UNIVERSITY OF CALIFORNIA
RIVERSIDE

Providing Performance Feedback to Paraeducators Implementing PALS

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Education

by

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June 2021

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ABSTRACT OF THE DISSERTATION

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University of California, Riverside, June 2021
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Fluency is a crucial literacy skill whose mastery facilitates the acquisition of higher order readings skills such as comprehension. It can be improved through practiced-based instructional methods like repeated reading. Peer-Assisted Learning Strategies (PALS) is an intervention that utilizes repeated reading with partners to maximize practice and deliver corrective feedback to students. Although teachers understand the necessity of differentiated instruction, few have the time for proper implementation. Paraeducators are an extent resource that can be used as means to provide practiced-based interventions if given adequate training. Performance feedback is the best strategy for improving treatment integrity, and it can be improved further with the addition of negative reinforcement. The current study combines components of a multiple treatments and ABCBC single-case designs to investigate the effect performance feedback with negative reinforcement (PF + S_{R-}) will have on treatment integrity, when compared against performance feedback alone (PF) with respect to paraeducator implementation of PALS. Progress monitoring was used to analyze the effect paraeducator implementation of PALS had on reading outcomes. Results indicate that PF + S_{R-} maximized treatment integrity and that when a paraeducator is give adequate

training on a practice-based intervention, they can implement it with enough fidelity to produce positive student outcomes.

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Introduction

Reading skills are a fundamental requirement to function in our modern society. Many of us take these skills for granted when we look at a street sign, analyze the ingredient list on a package of food, check a text message, or decide what to watch on television. Even though using these skills seems simple and fluid for a majority of people, we now know that how reading processes work and how literacy skills are acquired are complex. The aptly named simple view of reading (Gough, Hoover, & Petersen, 1996) contends that the ability to read can be broken down into subskills, specifically decoding and comprehension. These skill areas were found to be positively correlated; thus, good readers are highly skilled in both of these dimensions. Conversely, skill deficits in one or both of these areas present unique challenges for poor readers.

Reading Fluency

The National Reading Panel (NRP, 2000) has identified several skill areas that further break down the simple view of reading. One of these skill areas is fluency which can be described as the ability to "read orally with speed, accuracy, and proper expression" (NRP, 2000, p. 11). Although this simple description has been generally accepted by educators and researchers alike, when it is examined further, fluency is revealed to be much more intricate. Hudson (2011) argues that fluency is a multidimensional construct that integrates many aspects of proficient reading that improves slowly over long periods of time. Specifically, there are three major components that fluency comprises.

The first of these major components is automaticity, a process that is fast, effortless, autonomous, and able to be completed without conscious control or attention (Hudson, 2011). Logan (1988) theorizes that automaticity is a phenomenon whereby information is directly accessed from memory in a single step. Logan's theory is based upon four general principles. First, automatic processes are fast, effortless, and unconscious because they rely on memory retrieval. For many, memory retrieval does not require much cognitive work; simply put individuals either know pertinent information or they do not. For example, if a person is asked what her name is, she does not spend much time thinking about; she just says it. The second principle of Logan's theory is that automaticity can be strengthened progressively through practice. This principle can be illustrated by repeating a phone number until is committed to memory. Logan's third principle describes how practice strengthens automaticity. Depending on the type of information being practiced, individuals rely on different problem-solving algorithms to obtain information. The more these algorithms are practiced, the more likely it is that the information is committed to memory: hence the individual no longer relies on the algorithm. Going back to the phone number example, perhaps the individual conceptualizes phone numbers to follow a particular rhythmic cadence. When practicing the recitation of the number, the individual follows this cadence until the number is memorized. Once the number is memorized, the individual no longer follows this cadence, she can just produce the phone number when necessary. Logan's final principle involves consistency. Specific information is retrieved from memory as a response to specific stimuli. Using the phone number example, if the individual were asked, "What is

Derek's phone number?" she would produce a response that is consistent with her practice and specific to the question that was asked.

The second major component that contributes to fluency is efficiency. Efficiency can be described by how quickly various processes can activate and be completed (Hudson, 2011). In his verbal efficiency theory, Perfetti (1985) outlines the processes that must be completed efficiently to achieve fluent reading. First, as readers look upon a text, they must visually identify orthographic symbols and match them with their corresponding phonology. Connecting orthography with phonology facilitates word identification. Next, readers must access long term memory to connect the word with its semantic meaning. The reader must understand the semantic meaning both on a vocabulary level and within the context of the rest of the text. If readers can make a semantic connection to the word that they are reading, they must integrate the word on two levels. On the sentence level readers must integrate the word syntactically, and at the text level they must be able to infer the semantic meaning of the passage as a whole. All of these processes occur within readers' working memory which, relative to long term memory, has a very limited capacity. If these processes are automatized, readers can complete them efficiently. Conversely, if these one or more of processes are not automatized, a strain may be placed upon working memory, which may lead to further reading difficulties.

The final major component of fluency is the ability to flexibly coordinate the multiple processes associated with reading in order to accomplish the reader's specific goal (Hudson, 2011). Rasinski (2004) postulates that in order for readers to be successful,

they must have control over surface-level text processing to understand the deeper meaning of the text. Readers who have achieved mastery over these processes can coordinate and synchronize them in order to maintain all the facets of oral and silent reading. One of these facets that is of particular importance is prosody. Hudson (2011) describes prosody as the rhythmic and tonal aspects of oral language. Some key features of prosody include intonation, stress patterns, and duration, all of which add to the expressiveness in which a text is read. Prosody may be an indication the reader can efficiently manage word-level processes and comprehend the deep meaning of the text being read.

Why is fluency important? Although fluency is only one of five critical literacy skill areas (NRP, 2000), failure to gain proficiency in fluency can have lasting consequences. As previously mentioned, Perfetti's (1985) verbal efficiency theory contends that comprehension is a higher order process that places an intense demand on cognitive resources. If a reader has not achieved proficiency over lower order, word-level processes, she cannot efficiently manage her cognitive resources and will struggle with reading as a consequence. This notion was expanded upon by Jenkins, Fuchs, van der Broek, Espin, and Deno (2003) who examined the effects reading within context of a text has on fluency and the relation fluency has to comprehension. To accomplish this, the researchers had their sample (N = 113) of fourth grade readers complete a context-free measure of reading performance, which is indicative of processing words in isolation, as well as a context measure, which is indicative of unconscious expectancy processes. Additionally, an overall measure of reading comprehension was also administered. Their

results indicated that although both conditions contribute to comprehension, context skills account for a significantly larger amount of the unique variance. Another finding specifies that context-free skills contribute to context fluency for poor readers, whereas comprehension processes contribute more to context fluency for more fluent readers. An explanation for this phenomenon may be that the more fluent readers have successfully automatized word-level skills, allowing them to access the deeper meaning of the text. Conversely, the poor readers focus most of their cognitive resources on word-level skills, which affects their ability to read fluently and comprehend the text. Taken together, these results stress the importance that mastery of word-level skills has on fluency as well as on higher order reading skills.

Seidenberg and McClelland's (1989) connectionist model provides more insight into how word-level processes affect comprehension. The connectionist model contends that orthography and phonology are separate processes that influence each other. In addition, both of these processes on their own have a mutually influential relation to semantic meaning. This model suggests that the level of efficiency in each of these areas affects the other. To create a deeper understanding of how the connectionist model facilitates fluency, Roembke, Hazeltine, Reed, and McMurray (2019) investigated the role automaticity plays in the model. For their analysis, the researchers administered a series of measures to 58 middle school students that assessed their ability in decoding, oral fluency, silent fluency, and comprehension. Additionally, three researcher designed measures were used to assess the extent to which either the orthography to semantic meaning pathway (O to S) or the orthography to phonology pathway (O to P to S)

contributes to word recognition. In order to separate the effect that prior knowledge of letters and words has on automaticity, a backward masking procedure was used on half of the trials on the research designed measures. Their results indicate that although both pathways contribute to automaticity, the O to S pathway is more directly involved. The O to P to S pathway demonstrated a slower activation of semantic information which may be indicative of the process by which new words are decoded. These findings, taken together with verbal efficiency theory, provide more evidence to suggest that word-level processing must be mastered in order to activate fluency and directly access semantic meaning.

