedback was faded using three changing criterion

schedules, randomly selecting permanent products from one day to review, meeting every

other day, and meeting one a week. Teachers' criteria changed contingent upon two

consecutive days of 100% adherence. Researchers also included a maintenance phase in

which the consultant and teacher only met once every other week. The results of Gross

and colleagues' (2014) study indicate that treatment integrity can be maintained as

performance feedback procedures are faded. Researchers also demonstrated that integrity

was positively linked with student outcomes.

Digital Performance Feedback

Digital performance feedback (DPF) is a more recent consultative follow-up

strategy that utilizes a combination of video modeling, negative reinforcement, and

performance feedback. Although other studies have utilized electronic or digital forms of

feedback (e.g., email; Collier-Meek, Fallon, & DeFouw, 2017), DPF is a consultative

package. This procedure provides a more efficient method to provide teachers with

feedback and promote integrity (Whipple, 2016). Specifically, DPF includes the

consultant sending performance feedback to teachers via text message following that

day's implementation. The text message includes data regarding the teacher's integrity as

well as student appropriately engaged behavior (AEB) and disruptive behavior (DB). The

text message also includes a link to video models of any missed intervention steps. If the teacher watches the video models, then no face-to-face meeting is scheduled; however, if the teacher did not watch the video model(s) then the consultant would have to meet with the teacher prior to the next day's implementation to practice the missed steps with the consultant. Whipple (2016) evaluated the effects of digital performance feedback on teachers' integrity of a self-monitoring intervention with general education students within a multiple baseline design across participants.

Three general education elementary school teachers referred themselves for consultation regarding student problem behaviors in the classroom. The consultant recommended a self-monitoring intervention after three direct observations of student behavior confirmed the referral concern. The consultant trained the teacher how to implement the self-monitoring intervention and met with the student to provide training on the self-monitoring procedures. Teachers implemented the intervention without feedback from the consultant during implementation baseline. During implementation baseline, average treatment integrity was 36.74%. Integrity immediately increased for all teachers once DPF was added to an average of 95.25%. Only one teacher required a face-to-face meeting for not watching the video model(s). This follow-up procedure provided teachers with more feasible support and increased integrity immediately following the implementation. Teachers also rated this consultation procedure as an acceptable follow-up procedure.

<center>Purpose</center>

The proposed study aims to address some limitations of Whipple (2016). The strategies described above have been demonstrated as effective procedures for promoting

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treatment integrity; however, school psychologists may be limited in the amount of time they have to meet with teachers face-to-face. Not only do consultants often have large caseloads, they are often required to travel between multiple schools within a school district (Bice-Urbach & Kratochwill, 2016). This can be especially difficult for consultants working in rural areas, which makes face-to-face consultation more challenging. Goforth and Beebe-Frankenberger (2012) found that that 74% of rural school psychologists were required to provide services to three or more schools. In addition to the number of schools they served, 32% were required to travel more than 250 miles per week. Whipple (2016) offered some solutions to this issue; however, there were limitations in the study that need to be addressed. For instance, consultants were still required to observe the implementation of the self-monitoring intervention daily in order to provide teachers with feedback. This fact reduces the utility of the DPF procedure for school rural school psychologists or those serving multiple schools.

As Gresham et al. (2016) indicated, direct observation of treatment integrity is the "gold standard", but it may not be feasible to conduct daily direct observations. The research conducted by Gresham and colleagues (2016) supports the use of permanent products, although there are limitations with these forms of measurement. For instance, not all intervention components produce a permanent product; however, if an intervention does produce permanent products, it could be useful for school consultants to utilize this measurement procedure and research has found significant correlations with direct observations. Additionally, teachers in Whipple (2016) may not have been motivated to implement the intervention with high integrity due to high rates of AEB and low rates of

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DB. Furthermore, only one study has been conducted examining the effectiveness of DPF as a procedure to increase integrity.

The purpose of the current study was to evaluate the effects of DPF in a different context, academic intervention to promote reading fluency. Teachers who were nonadherent in implementing RR for students with reading difficulties were included in this study to determine if DPF is an effective strategy to increase integrity. Integrity was assessed entirely through permanent products to eliminate the issue with direct observations requiring the consultant to still be present during implementation. As mentioned previously, assessing treatment integrity is an important issue within school consultation research and practice. Finding more efficient, effective strategies for promoting integrity is critical.

Research Questions

1. Is digital performance feedback an effective follow-up strategy in increasing treatment integrity among initially non-adherent classroom teachers?

2. Does increased treatment integrity correspond to improved student outcomes?

3. Is digital performance feedback rated as socially valid by teachers?

CHAPTER II - METHOD

Participants and Settings

Three teacher-student dyads participated in the study, which took place in a rural school district in the Southeast United States. All participants were in general education elementary classrooms. The elementary school consisted of a total of 365 students (53% female). Of the students, 75% were White, 23% were African American, and 2% were Hispanic. 69.3% of the student body received free and reduced lunch. Teachers were recruited through a self-referral process, meaning all three participating teachers requested consultation services for students in their classrooms who were exhibiting reading difficulties. Because the primary purpose of this study was to identify initially non-adherent teachers, an inclusion criterion based on teachers' initial level of treatment integrity was included. Specifically, teachers needed to demonstrate an average of 50% or less integrity across at least three observations during the implementation baseline phase to be included. The first three teachers that self-referred met this inclusion criteria.

Teacher-Student Dyad 1

Teacher 1 was a Caucasian female who taught 2nd grade and was in her 4th year of teaching. She obtained a Bachelor's degree in Elementary Education with endorsements in Reading and English. The student participant in Teacher 1's class was a 7-year-old white female. She was referred by her teacher because of low grades in reading. At the start of the study, Student 1 had a D in reading and was not receiving any academic intervention services.

Teacher-Student Dyad 2

Teacher 2 was a Caucasian female who was a 1st grade teaching assistant. She was in her 1st year of teaching and possessed a Bachelor's degree in Public Relations. Teacher 2 was the assistant in Student 2's classroom. Student 2 was a 7-year-old white female. She was referred due to inconsistent test scores and low grades in reading. She was also recommended for Tier 2 services in reading but had not received any intervention services by the start of this study.

Teacher-Student Dyad 3

Teacher 3 was a Caucasian female who served as the 4th, 5th, and 6th grade interventionist. She provided intervention services in the areas of reading, language arts, and mathematics. She was in her 13th year of teaching and obtained a Master's degree in Elementary Education. The target student was recommended to receive Tier 2 reading intervention with Teacher 3. Student 3 was an 11-year-old white male. He had a low B in reading at the start of the study.

Materials

Repeated Reading Materials

Repeated reading was recommended to participants as the standard reading intervention to evaluate the effects of digital performance feedback. This intervention was selected because it can be easily broken down into fourteen steps (Appendix D) and used for individual students. The other benefit of this intervention is that many of the components can be evaluated through a review of permanent products. The teacher was required to mark the reading probe with the different times the student read the passage and then record results of the one-minute probe on the student data form (Appendix E). The teacher was also asked to audio record the session with her smartphone to ensure

instructions were read to students, which is technically not a permanent product because it is not directly related to typical intervention implementation. Teachers were provided a Repeated Reading protocol with script (Appendix F) and a binder of grade-appropriate reading passages for use with the intervention. The reading passages teachers used were the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) oral reading passages. The consultant used AIMSweb progress monitoring probes to conduct cold-probes with students.

Video Models

The primary researcher created fourteen video models, one for each intervention step. These videos included narration over each component to describe the different steps. Video models were all under 25 seconds to ensure that a teacher did not have to watch more than 6 minutes of footage in the event that all of the intervention steps were missed. Video models were created using Apple iMovie.

Smartphone

Teachers required the use of an internet-enabled smartphone or tablet computer to access the video models from the primary researcher. The primary researcher sent a link to the video models through a text message following that day's implementation of the intervention. The teacher also needed to send a text message to the consultant that included an audio file of that day's reading intervention implementation as well as a picture of the reading probe and data sheet. All teachers had access to their personal iPhone.