How can fluency be improved? The most certain way to improve fluency is to practice word level skills. Practicing these skills helps to facilitate automaticity, which in turn facilitates the efficient management of the processes involved in literacy (Perfetti, 1985). One method that provides students with opportunities to practice is repeated reading (Samuels, 1979). In repeated reading, a student is given a passage and is asked to read it aloud to an adult. The adult collects data on the student's reading speed and the number of word recognition errors. If students do not meet a predetermined criterion, then they are given time to reread the passage individually. After students have practiced reading the passage, they are given another opportunity to read the passage aloud to the adult. This process is repeated until students meet the predetermined criterion. As Dowhower (1989) points out, repeated reading can be adapted to meet the needs of a classroom in several ways. First, it can be used to provide direct instruction. The teacher can first read the passage to the class followed by having the class read it chorally before

reading to the teacher independently. Another way repeated reading can be adapted is by taking a centers approach. The teacher can group students and take turns meeting with each group. Lastly, repeated reading can fit into a cooperative learning strategy where students select partners and take turns reading aloud while the other provides feedback.

In the decades since its inception, repeated reading has been evaluated extensively to determine its efficacy. One of the most significant analyses of repeated reading comes from Therrien (2004), who utilized meta-analytic procedures to aggregate fluency and comprehension outcomes from 18 repeated reading studies spanning 24 years. A distinction was made between non-transfer results (this concerns the mastery of a specific passage) and transfer results (generalizable growth). Across all non-transfer studies, repeated reading had a large effect on fluency (ES = 0.83) and a moderate effect on comprehension (ES = 0.67). The transfer studies saw smaller, but meaningful growth with fluency and comprehension with moderate (ES = 0.50) and small (ES = 0.25) effects respectively. These results indicate that students who practice repeated reading are more likely to improve their skills relative to the specific passage they are practicing than they are to generalize those skills to other texts. Although transfer studies demonstrated decreased effects relative to non-transfer studies, when the transfer effects are placed within the larger context of reading intervention research (Wanzek et al., 2013), Therrien's results indicate that interventions that utilize repeated reading facilitate robust and generalizable gains in the areas of fluency and comprehension.

Important considerations. In order to maximize the efficacy of a repeated reading intervention there are several crucial factors that must be considered. In addition to

evaluating the overall effectiveness of repeated reading, Therrien's (2004) meta-analysis identified some critical components of repeated reading. The first critical component particularly applies to students who are struggling with a specific passage. In this event, it is recommended that students be provided with some sort of cue and that they should repeat the passage three to four times. Although cueing can provide a scaffold that assists the student in improving their fluency and comprehension of a particular passage, a definitive conclusion as to which type of cue is most effective (fluency, comprehension, or speed) was not reached. The second component to be considered is corrective feedback. Corrective feedback provides the student an opportunity to gain generalizable word-level and text-level skills that ultimately help the student meet the predetermined criterion.

Considerations for the reading materials used during intervention should also be made in order to maximize student outcomes. One of these considerations is the difficulty of the text. O'Connor et al. (2002) conducted a study that compared reading outcomes relative to two tutoring approaches. In the reading-level matched condition (RLM), pretest data were used to evaluate each individual student's level of reading proficiency. Students were then given instruction and reading materials based on their proficiency levels. In the classroom matched (CM) condition, intervention was derived from the general classroom materials. The results demonstrated that oral reading fluency was the only outcome that differed across conditions, favoring the RLM group. This may suggest that reading instruction given at the student's level of difficulty is a better means of

addressing specific fluency deficits. Additionally, the results also indicate that providing specialized instruction in a general class room setting can be challenging.

Another consideration regarding reading materials is the amount of word overlap, which refers to the amount of words that overlap across different texts (Hudson, 2011). In order to investigate the effect of word overlap, Hiebert (2005) conducted a study that compared repeated reading interventions that utilized two types of text. In the literature group, students were administered repeated reading procedures based on a district's literature-based reading program able to be adapted to accommodate the student's level of difficulty. The content group completed repeated reading procedures using a set of science and social studies texts that were designed to have very few, rare, multisyllabic words that only appeared once. The results demonstrated that the content group significantly outperformed the literature group on measures of fluency. This finding suggests that even if a text is accessible to a student, without significant word overlap students are not given maximal opportunities to practice.

Peer-Assisted Learning Strategies. One specific intervention that incorporates repeated reading is Peer-Assisted Learning Strategies (PALS; Fuchs, Fuchs, & Burish, 2000; McMaster, Fuchs, & Fuchs, 2006). PALS has been validated as an evidence-based intervention which utilizes several strategies to improve fluency and comprehension outcomes. First, student participants are paired and trained by the interventionist to use specific prompts, corrections, and feedback. Second, students interact with each other, taking turns within their pairs as tutors and tutees, which maximizes their opportunities to practice literacy skills. Finally, the pairs complete several structured activities

independently that are designed to target fluency and comprehension. During these activities, the interventionist can monitor progress and provide additional feedback to students. Although PALS was initially designed for grades two through six, it can also be adapted for other grade levels. Mastropieri et al. (2001) conducted a study of middle school students with learning disabilities by comparing a group that received a modified version of PALS to a non-treatment control group. Results indicated that students in the treatment group scored significantly higher on the post-test comprehension measure than the control group suggesting that PALS can be effective for older students, although more studies are needed.

Paraeducators

Although practice-based fluency interventions have demonstrated effect, issues may arise when they are applied in a practical setting. Perhaps the single greatest impediment to implementation is time. In a series of studies, Wanzek and Vaughn (2008) investigated the role that intervention time plays in facilitating reading outcomes by comparing data from a non-treatment control group that only received core reading instruction, a group that received one, additive, 30-minute daily intervention session, and a group that received two, additive, 30-minute daily intervention sessions. Results indicated that both intervention groups outperformed the control group, but there were no significant differences on the outcomes between the treatment groups. This would suggest that children with reading difficulties should receive at least 30 minutes of additional reading instruction each day in order to facilitate gains. However, this knowledge may present a strain on teachers. According to a study on teacher attitudes

conducted by Scruggs and Mastropieri (1996), even though teachers understand the necessity of differentiated instruction, they feel as though they do not have enough time to provide extra support to their struggling learners. This issue involving time indicates that teachers require additional help to provide additive intervention to the students who need it.

One resource that may be able to address issues involving time and is already present at most schools is paraeducators. Paraeducators are adults who are employed by a school district to assist teachers in their classrooms and work with students. Even though they usually do not hold any credentials, paraeducators are permitted to assist with classroom instruction. According to guidelines from the U.S. Department of Education (2004), the roles of a paraeducator usually include providing one-on-one tutoring support to students, assisting with classroom management, and providing instructional support services under the supervision of a teacher. In their review regarding paraeducators and literacy instruction, Causton-Theoharis, Giangreco, Doyle, and Vadasy (2007) provide additional guidance for using paraeducators in the classroom, suggesting that paraeducators are like educational "sous-chefs" who are used to supplement teacher instruction and not supplant it. They suggest that a highly qualified teacher should provide core instruction, and that a paraeducator can provide one-on-one or small group tutoring to complement and reinforce the teacher's lesson.

In addition to being extant resources whose roles are intended to provide teachers with instructional support, paraeducators have demonstrated that they can be an efficacious means of providing reading intervention. Jones and Geraghty (2018) used

meta-analytic procedures to evaluate the overall effectiveness of paraeducator-implemented reading interventions. Nine studies that were published after the passage of the No Child Left Behind Act of 2001 (2002; i.e., this legislation created minimum job qualifications for paraeducators) evaluated paraeducator implementation of reading intervention across six outcomes including phonological awareness, alphabetic skills, decoding, word reading, spelling, and reading comprehension. Although the results indicated that four of the outcome effects could not be interpreted due to issues involving homogeneity of variance, significant effects in the areas of decoding (ES = 0.61) and spelling (ES = 0.86) were found. These findings suggest that the type of outcome should be considered before utilizing paraeducators in the implementation of reading intervention. Intervention in the areas of phonological awareness, alphabetics, and comprehension requires knowledge and a skill set that may be outside the competency of a paraeducator. On the other hand, decoding is a word-level process whose mastery contributes to fluency (Perfetti, 1985; Roembke, Hazeltine, Reed, & McMurray, 2019). Paraeducators are perfectly suited to provide practice-based interventions that allow struggling readers the opportunity to automatize decoding skills.