Video hosting service site

Video models were uploaded to a website called SproutVideo (www.sproutvideo.com) This particular website was selected over alternatives (e.g., YouTube) because it provides real-time data on the number of views a video receives and the duration of each view, in seconds, that each participant interacts with the video. This is important because the primary researcher needed to determine if the video models were watched and how long videos were viewed prior to the next day's implementation.

<div align="center">Measures</div>

Treatment Integrity Checklist

A treatment integrity checklist was used to assess the integrity of the repeated reading intervention. The primary researcher completed this checklist each day beginning in the implementation baseline phase using the permanent products generated from implementation of the repeated reading intervention. During steps that required multiple opportunities (i.e., placing a slash through incorrect words), the primary researcher considered the step accurately implemented if agreement with the consultant was at least 90%.

Reading Passages

DIBELS passages (Good & Kaminski, 2002) were prepared for each teacher in a binder to use as intervention passages. The consultant worked with the teacher to determine how much the student should read each session. The length of the passage was determined by looking at the median score in benchmark assessments and increasing the length by 25-50%. For example, if the student read 100 words per minute during benchmark probes, then the intervention passages would include anywhere from 125-150 words. AIMSweb passages (Edformation, 2003) were used for all benchmarking and progress monitoring

sessions. All students received grade level passages. Reliability and validity of DIBELS passages are high, with coefficients ranging from 0.92 to 0.97 for test-retest reliability and 0.89 - 0.94 for alternate form reliability. Criterion-referenced validity ranged from 0.52 to 0.91. For AIMSweb passages, reliability and validity are also high, with a test-retest reliability coefficient of 0.92 and alternative form reliability of 0.89. Inter-rater agreement was 0.99 and criterion-referenced validity was 0.91 (Dufrene et al., 2010).

The Behavior Intervention Rating Scale (BIRS; Elliot & Treuting, 1991)

The BIRS (Appendix G) was used to measure the social validity of the reading intervention. This questionnaire includes 24 items ranging from 1 (strongly disagree) to 6 (strongly agree). The items address the teacher's view on the intervention in terms of acceptability, effectiveness, and time of implementation (Elliott & Treuting, 1991). A modified version of the BIRS (Appendix H) was also used to gain information regarding the social validity of the digital performance feedback procedure. The BIRS was modified by changing the first instance of "intervention" to "Digital Performance Feedback" and the second instance of "intervention" to "consultation procedure" in the first question, then subsequent instances of "intervention" to "Digital Performance Feedback" in remaining BIRS items. Previous research indicates that these minor revisions do not significantly affect the psychometric properties of the BIRS (Sheridan & Steck, 1995; Sheridan, Eagle, Cowan, & Mickelson, 2001). Teachers completed the BIRS at the conclusion of the study. Total scores were calculated for each teacher with higher scores indicating greater acceptability. Previous support for the internal consistency of the BIRS yielded an alpha coefficient of .97 for the entire rating scale, and alpha

coefficients of .97, .92, and .87 for acceptability, effectiveness, and time of effectiveness, respectively.

Children Intervention Rating Profile (CIRP; Witt & Elliott, 1985)

The CIRP (Appendix I) was used to assess the students' acceptability of the reading intervention. The CIRP consists of seven items assessing the effectiveness and fairness of an intervention. Items range from 1 (strongly disagree) to 6 (strongly agree; Elliott, 1986). Student participants completed the CIRP at the end of the study. Scores were totaled for each target student with higher scores indicating greater acceptability. The CIRP includes one factor, meaning all items reflect the General Acceptability factor. Psychometric evaluations for the CIRP resulted in alpha coefficients that ranged from 0.75 to 0.89 (Witt & Elliott, 1985).

Consultation Acceptability and Satisfaction Scale (CASS; Taber, 2015)

A rating scale to assess the acceptability of the consultation procedures was also utilized (Appendix J). This instrument includes 12 items rated from 1 (strongly disagree) to 6 (strongly agree). Teachers completed this at the conclusion of the study to assess the acceptability of DPF as a consultation procedure. Total scores were calculated for each teacher, with higher scores reflective of positive perceptions of the consultation process. The psychometrics of this instrument have not yet been evaluated.

<div align="center">Dependent Measures and Data Collection</div>

The primary dependent variable in this study was treatment integrity. Treatment integrity was defined as the implementation of the intervention as planned, operationalized by the reading intervention component checklist previously mentioned. Treatment integrity was calculated by dividing the number of steps implemented

correctly by the total number of steps and multiplying by 100. The secondary dependent

measures included student outcomes of reading, more specifically Words Correct Per

Minute (WCPM) as measured by progress monitoring AIMSweb probes which were

conducted by the consultant every 3rd intervention session. A word was scored as correct

if it was correctly pronounced within three seconds. A word was scored as incorrect if it

included an omission, substitution, was misread, or the student paused for more than

three seconds.

Experimental Design and Data Analysis

A concurrent multiple baseline design (Cooper et al., 2007) across teachers was

utilized to demonstrate a functional relationship between the implementation of digital

performance feedback as a follow-up procedure and an increase in treatment integrity of

teachers. The phases included baseline, implementation baseline, and digital performance

feedback. To meet design standards according to Kratochwill and colleagues (2012), the

design must meet four criteria. First, the independent variable must be systematically

manipulated. Second, interobserver agreement (IOA) must be between greater than 80%

and collected for at least 20% of data points within each condition. Third, there must be

at least three attempts to demonstrate the intervention effect at different time points.

Finally, each phase must have a minimum of three data points, with a preference for five

data points (Kratochwill et al., 2012). This study was designed to meet these standards.

Procedure

Baseline

Once teachers nominated themselves for participation through the consultation

process and informed consent was attained from all involved parties (i.e. teacher, parent,

child; Appendices A-C) the baseline phase began. During baseline, researchers met with the teachers to gain information about the target student's reading difficulties. All meetings occurred in the teacher's classroom during planning periods. After the meeting with the teacher, researchers conducted three baseline reading probes to determine the student's instructional level. The median probe was used to determine the instructional level. Next, a skill vs. performance deficit assessment was conducted by the primary researcher. This assessment began with a brief preference assessment to determine what the student would like to work for during the reading assessments. For the brief preference assessment, the researcher asked the participant to choose from an array of 3-5 items. The researcher included items identified by the teacher as potentially reinforcing for the student (e.g., candy, stickers, erasers). The researcher then conducted a Can't Do/Won't Do (CDWD; Daly, Witt, Martens, Dool, 1997; Shapiro, 2010) assessment in which the student read a passage, the researcher offered the student the selected reward for beating his or her score, and then the student read another passage aloud. If the score for the second passage was greater than the score on the first passage (i.e., more than a 25% increase or going from frustrational to instructional range) then the reading problem was labeled a performance deficit; however, if the two scores were roughly equal (i.e., less than a 25% increase, remaining in the same instructional classification), then it would be considered a skill deficit. All students in this study exhibited a skill deficit.

Implementation Baseline

Following baseline probes, the researcher met with the teacher to discuss baseline data. A Repeated Reading intervention was recommended to the teacher as a potentially viable strategy and the researcher conducted brief didactic training on the intervention's

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procedures with the teacher. The brief training is standard practice and included reviewing the data, providing teacher with the rationale and the instructions for the reading intervention. The teacher received all of the necessary materials (i.e., protocol, binder) to implement the reading intervention. The researcher then demonstrated how the intervention should be implemented and allowed the teachers to practice implementing the intervention themselves. During implementation baseline, teachers were asked to identify a 10-minute time period to implement the reading intervention daily, without any further feedback from consultant.

The repeated reading intervention had 14 steps (Appendix D). The student was instructed to read the passage four times total. For the first three times the student read the passage, the teacher told the student how long it took to read the passage, the number of words read correct and the number of errors. For the fourth read, the student had one minute to read the passage while the teacher calculated the student's WCPM and EPM. The WCPM and EPM were then recorded on the data tracking sheet by the teacher.

Teachers were instructed to send a text message with a picture of the marked-up reading probe, data tracking sheet, and audio recording to the consultant's phone each day before 5pm. Daily review of permanent products (e.g., reading probe, data tracking sheet, audio recording) of the teacher's treatment integrity were assessed using the component checklist of the reading intervention. Once treatment integrity was low and stable, or demonstrating a decreasing trend, the consultant met with the teacher to discuss digital performance feedback.

Digital Performance Feedback

After the implementation baseline phase, the consultant met with the teacher to discuss student outcomes as well as treatment integrity data. At this time, the consultant verbally commented on expected results and indicated that the intervention was not working the way it was intended, following a script (Appendix K) to standardize the interaction across teachers. The consultant then suggested using digital performance feedback as a way to provide more support to teachers to help increase integrity of the reading intervention. There were three components involved in the DPF procedure: performance feedback, video model delivery, and meeting cancellation.

Performance Feedback. Each day, following implementation of the reading intervention, the consultant sent teachers a text message to serve as the performance feedback component of DPF. The text message included a praise statement and data regarding integrity and student outcomes. The text message also included a link to the video models of the steps missed during previous day's implementation. For example,

> Ms. XXXX- Thanks so much for sending this! You did an awesome job
> implementing the reading intervention with XXXX and filling everything out.
> Just please remember to send the audio clip because I was not able to assess all
> steps; therefore, integrity was 53.84%. XXXX did a great job with reading! Her
> one-minute read was much faster. I have attached a link for you to view the
> missed intervention steps. Please watch before 10pm. Again, thanks so much for
> all your hard work! https://kennedykrieger.vids.io/videos/1c9adeb31c12eacc94-
> dpf-2-mp4 (H. Whipple, personal communication, April, 2018).

Video Model Delivery. The video models delivered to the teachers only included the intervention steps that the teacher missed that day. For example, if the teacher did not

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record the time it took for the student to read the passage the first time, then the video

model would include the primary researcher acting out that step of the intervention. The

consultant edited and strung together the video models using iMovie as necessary each

day. For instance, if the teacher missed two intervention steps, the consultant used iMovie

and put the two steps together into one video clip. The clip was then uploaded to

SproutVideo, which generated a link to provide teachers in text message format. Teachers

were able to click the link directly from their phone and watch the video model on their

device.

Meeting Cancellation. Face-to-face performance feedback meetings were scheduled for

every morning during the DPF phase in which integrity was below 90%; however, if the

teacher watched 90% or more of the video model that was sent the previous day, the

meeting was cancelled. If the teacher watched less than 90% of the video or did not

access the video at all, the face-to-face performance feedback meeting would take place

as planned. These meetings consisted of the teacher and consultant watching the video

model, practicing the missed steps of the intervention, and then the consultant providing

the teacher with the data from the previous day. Once teachers agreed to the DPF

procedures, teachers were sent the link to the video models of the missed steps on the last

day of implementation baseline. Teachers were instructed to watch the first video with

the consultant to ensure that they had a clear understanding of procedures and to make

sure the link to videos work on teachers' smartphones.

<div align="center">Reliability</div>

Interobserver Agreement (IOA) was conducted for at least 25% of all reading

probes (i.e., instructional passages and progress monitoring passages) in each condition

across each of the three participants. IOA was calculated separately for treatment integrity and the target student's words read correct per minute (WCPM) and errors per minute (EPM). Agreement for treatment integrity was calculated using an exact agreement method (Cooper et al., 2007). That is, the number of agreements between observers was divided by the total number of agreements and disagreements and multiplying by 100. Agreement for WCPM and EPM was calculated using a total count method, meaning the smaller count was divided by the larger count and multiplied by 100.

For Teacher-Student dyad 1, IOA was collected for 43.48% of all observations. IOA was collected for 100% of baseline observations. Agreement was 100% for student WCPM and EPM. IOA was collected for 42.86% of implementation baseline observations. IOA was 100% for treatment integrity and student WCPM and EPM. IOA was assessed for 30.77% of DPF observations with a mean of 100% for treatment integrity and student reading scores.

For Teacher-Student dyad 2, IOA was collected for 41.67% of all observations. IOA was collected for 100% of baseline observations. Agreement was 100% for student WCPM and EPM. IOA was collected for 27.27% of implementation baseline observations. IOA was 100% for treatment integrity and student WCPM and EPM. IOA was assessed for 40.00% of DPF observations with a mean of 100% for treatment integrity and student reading scores.

For Teacher-Student dyad 3, IOA was collected for 29.17% of all observations. IOA was collected for 0% of baseline observations due to a recording issue with the audio device. Agreement was 100% for student WCPM and EPM. IOA was collected for

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31.25% of implementation baseline observations. IOA was 100% for treatment integrity and student WCPM and EPM. IOA was assessed for 40.00% of DPF observations with a mean of 100% for treatment integrity and student reading scores.

<center>Procedural Integrity</center>

Procedural integrity was assessed by completing a checklist to determine if every step of teacher training and the DPF procedure was implemented (Appendices L-U). More specifically, procedural integrity for the consultation procedure (i.e., DPF) included sending a text message to the teacher following intervention implementation including all necessary components. Procedural integrity for DPF also included checking the website, if necessary, to ensure teachers watched the video models. If the teachers did not watch the video model, then procedural integrity for the meeting cancellation was also collected. IOA was collected on procedural integrity for 100% of training sessions and 35.71% of all DPF sessions. IOA for procedural integrity was 100% across all conditions.

<center>Data Analysis</center>

Visual analysis was used as the primary method of data analysis. More specifically, data were analyzed by examining level, trend, variability, immediacy, nonoverlap, and consistency across similar conditions (Horner et al., 2005). A nonparametric effect size was also calculated to supplement visual analysis. Tau-U was selected because it controls for trends in baseline phases, and is considered more conservative than NAP (Parker, Vannest, Davis, & Sauber, 2011). Effects sizes between 0 and 0.20 are considered small effects, 0.20 and 0.60 are moderate effects, 0.60 and 0.80 are large effects, and above 0.80 are very large effects (Vannest & Ninci, 2015). Effect sizes were calculated for integrity and student outcomes. Pearson's *r* correlation was also

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calculated to determine the link between treatment integrity and student outcomes.

Values for Pearson's *r* fall between -1 and 1. Values of 1 and -1 indicate a perfect linear

relationship. Values of 0.70-0.99 indicate a strong relationship, 0.50-0.69 indicates a

moderate relationship, and 0.30-0.49 indicates a weak relationship (Mukaka, 2012).