An important factor to consider for paraeducator-implemented reading interventions is the paraeducator's level of training. Generally, have less education on instructional practices, and have received less training than credentialed teachers. It is for this reason that if they are going to implement a reading intervention, Causton-Theoharris and colleagues (2007) suggest that paraeducators receive training specific to the intervention that will be used both initially, and ongoing throughout implementation. The

classroom teacher can fulfill this role, ensuring fidelity to the intervention procedures, and ultimately, maximizing student outcomes. The effect of paraeducator training was demonstrated in a study from Jones, Larsen, Sudweeks, Young, and Gibb (2018), which compared student reading outcomes between a group that received a manualized direct instruction intervention implemented by a paraeducator and a group that received computer-assisted instruction. Results indicated that the direct instruction intervention implemented by paraeducators was significantly more effective than the computer-assisted instruction. Furthermore, paraeducators were able to follow memorized directives with high fidelity. Although this offers great promise for the use of paraeducator-implemented interventions, the paraeducators in the study struggled to consistently follow-up with student responses and varied in the amount of praise they offered to students. Although it was unclear why the paraeducators demonstrated low fidelity for student responses, perhaps it is indicative of a need for consistent, ongoing training and feedback throughout implementation.

Treatment Integrity

An important factor involved in implementing any intervention is treatment integrity. Although Hagermoser-Sanetti and Kratochwill (2009) point out that it is a relatively new consideration within education research, they define treatment integrity broadly as "the extent to which essential intervention components are delivered in a comprehensive and consistent manner by an interventionist trained to deliver the intervention" (p. 448). Dane and Schineider (1998) expand upon this notion by highlighting several crucial aspects of implementation. First is fidelity, which refers to

the extent to which implementation corresponds to the original intent of the intervention program. Second is dosage or how much of the intervention has been delivered. Lastly, quality involves how well the intervention components have been delivered.

The degree to which an intervention is implemented with integrity can make or break its overall success. In order to examine the body of research surrounding treatment integrity, Durlak and DuPre (2008) conducted a systematic literature review of 483 studies to specifically evaluate whether implementation affects intervention outcomes. They found that high treatment integrity not only increases the likelihood that there will be statistically significant differences between treatment and control groups, but it also maximizes the potential benefits for individual participants. Additionally, they were able to determine that of Dane and Schineider's (1998) aspects of implementation, the most impactful factors are fidelity and dosage. Low treatment integrity can also impact outcomes. Noell (2010) postulates that outcomes may see minimal growth or negative results when treatment integrity is low and focuses on two plausible areas of concern. The first is accuracy of implementation. If an intervention is not implemented with fidelity, there is a strong possibility that it will not have the intended effect on student outcomes. The second area of concern involves ensuring that all the components of the intervention are included in implementation. In practice, an interventionist may use their professional acumen to deem specific components of an intervention as unnecessary. Although it is possible that omitting some components may not affect some students, others may require all of the intended components of the intervention to fully access the

instructional curriculum. Taken in conjunction, all of these points suggest a positive relation between treatment integrity and intervention outcomes.

Finding ways to improve treatment integrity can have a significant impact on intervention outcomes and ultimately help students. Fixsen and Blase's (2008) implementation drivers framework takes a systematic approach to improving treatment integrity by highlighting three interrelated factors that drive higher levels of fidelity. Organizational drivers describe mechanisms that create and sustain hospitable organizational and system environments in order to provide effective services. This includes the use of data systems to support decision making, administrative personnel that can facilitate service delivery, and systems-level interventions. Leadership drivers involve providing appropriate leadership strategies for various challenges. Specifically, leaders should be able to adapt to the organizational needs of service delivery and possess the technical knowledge to support instructional personal. Competency drivers comprise the mechanisms used to develop, improve, and sustain an interventionist's ability to implement intervention with fidelity in order to benefit students, their families, and the school community. To ensure the competency of interventionists, leaders must select qualified individuals and provide them with adequate training on the interventions that will be administered. Additionally, leadership should coach interventionists throughout implementation to provide feedback and ensure that the intervention is being implemented as intended.

On an individual level, Hagermoser-Sanetti and Kratochwill (2009) echo the coaching aspect of the implementation drivers framework by plainly stating that

providing interventionists with performance feedback is the only strategy that has demonstrated promotion of high levels of treatment integrity. They go on to define performance feedback as a process in which interventionists are provided visual representations of their treatment integrity data and verbal recommendations that specifically address intervention steps that require improvement. In his review on intervention implementation, Noell (2010) argues that performance feedback has demonstrated effectiveness across a diverse population of interventionists and students as well as a wide variety of interventions and referral concerns. Regardless of whether interventions are relatively simple or complex, when implementation is poor, performance feedback improves it. Not only do these findings provide evidence of its effectiveness, but they also demonstrate that performance feedback is compatible in a variety of intervention contexts.

With specific regard to education, performance feedback has demonstrated effectiveness in helping teachers adopt new instructional strategies. Simonsen, Myers, and Deluca (2010) conducted a study that utilized performance feedback to teach middle and high school special education teachers to implement general classroom management strategies such as prompting, creating opportunities to respond, and providing contingent praise. The researchers found that after initial training, performance feedback was an effective means to increase the use of the classroom management strategies. Another study from Codding, Livanis, Pace, and Vaca (2008) was interested in parsing out whether increased treatment integrity could be attributed to observer reactivity instead of performance feedback. To test this, they combined a multiple baseline design across three

participants with an alternating treatment design as a means to increase treatment integrity for middle school special education teachers implementing a behavior intervention package. The multiple baseline aspect consisted of baseline data collection in the A phase and performance feedback administered in every session of the B phase. The treatments alternated between whether or not an observer was physically present. The results indicated that the level of treatment integrity was significantly lower in the A phase regardless of the treatment which suggests that observer reactivity did not confound the effects of performance feedback. Although both of these studies focused on behavioral interventions, they highlight how performance feedback is an effective means to help teachers increase treatment integrity when they are learning new instructional strategies.

Performance feedback provides a flexible framework for improving implementation that is able to incorporate behavioral components as well. DiGennaro, Martens, and McIntyre (2005) conducted a study that utilized single-case design to investigate how combining negative reinforcement with performance feedback would impact the implementation of a behavioral intervention for students with ADHD. At the beginning of the procedure, interventionists were provided with initial training on the intervention. Baseline data were collected where the interventionists implemented the intervention without any performance feedback. In the next phase, interventionists were given daily performance feedback reports. If they did not achieve 100% integrity, they had to attend a meeting with a consultant to verbally discuss the data. If the interventionist was about to obtain 100% integrity during a particular session, they were

still given their daily feedback report, but they also received negative reinforcement in the form of not having to attend the meeting with the consultant. The final phase involved a fading procedure where reinforcement was only provided if the interventionist was able to obtain 100% integrity for several consecutive days. Results indicated a dramatic increase in treatment integrity when performance feedback was used in combination with negative reinforcement across a majority of the interventionists. High integrity was also maintained during fading phase which may be indicative that the intervention was learned. This procedure was also rated as highly acceptable by the interventionists indicating that it is feasible within a school setting. All together, these findings suggest that negative reinforcement can be a powerful addition to performance feedback procedures.

The Current Study

Reading fluency is one of five critical skill areas that contribute to literacy (NRP, 2000). It is a multidimensional construct that consists of the smaller components of automaticity (Logan, 1988), efficiency (Perfetti, 1985), and the ability to manage the various processes involved in reading (Rasinski, 2004). Fluency is of particular importance because its mastery helps to facilitate higher ordered literacy skills like comprehension (Jenkins et al., 2003; Perfetti, 1985). Interventions that incorporate repeated reading facilitate gains in fluency because they provide learners ample opportunities to practice reading, allowing them to automatize and efficiently manage decoding skills (Samuels, 1979; Therrien, 2004).

Although many teachers understand the importance of providing differentiated instruction for struggling learners, they often lack the time to implement intervention (Scruggs & Mastropieri, 1996). One solution is to utilize paraeducators to supplement core literacy instruction by supporting students either in small groups or on a one-on-one basis (Causton-Theoharis et al., 2007). Paraeducators have been able to demonstrate that they can effectively provide literacy interventions, particularly those that target practice-based skills (Jones & Geraghty, 2018). This may suggest that an evidence-based repeated reading intervention like PALS (Fuchs et al., 2000; McMaster et al., 2006) might be suited for paraeducator implementation. Previous literature (Mastropieri et al., 2001) has also demonstrated that PALS can be effective at improving reading outcomes for middle school students. Although the possibility of additional service delivery options is exciting, Jones, Larsen, Sudweeks, Young, and Gibb (2018) point out that paraeducators require additionally training to improve intervention implementation. Implementation is evaluated through a variable known as treatment integrity, which monitors the fidelity, dosage, and quality of implementation (Dane & Schineider, 1998). Treatment integrity is a crucial factor in the success of an intervention because it has a positive relation to intervention outcomes (Durlak & DuPre, 2008; Noell, 2010). Providing performance feedback to an interventionist is a flexible means to promote high levels of treatment integrity (Hagermoser-Sanetti & Kratochwill, 2009; Noell, 2010). Additionally, behavioral strategies, such as negative reinforcement, can be incorporated with performance feedback in order to maximize treatment integrity (DiGennaro, Martens, & McIntyre, 2005).

The primary goal of the current study is to investigate: the effect performance feedback with negative reinforcement (PF + S_{R-}) will have on treatment integrity, when compared against performance feedback alone (PF) with respect to paraeducator implementation of PALS. Regarding this research question, it is hypothesized that treatment integrity will have an immediate, significant increase when PF + S_{R-} is administered, a minor but significant decrease when reversed to PF alone, and a large significant increase when PF + S_{R-} is administered again. The second research question is: what effect will paraeducator implementation of PALS have on reading outcomes? Since high treatment fidelity is expected, the hypothesis with respect to the second research question is that students will make steady gains towards their estimated reading goals that are based on a pre-calculated rate of improvement.

Method

Participants were a subsample from a larger, three-year longitudinal study. This larger study investigated the effects of a vocabulary intervention at three southern California middle schools. When the current study was implemented, the eligible students were in eighth grade. Of the 47 eligible student participants; 66% are male and 34% are female. An overwhelming majority (97.9%) of participants received special education services. Ethnically, students were 87.2% Hispanic, 8.5% White, 2.1% Black, and 2.1% Asian. In terms of language, 34.8% had preference for English, 63% prefer Spanish, and 2.2% preferred Vietnamese.

The current study utilized eighth grade students from one of these middle schools. Consent forms were sent home to the parents of 17 students who participated in the

previous study, and 11 parents responded affirmatively. Of those 11 students, six were randomly selected to participate in this study. A summary of student demographic information can be seen on Table 1.1. For the purposes of the current study, the participants have been assigned pseudonyms. Bart is a Hispanic male whose primary language preference is Spanish. At the beginning of this study he was 12 years and 9 months old, and he received special education services under the category of specific learning disability. Lisa is a Hispanic female whose primary language preference is Spanish, At the beginning of this study she was 12 years and 9 months old, and she received special education services under the category of specific learning disability. Milhouse is a Hispanic male whose primary language preference is Spanish. At the beginning of this study he was 12 years and 10 months old, and he received special education services under the category of autism. Nelson is a Hispanic male whose primary language preference is Spanish. At the beginning of this study he was 12 years and 11 months old, and he received special education services under the category of specific learning disability. Wendel is a Hispanic male whose primary language preference is Spanish. At the beginning of this study he was 13 years and 7 months old Hispanic, and he received special education services under the category of specific learning disability. Ralph is a Hispanic male whose primary language preference is English. At the beginning of the study he was 12 years and 9 months old, and he received special education services under the category of speech language impairment.

Table 1.1

Demographic Information of Student Participants

	%	n
Gender		
Male	83%	5
Female	17%	1
Ethnicity		
Hispanic/Latinx	100%	6
Language Preference		
Spanish	83%	5
English	17%	1
SPED Qualification		
SLD	67%	4
SLI	16.5%	1
AUT	16.5%	1
Total	100%	6

A paraeducator (from here on referred to as "Mr. C") who was employed at the school was selected for the study by the school principal because he was already working in the special education classroom and had rapport with the student participants. Mr. C is a Hispanic male who was 25 years old at the time of the study. He was bilingual and spoke both English and Spanish. He had lived in an area local to the school for 10 years, and although he had worked at the school for three years, he has not received any formal training from his employer. Additionally, Mr. C had attended some community college, but had not yet obtained a degree.

Independent Variables

Peer-Assisted Learning Strategies (PALS). PALS (Fuchs, Fuchs, & Burish, 2000; McMaster, Fuchs, & Fuchs, 2006) is a literacy intervention that targets fluency and comprehension skills. Students are grouped into pairs, taught specific corrective feedback

strategies, and take turns reading out loud and providing feedback in the role of a "tutor." The interventionist (in the case of the current study, the interventionist was a paraeducator) oversees the students during each session and provides additional feedback and prompting. Each PALS session consists of three structured activities. In Partner Reading with Retell, students take turns reading aloud from a connected text for a duration of five minutes. If the reader makes an error, the tutor provides prompting and corrective feedback. At the end of the five minutes, the students switch roles. Paragraph Shrinking is an activity where the reader must identify the main idea of the story. The tutor asks questions about the "who" or "what" of the story, and the reader must condense this information into ten words or fewer. At the end of five minutes, students switch roles. The final activity is Prediction Relay where the reader makes a prediction about the second half of a passage based on the information they read in the first half. If the tutor disagrees with the prediction, she gives a prediction of their own. The reader then reads the second half of the passage to confirm or disconfirm their prediction. After five minutes, the students switch roles.

Performance Feedback (PF) and Performance Feedback with Negative Reinforcement (PF + S_{R^-}). PF, as described by Hagermoser-Sanetti and Kratochwill (2009), is a strategy to improve treatment integrity involving an interventionist and a consultant or supervisor. After the completion of each intervention session, I acted as the consultant and presented the paraeducator with a graphed representation of their percentage of treatment integrity. Additionally, I met with the paraeducator for five-minute consultation sessions to discuss the data and give verbal recommendations. PF +

SR- (DiGennaro, Martens, & McIntyre, 2005) includes all of these procedures with the caveat that if the interventionist met a specific criterion of treatment integrity, they do not have to meet with the consultant to further discuss their results. In the current study, that criterion was 100%.

Dependent Variables

Treatment Integrity of PALS. Treatment integrity of PALS was measured by the PALS implementation checklist (Fuchs & Fuchs, 2006; see Appendix A). This checklist takes inventory of the interventionist's behaviors relative to their fidelity to the procedures and the intervention dosage. Specifically, the PALS implementation checklist helps the rater evaluate how well the materials were set up, the length of time that the structured activities lasted, and the interventionist's interactions with students including prompting, verbal praise, and corrective feedback. Each procedural step is assigned a point value, and a percentage of overall treatment integrity is calculated based on the points score divided by the points possible.

Fluency. Fluency was assessed using the eighth-grade level Oral Reading Fluency (ORF) measure from DIBELS 8th edition (Ives, Biancarosa, Fien, & Kennedy, 2019). ORF is a short curriculum-based measure (CBM) where a student is tasked with reading a short story aloud for one minute. A score is derived from the total words read correctly minus the total words read incorrectly. ORF comprises different, equivalent forms and is sensitive enough to change that it can be administered on a weekly basis. This allows for progress monitoring in regular intervals which creates a comparison of a

slope of actual achievement against a rate of improvement with is derived from national norms.

Treatment Integrity of Performance Feedback. Treatment integrity of performance feedback was evaluated using the performance feedback fidelity checklist (Cipani, 2018; see Appendix B). This inventory describes eight steps involved in performance feedback and provides a percentage of completed steps. I completed the checklist after each consultation meeting to ensure fidelity of implementation.

Social Validity. Social validity was measured by the Usage Rating Profile – Intervention, Revised (URP-IR; Chafouleas, Briesch, Neugebauer, Riley-Tillman, 2011; see Appendix C). The URP-IR measures social validity across dimensions including acceptability, understanding, home-school collaboration, feasibility, system climate, and system support. This measure is designed with a school-based setting in mind and is able to be completed by a wide-range of stakeholders. Interventionists rate a series of statements on a six-point Likert scale. Items are then coded to align with the six previously mentioned dimensions, and the scores are summed. Both Mr. C and his supervising classroom teacher completed the URP-IR.

Interobserver Agreement. Treatment integrity data for both PALS implementation and performance feedback was collected by an additional trained observer for 20% of the total sessions. Interobserver agreement was calculated and reported in ways that conform to What Works Clearinghouse (WWC) standards for single-case design (Kratochwill, Hitchcock, Horner, Levin, Odom, Rindskopf, & Shadish, 2010). Percentage of exact agreement describes the amount of items that both

observers rate the same, and the WWC standard is 80% on average. Coefficient Kappa is a more robust measure of interobserver agreement that accounts for the possibility that raters came to an agreement by chance. The formula used to calculate kappa is below:

$$K = \frac{p_o - p_e}{1 - p_e}$$

In this calculation, p_o represents the relative observed agreement between raters, and p_e represents the hypothetical probability of chance agreement (Smeeton, 1985). The WWC standard for kappa is 0.60.