CHAPTER III - RESULTS

Visual Analysis and Single-Case Effect Sizes

Treatment Integrity

The primary research question asked whether the DPF package would promote high rates of treatment integrity. The percentage of RR components implemented across teachers are presented in Figure 1. Tau-U (Parker et al., 2011) was calculated to assess the effects of DPF on levels of treatment integrity and student outcomes. Tau-U was calculated across teachers comparing treatment integrity in implementation baseline to integrity in DPF. Tau-U was also calculated across students comparing WCPM in implementation baseline to WCPM in DPF. Table 1 includes Tau-U across teachers and students.
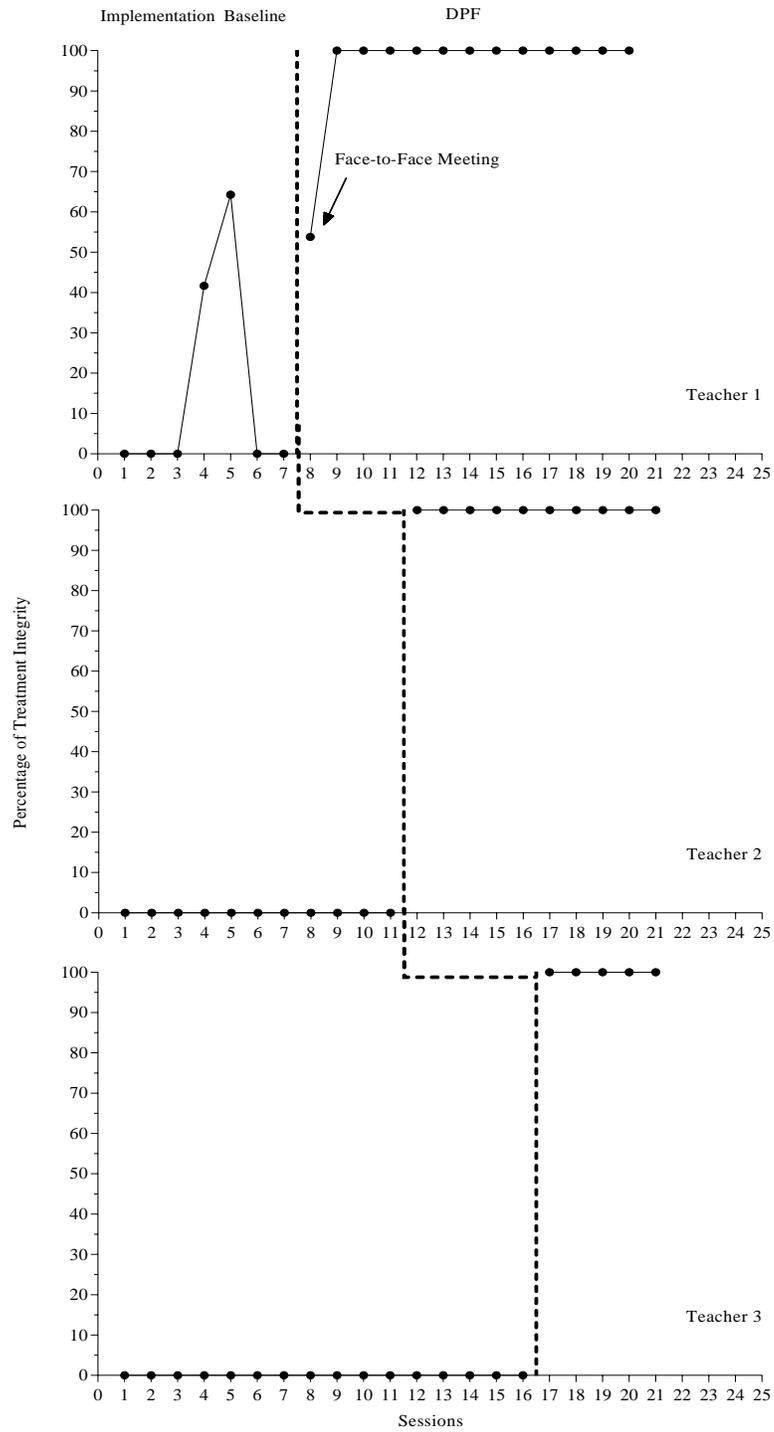
Figure 1. Percentage of treatment integrity across teacher

Table 1

Tau-U depicting the difference in treatment integrity and WCPM from implementation

baseline to Digital Performance Feedback in teachers and students

Dyad	Teacher	Student
1	0.97	0.80
2	1	1
3	1	0.40

Teacher 1. Teacher one demonstrated low rates of integrity, with the exception of two data points in the moderate range (M = 15.14%; range = 0.00-64.29%). Following the introduction of DPF, teacher one's integrity immediately increased and remained stable (M = 96.45%; range = 53.84 – 100%).

Teacher 2. Teacher two demonstrated similar effects with low and stable rates of treatment integrity across the implementation baseline phase (M = 0.00%). Following the provision of DPF, integrity immediately increased and remained stable (M = 100%).

Teacher 3. Teacher three demonstrated similar results to Teachers 1 and 2 in that she also engaged in low levels of treatment integrity during the implementation baseline condition (M = 0.00%). Once DPF was implemented, treatment integrity increased to 100% and remained stable.

All three teachers were consistent in moving from implementation baseline to digital performance feedback in that changes only occurred once the treatment was implemented. Treatment integrity remained low consistently across teachers during the implementation baseline phase, with teachers 2 and 3 implementing 0% integrity. With the provision of digital performance feedback, treatment integrity immediately increased and remained stable consistently across all teachers. Results of Tau-U comparing

treatment integrity from implementation baseline to DPF demonstrated high intervention effects across all teachers. Tau-U was 0.97, 1, and 1 for teachers 1, 2, and 3, respectively.

Student Outcomes

The second research question asked whether student outcomes would be associated with higher levels of treatment integrity. The WCPM and EPM are presented in Figure 2. Table 2 includes the median benchmark assessments and CDWD assessments across all students.

Figure 2. Student outcomes of words read correct and incorrect across students and phases.

Table 2

Benchmark and CDWD assessments across students

Student	Median Benchmark Assessments	CDWD Assessment	Percent Increase
1	78	94	20.51%
2	37	62	67.57%
3	149	153	2.69%

Student 1. During the initial benchmark assessments, Student 1 demonstrated reading fluency scores in the frustrational to instructional range (*Median* = 78, range = 50 – 81). A CDWD assessment was conducted in which Student 1 increased her score by 20.51% but remained in the instructional range. Student 1's WCPM increased slightly but were variable during the implementation baseline condition (*M* = 89, range = 81 – 97). With the provision of DPF, Student 1's WCPM increased, but continued to remain variable (*M* = 107, range = 91 -128). Additionally, Student 1's EPM remained low across all conditions. During the initial benchmark assessments, EPM averaged 2 (range = 0 -4). Student 1's EPM averaged 1.5 (range = 1 -2) and 2.6 (range = 0 -6) during implementation baseline and DPF, respectively. Results of Tau-U comparing WCPM from implementation baseline to DPF for Student 1 indicated a large effect (Tau-U = 0.80).

Student 2. During the initial benchmark assessments, Student 2 demonstrated reading fluency scores in the low instructional range (*Median* = 37, range = 34– 41). A CDWD assessment was conducted in which Student 2 increased her score by 67.57%, but

remained in the instructional range. Student 2's WCPM increased slightly but were relatively stable during the implementation baseline condition ($M = 44$, range $= 40 – 47$). With the provision of DPF, Student 1's WCPM continued to increase slightly ($M = 51$, range $= 48$ -59). Additionally, Student 2 engaged in moderate levels of EPM. EPM demonstrated a slightly decreasing trend throughout the study During the initial benchmark assessments, EPM averaged 7.67 (range $= 7$ -8). Student 2's EPM averaged 4.67 (range $= 4$ -6) and 3.5 (range $= 2$ -5) during implementation baseline and DPF, respectively. Results of Tau-U comparing WCPM from implementation baseline to DPF for Student 2 indicated a very large effect (Tau-U $= 1.00$).

Student 3. During the initial benchmark assessments, Student 3 demonstrated reading fluency scores in the low instructional range (*Median* $= 149$, range $= 133 – 151$). A CDWD assessment was conducted in which Student 3 increased his score by 2.69% but remained in the low instructional range. Student 3's WCPM remained relatively stable during the implementation baseline condition ($M = 151$, range $= 141 – 171$). With the provision of DPF, Student 3's WCPM were variable ($M = 161$, range $= 145$ -177). Additionally, Student 3's EPM remained low across all conditions. During the initial benchmark assessments, EPM averaged 0.67 (range $= 0$ - 1). Student 3's EPM averaged 2.8 (range $= 2$ - 5) and 2.5 (range $= 2$ -3) during implementation baseline and DPF, respectively. For Student 3, only a moderate effect comparing WCPM from implementation baseline to DPF was indicated (Tau-U $= 0.40$).

<div align="center">Pearson's r Correlation</div>

Pearson's *r* was calculated to determine if there was a correlation between treatment integrity and students' WCPM. For teacher-student dyads 1 and 2, a moderate

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relationship was demonstrated ($r = 0.58$ and 0.67 for dyads 1 and 2, respectively). A weak relationship was demonstrated for teacher-student dyad 3 ($r = 0.34$).

Social Validity

BIRS

Teachers completed the BIRS for the repeated reading intervention as well as the DPF procedures. Socially validity was high for both the repeated reading intervention and the DPF procedures across all teachers. Mean scores for the BIRS regarding the reading intervention were 5.17, 4.88, and 4.71 for teachers 1, 2, and 3, respectively. For the DPF procedures, the mean BIRS scores were 5.13, 5, and 5.21 for teachers 1, 2, and 3, respectively. Overall, teachers viewed the repeated reading intervention as an acceptable and effective intervention. Furthermore, teachers reported the DPF procedures as a socially valid consultation procedure. Table 3 includes mean scores across factors and teachers.

Table 3

Mean ratings across each factor on the Behavior Intervention Rating Scale across teachers.

Factors	Teacher 1		Teacher 2		Teacher 3	
	RR	DPF	RR	DPF	RR	DPF
Acceptability	5.17	5.13	4.88	5	4.71	5.21
Effectiveness	5	5	4.71	5	4.29	5
Time to Effectiveness	5.5	5	4.5	5	4.5	5

| Total | 5.17 | 5.13 | 4.88 | 5 | 4.71 | 5.21 |

CIRP

Student participants completed the CIRP at the conclusion of the study to assess the acceptability of the repeated reading intervention. Mean CIRP scores were 4.14, 4.57, and 5 for students 1, 2, and 3, respectively. Overall, students viewed this intervention as an acceptable intervention to target reading difficulties.

CASS

Teachers completed the CASS at the conclusion of the study to assess their acceptability of the DPF consultation procedure. Mean CASS scores were 4.58, 5, and 4.75 for teachers 1, 2, and 3. Overall, teachers viewed the DPF procedures as an acceptable consultation procedure.

CHAPTER IV – DISCUSSION

The purpose of this study was to evaluate the effectiveness of DPF within the context of a reading fluency intervention. As evidenced from the data, DPF was an effective procedure to increase the integrity of initially non-adherent teachers in their implementation of a repeated reading intervention. These data support the same general conclusion from the previous DPF study (Whipple, 2016). The aim of this study was to extend the results of Whipple (2016) by examining DPF within an academic context in which the consultant would not be directly observing the intervention.

The DPF follow-up consultation procedure produced immediate changes in treatment integrity, which remained stable throughout the duration of the study. Only one teacher contacted the face-to-face meeting with the consultant during the DPF condition. Teacher 1 did not watch the video model for her first implementation of the repeated reading intervention in the DPF phase. The face-to-face meeting was scheduled for the next day, but due to the teacher being out one day and the consultant being out an additional day, the meeting did not occur until 3 days later. Additionally, teachers rarely required the use of the video models following the initial video model during the training of the DPF condition. Only Teacher 1 required an additional video model throughout the duration of the study. During the implementation baseline phase, teachers mostly did not implement the intervention at all. Teacher 1 implemented the intervention twice during the implementation baseline phase. During her first implementation, she did not send the audio file to the consultant's device; therefore, all steps requiring the audio recorded data were coded as incorrect/not implemented. Her second implementation involved errors

with the overall repeated reading protocol (e.g., not implementing the final 1-minute read).

Student outcome data appeared linked to treatment integrity data as found in previous research (Allinder et al., 2000; Durlak & DuPre, 2008; Noell et al., 2002; Noell et al., 2005; Reinke et al., 2008). This finding was not supported in Whipple (2016), likely due to the high rates of academically engaged behavior during the implementation baseline. Although there were moderate correlations between treatment integrity and WCPM for two teacher-student dyads, it is important to note that student reading grades did not improve according to teacher report. Student 1 and 2's reading grades remained stable across the duration of the study. Anecdotally, however, Teacher 1 reported a positive conference with Student 1's parent. Her parent reported Student 1 was asking to read more at home, which had not been observed prior to implementation of the RR intervention. Student 3's reading grade increased slightly to a mid-B and only a weak correlation was demonstrated between integrity and student outcomes.

There are several reasons this may have occurred. First, reading grades are not solely determined by reading fluency. According to the instructional hierarchy, reading accuracy should be addressed first, then reading fluency, and finally reading comprehension and generalization. The repeated reading targeted reading fluency only with the hope that reading comprehension would increase with these improvements. These teachers assigned reading grades mainly on tasks that involved comprehension of printed text. Additionally, the duration of the study was approximately four weeks. Changes in reading grades were likely not observed because the intervention was not implemented for a longer period of time. Although teachers were trained on the repeated

reading intervention for the implementation baseline phase, teachers did not implement the intervention consistently, or at all, until the DPF phase. Therefore, Student 3 only received the intervention with acceptable levels of integrity for 1 week.

In regard to the third research question, all teachers indicated that DPF was an acceptable follow-up procedure. Scores were slightly lower than those in Whipple (2016). Anecdotally, teachers reported that this consultative procedure was better than traditional procedures which typically occur during teachers' planning periods. For instance, consultants typically schedule meeting times with teachers before school, during planning periods, or after school. This can be inconvenient for both parties because either the teacher and consultant are coming in early or staying late. Furthermore, teachers are usually required to prepare materials during their planning periods. Texting appears to be an efficient and effective consultative procedure.

<center>Limitations and Future Directions</center>

There are several limitations worth noting in the current study. First, IOA was collected through the use of audio recording devices. For one student, the audio device malfunctioned and IOA was not collected during the benchmark assessments. However, IOA was collected for 66.67% of all benchmark probes across students. Second, the DPF procedure is a packaged consultative procedure; therefore, it is unclear which components were necessary for the increase in treatment integrity. As mentioned previously, only teacher 1 required the face-to-face meeting and she only needed it once throughout the duration of the study. The only steps missed involved steps assessed with the audio recording of the implementation, which she did not sent. Additionally, teachers 2 and 3 only required the first video model during the initial DPF training. Furthermore,

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teachers rarely implemented the intervention during the implementation baseline phase, which could be due to receiving no feedback from the consultant. Therefore, it is unclear whether the integrity increased because of the video model or daily text message feedback. Future studies should conduct a component analysis of the procedures within the DPF procedure.

Third, although teachers rated the repeated reading intervention as a socially valid treatment, teachers were required to send audio recordings of the implementation and pictures of the reading probes to the consultant each day. Anecdotally, teachers reported the biggest problem with the intervention was having to complete this component because it required a few additional steps for the teacher; however, this was done to extend previous studies by evaluating more efficient consultation procedures since consultants are often required to attend multiple schools each day. Future studies should assess whether using the audio device only until IOA with the researcher is achieved then evaluating integrity solely on the permanent product created following the implementation.

Fourth, the implementation baseline phase lasted longer than planned for teachers 2 and 3 due to teacher absences and state-wide testing; therefore, DPF training was postponed. Students 2 and 3 only received the intervention for 1-2 weeks. Although the teachers were trained on the repeated reading intervention, teachers 2 and 3 never implemented the intervention during this phase. If students 2 and 3 had received the intervention for a longer duration and more consistently, grades may have improved and stronger correlations between integrity and outcomes may have been observed. Additionally, student 2 had a significant increase in the words read per minute during the

CDWD assessment (i.e., 67%). The student was included in the study because the primary purpose of the study was to increase treatment integrity and due to inconsistencies in reading scores/grades.

Fifth, due to time constraints with the end of the school year, the DPF procedures were not systematically faded; therefore, maintenance of integrity was not evaluated. Daily feedback may not be feasible for all consultants whereas weekly feedback may be more manageable. It took on average 10-15 minutes for the consultant to listen to the audio recording to assess integrity and send the text message. If video models were needed, it took an additional 10 minutes to edit videos in iMovie and upload to Sprout Videos. Typically, consultants are providing consultative services for multiple teachers and schools; therefore, this may not be feasible. Future studies should examine the fading of the DPF procedures to determine if weekly feedback is sufficient to maintain high integrity.

<div align="center">Implications for Practice</div>

The results from this study offer several implications for practitioners. First, face-to-face meetings were rarely required to increase and maintain high levels of treatment integrity. This is important for those practitioners who serve as the consultant for multiple schools or districts. Additionally, teachers only required the video models once or twice to increase integrity. Therefore, it may be useful to consider incorporating video models in the initial training process. Furthermore, daily feedback may not be necessary to maintain high levels of integrity. Although DPF was not faded in this study, teachers only required video models once or twice to demonstrate perfect integrity.

CHAPTER V – CONCLUSION

Treatment integrity is a critical variable to evaluate to demonstrate intervention effects. The results of this study offer further support for a DPF consultation procedure to increase treatment integrity with academic reading interventions. This procedure was an efficient and effective method for increasing integrity with initially non-adherent teachers. More importantly, this study extends Whipple (2016) by including an intervention that does not require the direct observations; meaning, the consultant is not required to be on site during the implementation. Additionally, the results from this study offer more support for the link between treatment integrity and student outcomes. Future studies should evaluate which components of the DPF package are necessary to increase and maintain high levels of treatment integrity.

APPENDIX A – Teacher Consent Form

Title of Study: Using Digital Performance Feedback to Increase Teacher Treatment Integrity of Reading Intervention.