Research Design

Research Question 1. To address the first research question, a single-case design that utilizes components from both a multiple treatments design and an ABCBC design was implemented creating four demonstrations of effect. Combining design components is a valid means to demonstrate intervention effects (Kazdin, 2011), and it addressed two issues that are specific to the current study. First, there is a strong possibility that the treatments will have a carryover effect based on the interpersonal interaction of the researcher providing PF to the paraeducator. Throughout implementation, it was expected that the paraeducator would learn the procedures; therefore, reversing to a non-treatment A phase would not provide meaningful data. The second reason for combining design components is that the two treatments (PF and PF + S_R) cannot be alternated within a single day. In a conventional multiple treatments design, treatments are alternated within the same day to demonstrate effect. Since PALS sessions are only meant to be implemented once per day, the same-day alternation procedure was not feasible.

Research Question 2. The second research question was addressed through weekly progress monitoring ORF data. Trends in student performance were compared against a goal criterion which was calculated using baseline data and a rate of improvement of 0.8 words per week. This rate of improvement was derived from Hasbrouck and Tindal (2005), who recommend that 0.8 words per week is a fitting goal for eighth-grade students performing at the 25th percentile in reading fluency. Data from the reading comprehension cluster of the Woodcock-Johnson IV Tests of Achievement (Mather & Wendling, 2014), was collected as a part of the preceding, larger study. These data indicated that all of the students who received consent forms at the beginning of the current study performed at or below the 25th percentile. Estimates derived from CBM data have been validated as a reliable and accurate means to evaluate student achievement, establish goals, and monitor progress (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Good & Shinn, 1990).

Procedures

The current study's procedures were implemented throughout several key phases. During the training phase, I conducted initial intervention training for the paraeducator and the student participants. The paraeducator's training on intervention procedures lasted approximately one day. The training began with our initial meeting, a general overview of the current study was given, his responsibilities were explained, and informed consent was obtained. The PALS manual includes several short reference guides for implementors that include summaries of overall goals of PALS, how to prepare for PALS sessions, and brief overviews of each of the PALS activities. I provided

Mr. C with copies of these reference guides, and we went over them together. I explained that his role as an implementer would be to set up the PALS materials, time each activity, signal transitions, monitor students to make sure they are on-task, provide additional feedback, and reinforce desired behaviors with PALS points. I gave Mr. C the student materials and explained their purpose. These materials included the question card (this reminds students of the steps involved in each activity), the correction card (which shows students how to provide corrective feedback), the point sheet (a log that allows each dyad to keep track of their points), and the PALS bookmarks (these keep track of where students are in their books and also have a copy of the PALS rules on them). I told him that it would be his responsibility to hold onto the student materials, then we practiced the set-up procedures. This involved saying aloud to the students, "It's time for PALS," making sure the students were in their dyads, and that they had their materials. For the main activities, we practiced announcing what they are (e.g. "It's time for Partner Reading"), timing them for five minutes, and prompting students to switch roles. We also conducted "role-play" scenarios where I modeled on-task behaviors for each of the activities so that Mr. C had an opportunity to practice reinforcing desired behaviors with PALS points.

During the PALS student training, they learned the rules of PALS, that the overall goals of PALS were to improve their reading skills, how to provide each other corrective feedback, and how participate in the three PALS activities. The student training took place over the course of 12, 30-minute session. Mr. C also attended these sessions to reinforce his own training and give him opportunities to practice providing students with

corrective feedback. Students were grouped into dyads according to PALS procedures and based on reading comprehension composite scores from the Woodcock-Johnson IV Tests of Achievement (Mather & Wendling, 2014), which was collected at the end of the students' seventh grade year. As a result, Lisa and Wendel were in pair 1, Milhouse and Bart were in pair 2, and Ralph and Nelson were in pair 3. During this phase baseline CBM data were also collected, so that goals could be calculated. Once training was complete intervention was implemented over 25 sessions with three sessions per week and five sessions per implementation phase. In order to collect data on relevant outcomes, the PALS implementation checklist was administered at every session and ORF was administered at the end of every week.

In the A phase, PALS implementation began without any form of performance feedback being offered to the paraeducator. This phase lasted five sessions and served to establish a baseline of treatment integrity. The first B phase began after the fifth session, and it lasted for five sessions. During this phase, the paraeducator received a graphic depiction of his treatment integrity data and attended a five-minute consultation meeting with the researcher after each session to discuss his implementation of that session and receive verbal feedback. Consultation meetings would begin with a greeting and brief small talk to build rapport. Next, we would look over the most recent graphed depiction of this data. During this portion, I would explicitly tell Mr. C his TI percentage from the current session and then I would use a graph to show how his current performance is trending relative to previous sessions. We would then review the most recent PALS implementation checklist to look over which specific steps of the intervention he did or

did not complete. I would then elicit his feedback and give him an opportunity to share his thoughts by simply asking how he felt the session went and what he thought about the data. Typically, Mr. C would understand the why his level of TI was where it was at. Often he would share his perceptions of student behavior, and whether or not it was difficult to manage. In the next step I would provide praise for tasks that he implemented well and discuss specific areas where he could improve his TI. During sessions where behavioral concerns were mentioned, we would discuss how to utilize the PALS point system to more effectively manage student behaviors. Finally, we would have a brief discussion about when then next PALS session would occur. Specifically, we would have these discussions when phases of the study were about to change. For example, during the last session of a B phase, Mr. C would be told which conditions needed to be met for a consultation meeting to occur in the C phase.

The first C phase began after the tenth session and lasted for five sessions. This phase followed similar procedures to the B phase except that the paraeducator was told that if he was able to reach 100% treatment integrity then he would not have to attend the next consultation meeting. Following this phase, a second B phase occurred after session 15, and then a second C phase after session 20.

Data Analysis

What Works Clearinghouse standards for single-case design (Kratochwill, Hitchcock, Horner, Levin, Odom, Rindskopf, & Shadish, 2010) indicate that single-case designs have traditionally utilized visual analysis to determine whether a relationship between independent and dependent variables exists and the magnitude of that

relationship. The standards mention that causal relations can be inferred with three demonstrations of effect if the following four steps are followed. First, the researcher must collect preintervention data to establish a predictable baseline. In the current study, this step was completed in the A phase of data collection. Second, data within each phase must be assessed to determine if there is enough consistency to establish a predictable pattern. Third, data are compared between phases to determine whether manipulation of the independent variable was associated with an effect. Finally, data from all phases are integrated to determine if there were at least three demonstrations of effect.

Since the current study utilized a single-case design, TI data were analyzed with the use of visual analysis in order to abide by What Works Clearinghouse standards (Kratochwill et al., 2010). Additionally, the standards indicate that within and between data patterns should be assessed across six dimensions. Level describes the average value of points within a particular phase. Level can be measured through a mean line. Trend is the tendency for the performance on the outcome to systematically increase or decrease over time. Variability involves the amount of bounce in the data. It may be useful to look at range and standard deviation when conducting analysis on this dimension. Overlap describes the amount of data from one phase that overlaps with the range of data from a previous phase. This is measured quantitatively with the percentage of overlapping data (PND; Parker, Vannest & Davis, 2014). Immediacy refers to the magnitude of change when the last three to five points in one phase are compared to the first three to five points of the next phase. This is described quantitatively as the improvement rate difference (IRD; Parker et al., 2014). The final dimension is consistency across similar

phases. This regards the extent to which similar phases are associated with similar data patterns (e.g. trend, level, variability, overlap, and immediacy). Similarly, fluency data visually compares the student's rate of improvement to the slope of their actual achievement.