Purpose of Study: This study will examine the effects of a reading intervention on student's reading. This study will also look at the effects of different follow-up strategies to increase integrity of the reading intervention.

Participants: Students from the general and special education population from grades K – 12 and their teachers can participate in this study. The student must be exhibiting disruptive behaviors in the class.

Methods and Procedures: After agreeing to participant in the study, you will contacted by the primary researcher. You will identify the target student and describe reading problems. Researchers will collect three baseline reading probes on target student. The primary researcher will consult with you to discuss intervention with student. You will serve as interventionists. A repeated reading intervention will be suggested at this time. The primary researcher will review permanent product data to conduct to monitor intervention as well as the student's reading outcomes. A digital performance feedback follow-up procedure will be utilized to determine effects this follow-up procedure has on the integrity of the intervention.

Benefits: You may benefit from participation in the study in that you may gain knowledge and new skills regarding integrity of interventions. In addition, student reading improves when integrity remains high which allows more time for instruction.

Risks and Discomfort: There are minimal risks for the participation of this study for both you and students. You may experience some discomfort meeting with the primary research during the follow-up procedure. The target student may also experience mild discomfort with the reading intervention by receiving extra attention from you. The faculty advisor for this project is a licensed psychologist and will supervise this project and provide recommendations for any problems participants might experience.

Confidentiality of Records: All data will be recorded reading forms and integrity checklists created by the primary investigator. There will be no information regarding your identity on these forms; instead, you will be identified by placing a coded name on the data sheets. Permanent products from data collection will be stored in a locked filing cabinet in the School Psychology Service Center at the University of Southern Mississippi.

Voluntary Participation: Your participation in this study is voluntary. If you choose to withdraw from this study at any time, there will be no penalty or loss of benefits.

Teacher's Consent: If you agree to participate in this study, please read and sign the following page. If you have any questions about this study, please contact Heather Whipple and Dr. Evan Dart (Email: heather.whipple@eagles.usm.edu; evan.dart@usm.edu). This project and this consent form have been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the Institutional Review Board Office, The University of Southern Mississippi, Box 5147, Hattiesburg, MS 39406-5147, (601) 266-6820.

_____   _____
Heather Whipple, B.S.   Evan H. Dart, Ph.D.
                                        Supervising Licensed Psychologist

School Psychologist-in-Training   MS License
Department of Psychology   Department of Psychology
The University of Southern Mississippi   The University of Southern Mississippi

THIS SECTION TO BE COMPLETED BY TEACHER

Please Read and Sign the Following:

I have read the above documentation and consent to participate in this project. I have had the purpose and procedures of this study explained to me and have had the opportunity to ask questions. I am voluntarily signing this form to participate under the conditions stated. I have also received a copy of this consent. I understand that I may withdraw my consent for participation at any time without penalty, prejudice, or loss of privilege.

_____   _____

Signature of Teacher   *Date*

_____

Signature of Witness

APPENDIX B Assent Form

Why am I being asked to participate?

You are being asked to participate in a repeated reading intervention to help develop

foundational skills in reading. This means that you will be asked to practice reading

several times to improve your reading skills. Teachers have requested that you participate

in this intervention to help you improve your reading.

What will I have to do?

You will be asked to read a passage several times to improve your reading fluency; this

should only take about 10 minutes each time. After the study is complete, you will be

asked to complete a rating scale about the reading intervention that will take

approximately 5 minutes to complete.

What do I get if I agree to participate?

If you choose to participate, you will get practice reading which will improve your

reading accuracy and fluency. Improved reading will help you throughout all of your

coursework and help you make good grades.

Can anything bad happen if I participate?

There are few risks involved with this intervention. You may experience some discomfort

from getting extra teacher attention. However, the teacher will meet with you individually

and privately to decrease any potential discomfort you may experience.

Who will get to see information about me?

All of your information will be kept confidential. Fake names will be used for your

teachers and your name will not be included on any of the observation sheets. All the

information will be stored on password protected computers and in locked filing cabinets.

What if I do not want to participate?

You have the right to not participate in this intervention. If you choose to participate, you also have the right to withdraw (stop) the intervention at any given time without penalty.

Who may I contact if I have other questions or concerns about my participation?

This project has been approved by the Institutional Review Board. Its job is to project research participants. Questions or concerns about your participation should be directed to the Manager of the IRB at 601-266-5997.

Participant's Name: _____ Participant's Age: _____

Person Soliciting Assent: Heather Whipple

Agreement to Participate

I agree to participate in this research project. The project has been fully explained to me and I was given the chance to ask any questions I have about it. I understand that I can stop participating at any time.

_____   _____

Student signature   Date

_____   _____

Person soliciting assent   Date

APPENDIX C Parental Consent Form

Title of Study: Using Digital Performance Feedback to Increase Teacher Treatment Integrity of a Repeated Reading Intervention

Purpose of Study: This study is affiliated with The University of Southern Mississippi and will examine the effects of a repeated reading intervention on student's reading. This study will also look at the effects of different follow-up strategies to increase integrity of the repeated reading intervention.

Description of Study: After you agree for your child to participate, researchers will collect three benchmark reading probes on your child. A repeated reading intervention will be suggested at this time. The primary researcher will continue to conduct progress monitoring probes on the student's reading and review teacher integrity. A digital performance feedback follow-up procedure will be utilized to determine effects this follow-up procedure has on the integrity of the intervention. Following the completion of the study, your child will be asked to complete a rating scale about the acceptability of the repeated reading intervention. This will take approximately 5 minutes.

Benefits: Your child may benefit from participation in the study in that he/she will be able improve his/her reading skills. Also, the integrity of teacher's implementation of the reading intervention is examined. Higher integrity can lead to better student outcomes.

Risks: There are minimal risks for the participation of this study for your child. Your child may experience mild discomfort with the repeated reading intervention by receiving extra attention from the teacher. The faculty advisor for this project is a licensed psychologist and will supervise this project and provide recommendations for any problems participants might experience.

Confidentiality of Records: All data will be recorded on reading data forms, reading probes and integrity checklists created by the primary investigator. There will be no information regarding your child's identity on these forms. Permanent products from data collection will be stored in a locked filing cabinet in the School Psychology Service Center at the University of Southern Mississippi.

Alternative Procedures: Participation is voluntary. If you choose to not allow your child to participate, your child can still receive additional supports in the classroom from the teacher.

Participant Assurance: This project has been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Manager of the IRB at 601-266-5997. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Any questions about the research should be directed to the Principal Investigator, Heather Whipple, at heather.whipple@eagles.usm.edu.

Parental Consent Information

Participant's Name: _____   **Participant's Age:** _____

Parent or Guardian's Name: _____

Person Soliciting Parental Consent: Heather Whipple

Agreement to Allow Participation in Research

Consent is hereby given to participate in this research project. All procedures and/or investigations to be followed and their purpose, including any experimental procedures, were explained. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected.

The opportunity to ask questions regarding the research and procedures was given. Participation in this project is completely voluntary, and participants may withdraw at any time without penalty, prejudice, or loss of benefits. All personal information is strictly confidential, and no names will be disclosed. Any new information that develops during the project will be provided if that information may affect the willingness to continue participation in the project.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-5997.

_____   _____

Parent or Guardian of Research Participant   Date

_____   _____

Person Explaining the Study   Date

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APPENDIX D Repeated Reading Integrity

Teacher:_____   Date:_____

Observer:_____

Component	Completed		
1. Read instructions to student	Y	N	N/A
2. Said, "Begin" and started timer after student started to read	Y	N	N/A
3. Marked any incorrect words with slash	Y	N	N/A
4. Recorded how long it took student to read after 1st read	Y	N	N/A
5. Said, "Begin" and started timer after student started to read	Y	N	N/A
6. Marked any incorrect words with slash	Y	N	N/A
7. Recorded how long it took student to read after 2nd read	Y	N	N/A
8. Said, "Begin" and started timer after student started to read	Y	N	N/A
9. Marked any incorrect words with slash	Y	N	N/A
10. Recorded how long it took student to read after 3rd read	Y	N	N/A
11. Told student the time and told to read again for final 1 minute read	Y	N	N/A
12. Said, "Begin" and started timer for 1 minute after student started to read	Y	N	N/A
13. Marked any incorrect words with slash	Y	N	N/A
14. Recorded how many words read correct/incorrect in one minute probe	Y	N	N/A

Number of steps completed: **/ 14**

Percentage of steps completed: _____

APPENDIX E Student Data Tracking Sheet

Date	Name of Passage	WCPM	EPM

APPENDIX F Repeated Reading Script

1. Present the student copy of the Instructional Passage to student and say: "Today we are going to practice reading a story several times to help you get better at reading. Each time I will tell you how fast you read the story. Here is the story. Read the story aloud. Try to read each word, but if you come to a word you don't know, I will tell it to you. Be sure to do your best reading. Do you have questions?"