Results

The first research question involved investigating what effect PF + S_{R-} had on treatment integrity, when compared against PF alone with respect to paraeducator implementation of PALS. A graphic depiction of the results are illustrated in Figure 1.1. The baseline phase observed the lowest levels of treatment integrity and a relatively low amount of variability (Mean = 69.8; SD = 3.9; See Table 1.2.). Specific procedural steps that Mr. C struggled to implement included making sure reading materials were place between students at the beginning of sessions, awarding points for exemplary behaviors, and providing both positive and corrective feedback to the students. Once PF was administered in the first B phase (B1), a level increase occurred specifically at session 7 with minor overlap between phases A and B1 (Mean = 89.2; PND = 80%; IRD = 80%; See Table 1.3). During this phase, Mr. C ensured that students began each session with their reading materials in the middle of each pair, but did not consistently award points or provide positive and corrective feedback to the student across the three structured activities. A significant trend between these two phases was not observed; however, there was a larger amount of variability in phase B1 (SD = 9.96). There was another significant level increase with minor overlap once the first C phase (C1) was implemented (Mean = 98.4; PND = 80%; IRD = 80%) and the amount of variability (SD = 2.3) was lower as the

data began to reach the ceiling. In particular, Mr. C began to award points and provide feedback to students more consistently across the structured activities until he achieved 100% TI. During the second B phase (B2) the level showed a 60% (IRD) decrease (Mean = 98.4). Additionally, there was 100% overlap indicated by a PND score of 0% and minimal variability (SD = 0.89). This drop was attributed to a neglect to provide points for model PALS behaviors in one or more of the structured activities. The final C phase (C2) saw an immediate increase with no overlap (Mean = 100; PND = 100%; IRD = 100%) and no variability observed in this phase (SD = 0) since all of the data points reached the ceiling. When the two B phases were compared, although B2 had a higher level than B1 (B1 = 89.2; B2 = 96.6), they are similar in that they both displayed lower levels than the C phases. Both of the C phases were comparable as both will have similar mean levels (C1 = 98.4; C2= 100).

Figure 1.1

Treatment Integrity of Paraeducator Implementation of PALS

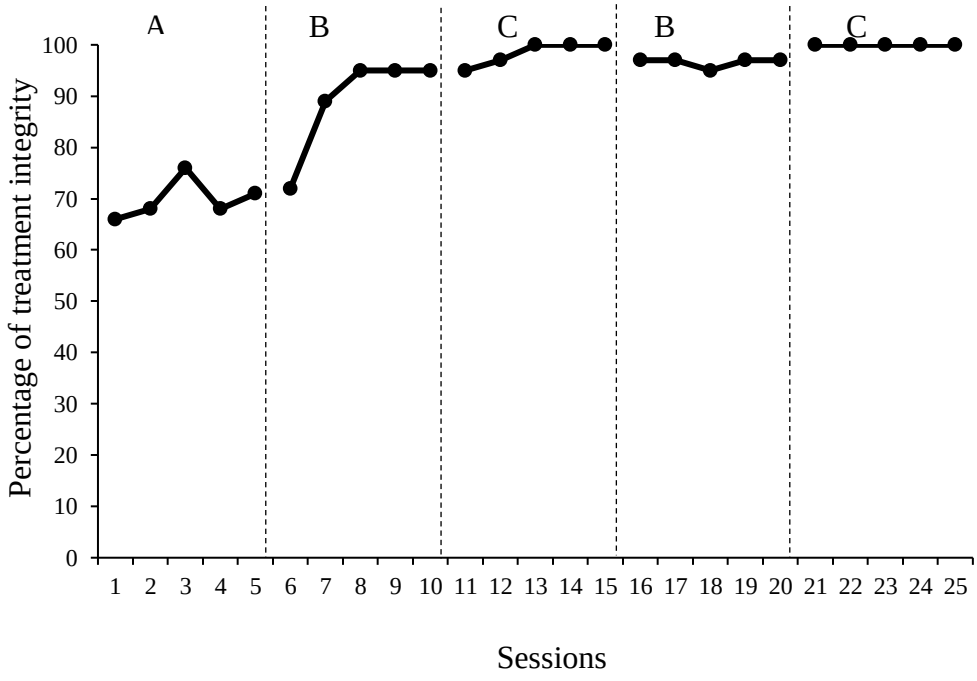


Table 1.2

Summary Statistics for Treatment Integrity by Phase

	Mean	SD
Phase A	69.8	3.90
Phase B1	89.2	9.96
Phase C1	98.4	2.30
Phase B2	96.6	0.89
Phase C2	100	0.00

Table 1.3

Quantitative Metrics of Treatment Integrity by Phase Transition.

	PND	IRD
A – B1	80%	80%
B1 – C1	80%	80%
C1 – B2	0%	60%
B2 – C2	100%	100%

TI of PF, IOA, and Social Validity

Performance feedback was administered during all of the sessions in both B phases and during the first two sessions of phase C1. 100% treatment integrity was achieved during all 12 performance feedback sessions. With respect to interobserver agreement (IOA), the second observer collected data for one session in each phase (five

sessions total, 20% of each phase). Percentage of exact agreement overall was 100% and kappa was calculated at 1.0 for all of the IOA sessions.

Results from the URP-IR are summarized in Table 1.4. Overall, Mr. C rated the intervention highly across dimensions of acceptability (5.78), understanding (6.0), home-school collaboration (4.67), feasibility (5.67), and system climate (5.4). His lowest rating was for system support at 3.0. Although the classroom teacher had minimal involvement with the study, he also completed the URP-IR and provided slightly positive ratings for acceptability (4.22), feasibility (4.17), system climate (4.4), and system support (4.0). His lowest ratings were for understanding (2.0) and home-school collaboration (1.33).

Table 1.4
Social Validity as Measured by the URP-IR

	Paraeducator	Classroom Teacher
Acceptability	5.78	4.22
Understanding	6.00	2.00
Home-School Collab	4.67	1.33
Feasibility	5.67	4.17
System Climate	5.40	4.40
System Support	3.00	4.00

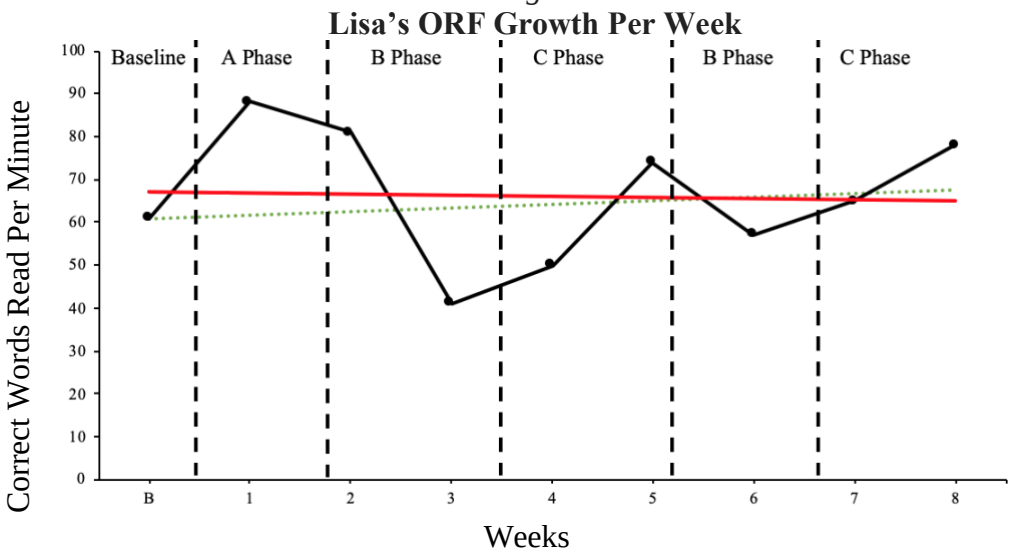
Research Question 2

The second research question regards how students progressed on reading outcomes during the course of the current study. This was measured by progress monitoring each student's ORF scores will be reported individually.

Lisa. A graphic depiction of Lisa's ORF growth can be seen in Figure 1.2. At baseline, Lisa was able to read 61 words per minute (WPM). With a rate of improvement

of 0.8 words per week, it was estimated that she would be able to read at a rate of 67.4 WPM by the end of eight weeks of intervention. Her actual performance seemed to fluctuate for the first four weeks of intervention. During weeks one and two of the intervention, her scores were above her estimated trajectory at 88 and 81 WPM respectively. However, during weeks three and four her scores declined below her estimated trajectory at 41 and 50 WPM respectively. From then on, she made steady gains, ultimately surpassing her goal with a week eight score of 78 WPM.

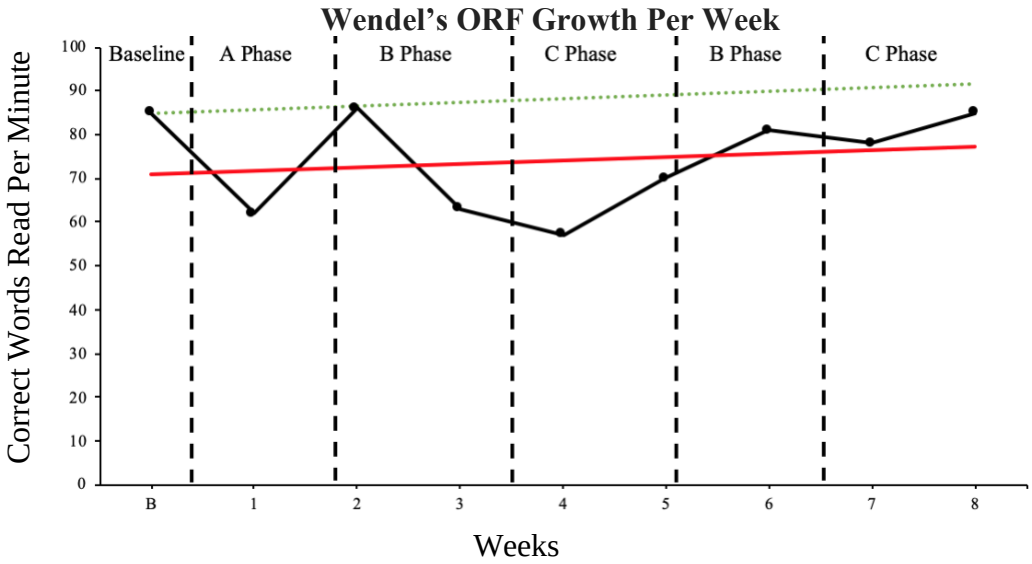
Figure 1.2



**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

Wendel. A graphic depiction of Wendel's ORF growth can be seen in Figure 1.3. At baseline, Wendel was able to read 85 WPM. With a rate of improvement of 0.8 words per week, it was estimated that he would be able to read at a rate of 91.4 WPM by the end of eight weeks of intervention. Although Wendel's overall performance had a positive trajectory, he was rarely on track to meet his goal. By week eight, Wendel was only able to read 85 WPM, which indicates that he made no growth over his baseline score.

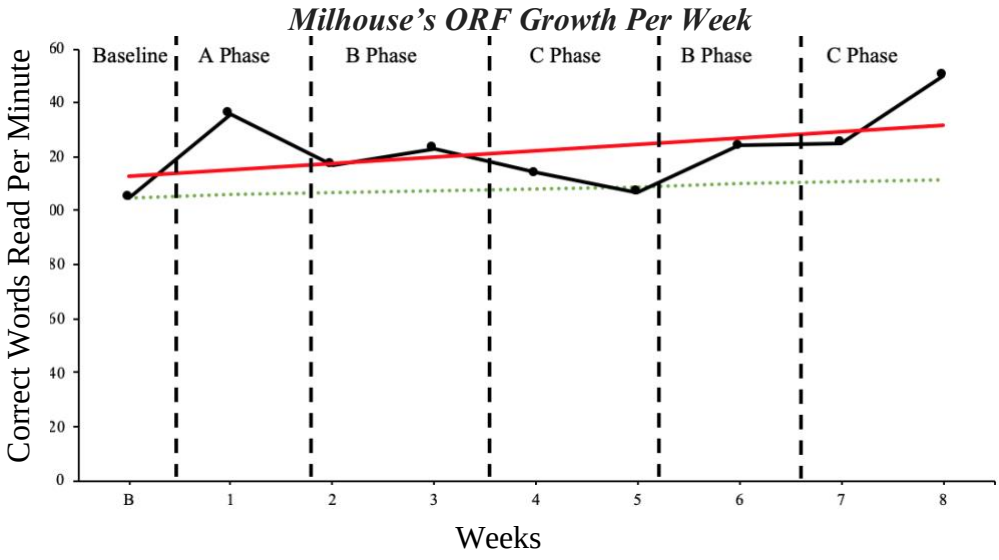
Figure 1.3.



**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

Milhouse. A graphic depiction of Milhouse's ORF growth can be seen in Figure 1.4. At baseline, Milhouse was able to read 105 WPM. With a rate of improvement of 0.8 words per week, it was estimated that he would be able to read at a rate of 111.4 WPM by the end of eight weeks of intervention. Not only did his actual scores trend positively, but he also consistently outperformed his goal trajectory. By week eight, Milhouse was able to read 150 WPM.

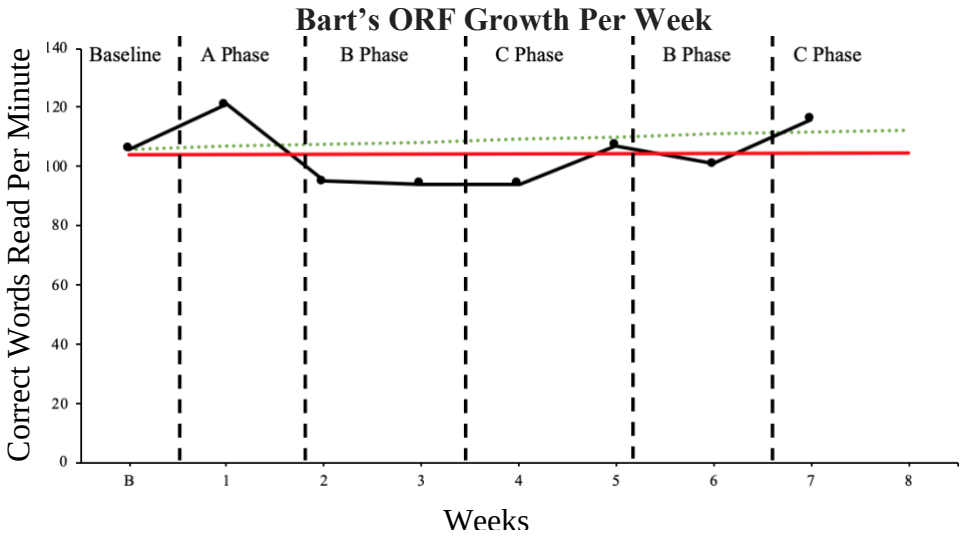
Figure 1.4



**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

Bart. A graphic depiction of Bart's ORF growth can be seen in Figure 1.5. At baseline, Bart was able to read 106 WPM. With a rate of improvement of 0.8 words per week, it was estimated that he would be able to read at a rate of 112.4 WPM by the end of eight weeks of intervention. During weeks two, three, and four, Bart underperformed when compared to his goal trajectory. Afterwards, he maintained positive growth and surpassed his goal with a week seven score of 116 WPM. Unfortunately, Bart missed the final two sessions of the intervention and his week eight score was unable to be collected.

Figure 1.5

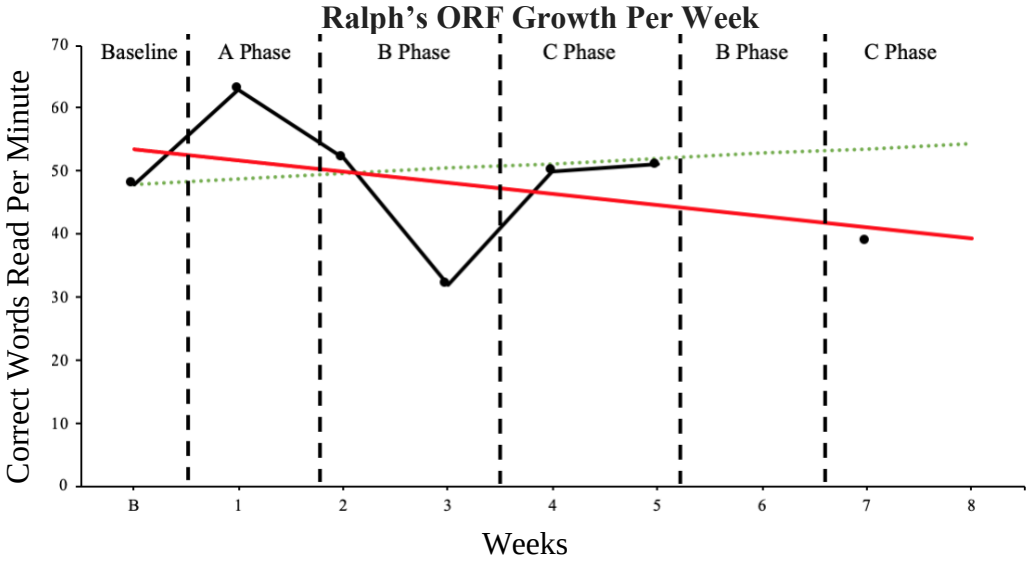


**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

Ralph. A graphic depiction of Ralph's ORF growth can be seen in Figure 1.6. At baseline, Ralph was able to read 48 WPM. With a rate of improvement of 0.8 words per week, it was estimated that he would be able to read at a rate of 54.4 WPM by the end of eight weeks of intervention. During the first five weeks of intervention, Ralph seemed to be making adequate progress toward his goal. The only exception was his week three score of 32 WPM, which was significantly below his goal trajectory. Ralph was absent for sessions 18 and 19, and during this time Mr. C commented that there were lower levels of off-task talking than usual, and that the students seemed to be more engaged with instruction. It was hypothesized that Ralph initiated the majority of the off-task talking which made him less engaged in instruction. When he returned to school, it was decided that momentary-time sampling data would be collected at 15 second intervals for the remainder of the study to estimate the amount of time Ralph was academically engaged. At every fifth interval, data were collected on Bart who was recommended by