2. Say "Begin" and start the stopwatch when the student reads the first word

3. If the student hesitates on a word for more than three seconds or reads the word incorrectly, tell the student the word and make the word with a slash.

4. When the student has finished, say "You read the story in _____ minutes/seconds. Try reading it again and I will tell you how quickly you read the story" and record time on teacher copy of reading passage.

5. Say "Begin" and start the stopwatch when the student reads the first word

6. If the student hesitates on a word for more than three seconds or reads the word incorrectly, tell the student the word and make the word with a slash.

7. When the student has finished, say "This time you read the story in _____ minutes/seconds. Try reading it again and I will tell you how quickly you read the story." Record the time on teacher copy of reading passage.

8. Say "Begin" and start the stopwatch when the student reads the first word

9. If the student hesitates on a word for more than three seconds or reads the word incorrectly, tell the student the word and make the word with a slash.

10. When the student has finished, say "This time you read the story in _____ minutes/seconds. Recorded this time on teacher copy of reading passage.

11. Say, "Try reading it one more time and I will tell you how many words you read in one minute."

12. Say "Begin" and start the timer for one minute when the student reads the first word

13. If the student hesitates on a word for more than three seconds or reads the word incorrectly, tell the student the word and make the word with a slash.

14. Stop the student after one-minute and record the number of words read correct/incorrect in one-minute on the data tracking sheet

<div align="right">Adapted from Clinic CD</div>

APPENDIX G Behavior Intervention Rating Scale (BIRS)

1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Slightly Agree, 5=Agree, 6=Strongly Agree

1.   This would be an acceptable intervention for the child's   1   2   3   4   5   6
     problem behavior.

2.   Most teachers would find this intervention appropriate   1   2   3   4   5   6
     for behavior problems in addition to the one described.

3.   The intervention should prove effective in changing the   1   2   3   4   5   6
     child's problem behavior.

4.   I would suggest the use of this intervention to other   1   2   3   4   5   6
     teachers.

5.   The child's behavior problem is severe enough to   1   2   3   4   5   6
     warrant use of this intervention.

6.   Most teachers would find this intervention suitable for   1   2   3   4   5   6
     the behavior problem described.

7.   I would be willing to use this in the classroom setting.   1   2   3   4   5   6

8.   The intervention would *not* result in negative side effects   1   2   3   4   5   6
     for the child.

9.   The intervention would be appropriate for a variety of   1   2   3   4   5   6
     children.

10   The intervention is consistent with those I have used in   1   2   3   4   5   6
     classroom settings.

11. The intervention was a fair way to handle the child's   1   2   3   4   5   6
     problem behavior.

12. The intervention is reasonable for the behavior problem   1   2   3   4   5   6
     described.

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| 13. | I like the procedures used in the intervention. | 1 | 2 | 3 | 4 | 5 | 6 |

| 14. | The intervention was a good way to handle this child's behavior problem. | 1 | 2 | 3 | 4 | 5 | 6 |

| 15. | Overall, the intervention would be beneficial for the child. | 1 | 2 | 3 | 4 | 5 | 6 |

| 16. | The intervention would quickly improve a child's behavior. | 1 | 2 | 3 | 4 | 5 | 6 |

| 17. | The intervention would produce a lasting improvement in the child's behavior. | 1 | 2 | 3 | 4 | 5 | 6 |

| 18. | The intervention would improve a child's behavior to the point that it would not noticeably deviate from other classmates' behavior. | 1 | 2 | 3 | 4 | 5 | 6 |

| 19. | Soon after using the intervention, the teacher would notice a positive change in the problem behavior. | 1 | 2 | 3 | 4 | 5 | 6 |

| 20 | The child's behavior will remain at an improved level even after the intervention is discontinued. | 1 | 2 | 3 | 4 | 5 | 6 |

| 21. | Using the intervention should not only improve the child's behavior in the classroom, but also in other settings (e.g., other classrooms, home). | 1 | 2 | 3 | 4 | 5 | 6 |

| 22. | When comparing this child with a well-behavior peer before and after the use of the intervention, the child's and the peer's behavior would be more alike after using the intervention. | 1 | 2 | 3 | 4 | 5 | 6 |

23.   The intervention should produce enough improvement in   1   2   3   4   5   6

        the child's behavior so the behavior no longer is a

        problem in the classroom.

24.   Other behaviors related to the problem behavior also are   1   2   3   4   5   6

        likely to be improved by the intervention.

Adapted from Elliott, S., & Von Brock Treuting, M. (1991). The behavior intervention rating scale:

Development and validation of a pretreatment acceptability and effectiveness measure. *Journal of School*

Psychology, 29, 43-51.

APPENDIX H Behavior Intervention Rating Scale DPF

BEHAVIOR INTERVENTION RATING SCALE

Please respond to each of the following statements thinking about the consultation

process (i.e., Digital Performance Feedback). Please then circle the number associated

with your response. Be sure to answer all statements.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Digital Performance Feedback was an acceptable consultation process for the students' problem behavior(s).	1	2	3	4	5	6
Most teachers would find digital performance feedback appropriate for other classroom behavior problems.	1	2	3	4	5	6
Digital performance feedback proved effective in helping to change students' problem behavior(s).	1	2	3	4	5	6
I would suggest the use of digital performance feedback to other teachers.	1	2	3	4	5	6

The behavior problems were severe enough to warrant use of this consultation process.	1	2	3	4	5	6
Most teachers would find digital performance feedback suitable for the classroom use described.	1	2	3	4	5	6
I would be willing to use digital performance feedback again in the classroom.	1	2	3	4	5	6
Digital performance feedback did *not* result in negative side effects for the teachers.	1	2	3	4	5	6
This consultation procedure would be appropriate for a variety of teachers.	1	2	3	4	5	6
Digital performance feedback was a fair way to provide consultation.	1	2	3	4	5	6
Digital performance feedback was reasonable for the problem behaviors described.	1	2	3	4	5	6

I liked the procedures used in Digital performance feedback.	1	2	3	4	5	6
Digital performance feedback was a good way to provide consultation.	1	2	3	4	5	6
Overall, digital performance feedback was beneficial to the students.	1	2	3	4	5	6
Soon after using digital performance feedback, the teacher noticed a positive change in the problem behavior.	1	2	3	4	5	6

Adapted from Elliott, S., & Von Brock Treuting, M. (1991). The behavior intervention rating scale: Development and validation of a pretreatment acceptability and effectiveness measure. *Journal of School Psychology, 29*, 43-51.

APPENDIX I Children's Intervention Rating Profile

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
This intervention was fair.	1	2	3	4	5	6
I liked this intervention.	1	2	3	4	5	6
I think other students would like this intervention	1	2	3	4	5	6
This intervention helped me do better in school.	1	2	3	4	5	6
There are better ways to handle reading problems than using this intervention	1	2	3	4	5	6
This intervention caused problems for my friends	1	2	3	4	5	6
This intervention caused problems for me	1	2	3	4	5	6

Adapted from Witt, J. C., & Elliot, S. N. (1985). Acceptability of classroom intervention strategies. In T. R. Kratochwill (Ed.), Advances in School Psychology (Vol. 4, pp. 251-288). Hillsdale, NJ: Erlbaum. Copyright 1985 by Lawrence Erlbaum Associates, Inc. Reprinted

APPENDIX J Consultation Acceptability and Satisfaction Scale

(Taber, 2014)

	Strongly Disagree					Strongly Agree
1. The consultant seemed knowledgeable about effective classroom practices.	0	1	2	3	4	5
2. The consultant effectively answered my	0	1	2	3	4	5
3. The consultant provided recommendations that were appropriate given the concerns about the student/class.	0	1	2	3	4	5
4. The consultant clearly explained the assessment and/or intervention procedures.	0	1	2	3	4	5
5. The consultant effectively taught me how to implement their recommendations.	0	1	2	3	4	5
6. The consultant provided me with the resources to implement their	0	1	2	3	4	5
7. The consultation process seemed appropriate give the severity of the student's/class's referral concern.	0	1	2	3	4	5
8. The consultation process did NOT significantly interfere with classroom	0	1	2	3	4	5
9. The consultation process was completed in a timely fashion.	0	1	2	3	4	5
10. The referred student/class benefited from the consultation process.	0	1	2	3	4	5
11. I would like to work with this consultant again in the future.	0	1	2	3	4	5
12. Other teachers would benefit from working with this consultant.	0	1	2	3	4	5

APPENDIX K Repeated Reading Script

For Teacher –DPF

1. Start by providing data via text message – make sure teacher receives text okay

    a. Say, "As you know, we have been conducting some data for

       _____. I first want to just present the data we collected and

       explain exactly what we were looking for. Here we have number of words read

       correctly and words read incorrectly data. We were also looking at the integrity of the

       intervention (those 14 steps we talked about for repeated reading)."

        i. Comment on the results

2. Introduce Digital Performance Feedback

    a. Say, "Based on this I'd like to introduce something called Digital Performance

       Feedback. We want to find better, more convenient ways to provide consultation to

       teachers. So now, if I don't see a step implemented correctly, I will send you a text

       message with a link attached. The link will take you to a video model(s) of the steps

       you missed. They are VERY short videos, so please watch them. If you don't watch

       the video then we will need to have a face-to-face meeting to go over the missed

       step(s). The goal of this follow-up procedure is to provide teachers with feedback

       without cutting into your planning time. I know teachers are SUPER busy so I want

       to make sure we are providing consultation when it's convenient for you. Having

       video models may provide us with a better, more efficient way to provide feedback.

       You can watch the videos anytime, but if you don't watch them by 10pm then I will

       be coming before school starts to meet with you to go over the steps."

        i. Make sure this all makes sense for teacher and ask if he/she is okay with

           providing cell-phone number for the text messages.

3. Send text with video model(s) of missed intervention steps from previous day and have her watch in front of you to make sure the video works

4. "Any questions?"

APPENDIX L Procedural Integrity Checklist for Benchmark Assessments

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps	
The consultant collects parent consent form from teacher	✓ X
The consultant meets with the student individually	✓ X
The consultant has student complete the assent form	✓ X
The consultant has student read three passages (current grade)	✓ X
The consultant records student data (frustrational, instructional, mastery)	✓ X
The consultant continues the process until instructional is met	✓ X N/A
Steps completed	/
Percentage of Steps completed	

APPENDIX M Procedural Integrity for Performance vs. Skill Deficit

Teacher Name:_____   Date:_____ Phase:_____

Observer:_____

Procedural Integrity Steps	
The trainer met with the student individually	✓ X
The trainer explained the procedure (i.e., if you beat your previous score you get to pick a prize)	✓ X
The trainer tells the student the goal to beat based on the previous median of benchmark assessments on current grade	✓ X
The trainer has student read an additional passage for 1 min	✓ X
The trainer shares the score with student	✓ X
The trainer provides the student with a prize (if he/she beat goal)	✓ X N/A
The trainer withholds prize for not beating score	✓ X N/A
The trainer records all data to determine skill vs performance deficit	✓ X
Steps completed	/
Percentage of Steps completed	

APPENDIX N Procedural Integrity Checklist for Cold Probe Assessments

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps	
The observer meets with the student individually after every third intervention session	✓ X
The observer has student read one AimsWeb passage (without intervention)	✓ X
The observer records student data (frustrational, instructional, mastery)	✓ X
Steps completed	/
Percentage of Steps completed	

APPENDIX O Procedural Integrity Checklist for Initial Meeting/Prior to Baseline

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps		
The trainer met with the teacher individually	✓	X
The trainer gathers information regarding student concerns	✓	X
The trainer has teacher complete consent	✓	X
The trainer provides teacher with parent consent to distribute	✓	X
Steps completed	**/**	
Percentage of Steps completed		

APPENDIX P Procedural Integrity Checklist for Implementation Baseline

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps	
The consultant collects intervention material from mailbox daily.	✓ X
The consultant does not provide any feedback to teachers.	✓ X
The consultant collects teacher treatment integrity via audio recording and intervention sheet	✓ X
The consultant returns the audio recorder to mailbox	✓ X
Steps completed	/
Percentage of Steps completed	

APPENDIX Q Procedural Integrity Checklist Following Reading Intervention

Teacher Name:_____ Date:_____ Observer:_____

Procedural Integrity Steps	
The researcher sends text message following intervention providing teacher the results of: • Student WCPM • Praise statement • Feedback	Y N
The researcher sent link to video model(s) of missed steps	Y N N/A
The researcher checked website to determine if teacher watched video model(s)	Y N N/A
Researcher met with teacher prior to next day's implementation	Y N N/A
Steps completed	**/**
Percentage of Steps completed	

APPENDIX R Procedural Integrity Checklists for Meeting with Teacher Prior to

Implementation Baseline

Teacher Name:_____   Date:_____ Phase:_____
Observer:_____

Procedural Integrity Steps		
The trainer met with the teacher individually	✓	X
The trainer explained the results of benchmark assessments with the target student	✓	X
The trainer introduced repeated reading intervention, following script	✓	X
The trainer explains the operational definitions of the correct/incorrect words	✓	X
The trainer provides the teacher with all of the materials needed for intervention implementation including • Audio recording • Data Sheet • Binder with probes • Protocol	✓	X
The trainer explains and demonstrates how to use the audio recorder	✓	X
The trainer explained steps of the intervention	✓	X
The trainer discussed when/where to place materials for pickup each day	✓	X
The trainer ensures the teacher has a full understanding of the intervention components.	✓	X
Steps completed	/	
Percentage of Steps completed		

APPENDIX S Procedural Integrity for Meeting with Teacher After Implementation

Baseline

Teacher Name:_____   Date:_____ Phase:_____
Observer:_____

Procedural Integrity Steps		
The trainer met with the teacher individually	✓	X
The trainer explained the results of reading with progress monitoring with the target student	✓	X
The trainer reviewed teacher integrity data	✓	X
The trainer explains the Digital Performance Feedback procedures, following script.	✓	X
The trainer reviewed the repeated reading intervention	✓	X
The trainer sent the required video models via text to teacher	✓	X
The trainer ensures the teacher has a full understanding of the intervention components.	✓	X
Steps completed	/	
Percentage of Steps completed		

APPENDIX T Procedural Integrity Checklist Following Observations – Final Meeting

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps	
The researcher met with teacher individually	✓ X
The researcher went over all results	✓ X
The researcher had teacher complete the BIRS (one for intervention and one for DPF) and CASS	✓ X
The researcher had student complete the CIRP	✓ X
The researcher collected all demographic information regarding teacher, student, classroom, and school	✓ X
Steps completed	/
Percentage of Steps completed	

APPENDIX U Procedural Integrity Checklist Following Reading Intervention – Meeting

Cancellation

Teacher Name:_____   Date:_____ Observer:_____

Procedural Integrity Steps	
The researcher met with teacher individually	Y N N/A
The researcher went over missed steps of previous day's implementation	Y N N/A
The researcher practiced missed steps of the intervention	Y N N/A
Steps completed	/
Percentage of Steps completed	

APPENDIX V – IRB Approval Letter

THE UNIVERSITY OF SOUTHERN MISSISSIPPI.

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 17033004
PROJECT TITLE: Using Digital Performance Feedback to Increase Teacher Treatment Integrity of a Repeated Reading Intervention
PROJECT TYPE: New Project
RESEARCHER(S): Heather Whipple
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 04/04/2017 to 04/03/2018
Lawrence A. Hosman, Ph.D.
Institutional Review Board

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