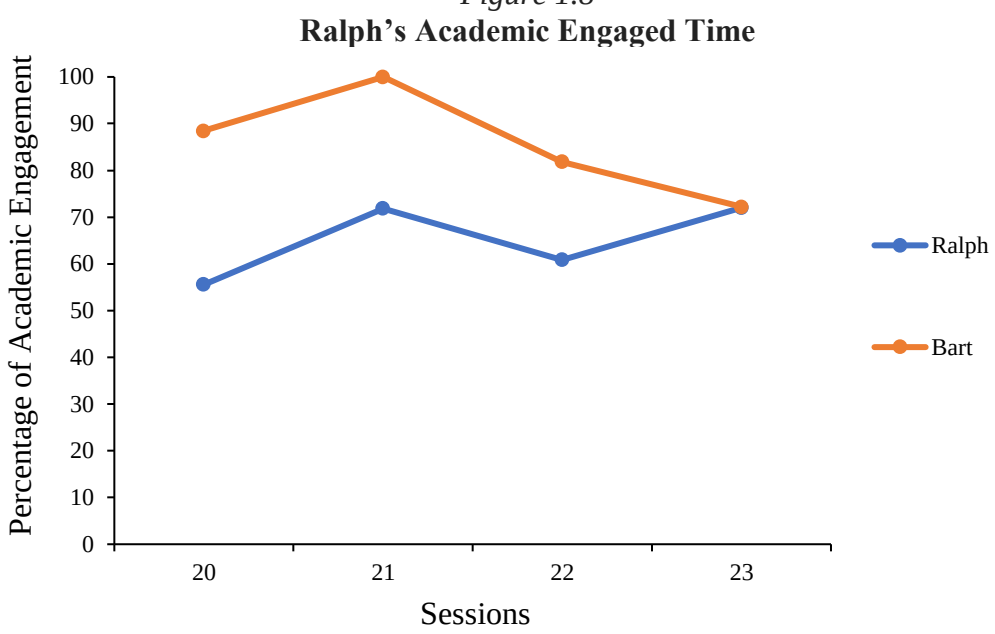
Mr. C as an adequate comparison. A graphical depiction of these data can be seen in Figure 1.8. Over four sessions, Ralph was estimated to be academically engaged for an average of 65.07% of each session; compared to Bart who was estimated to be engaged for an average of 85.63% of each session. Ralph was absent for the last two sessions, so his final score of 39 WPM was collected at the end of week 7. Not only did his final score not meet his overall goal, but Ralph was the only student in the study whose progress trended in a negative direction.

Figure 1.6



**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

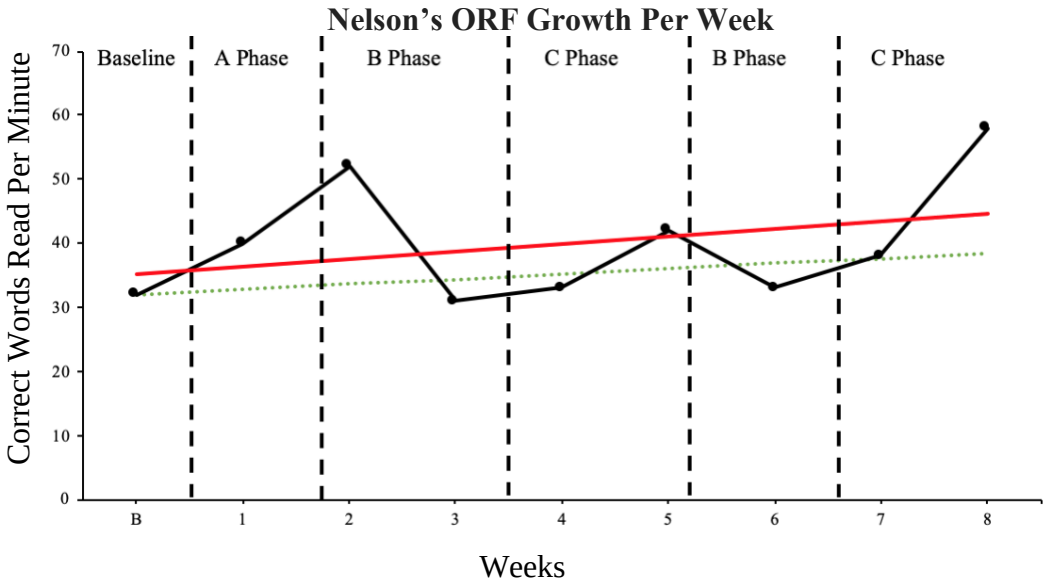
Figure 1.8



Momentary time sampling was used during sessions 20 through 23 to estimate the percentage of time Ralph was engaged during instruction. Bart was observed every fifth interval as a peer comparison

Nelson. A graphic depictions of Nelson's ORF growth can be seen in Figure 1.7. At baseline, Nelson was able to read 32 WPM. With a rate of improvement of 0.8 words per week, it was estimated that he would be able to read at a rate of 38.4 WPM by the end of eight weeks of intervention. It should be noted that Nelson had the lowest baseline score of the six students, which indicated that he had the most room for growth. Throughout intervention, his progress consistently outperformed his goal trajectory. Ultimately, his week eight score of 58 WPM exceeded his final goal.

Figure 1.7



**Dotted green line represents the project achievement goal. The black line represents actual achievement. The red line is the estimated trend based on actual achievement*

Discussion

The results indicate that the use of PF is an effective means for training paraeducators to implement a reading intervention package that emphasizes student practice. Not only was high TI demonstrated from the first B phase onward, but with each subsequent phase response variability diminished until the paraeducator achieved 100% TI for each session of the second C phase (see Table 1.2.). This progressively shrinking variability may indicate that PF allowed the paraeducator to increase his opportunities to learn the PALS procedures and implement them with higher fidelity in each successive phase. Previous literature has already established PF as an efficacious method to improve fidelity of implementation in a variety of contexts (Noell, 2010) and is particularly useful in the context of helping teachers adopt new instructional strategies after they have received initial training (Codding et al., 2008; Simonsen et al., 2010). The current study

adds another piece of evidence to this chorus suggesting that PF also benefits paraeducators.

Another major finding regards the use of negative reinforcement in combination with PF (PF + S_{R-}). The results indicated that PF + S_{R-} was able to maximize the paraeducator's level of TI. Although TI levels were relatively high in both of the B phases when compared to the A phase, it was only when PF + S_{R-} was administered in the C phases that the paraeducator achieved 100% TI. Not only does this finding replicate results from DiGennaro et al. (2005) but adding reinforcement to the PF process may have three underlying benefits. First, adding reinforcement can teach paraeducators skills that they may have overlooked otherwise to refine their TI. Data in the first B phase plateaued at 95% TI for its last three sessions due to an inconsistent administration of points and feedback to students. Once the first C phase began TI trended positively until it reached its ceiling. It is possible that adding reinforcement contingent on 100% TI helped teach Mr. C to consistently award points and give corrective feedback to student.

The second benefit of adding reinforcement to PF is that it may increase the paraeducator's motivation to implement intervention with high fidelity. Once the first C phase ended, the paraeducator's TI dropped from 100% to a mean level of 96.6% in the second B phase. In particular, Mr. C neglected to provide points for model PALS behaviors in one or more of the structured activities. Variability was low (SD = 0.89) which may indicate that the paraeducator knew the intervention steps but was no longer incentivized to complete them with maximum fidelity. When reinforcement returned in the second C phase, TI was immediately maximized. A third benefit of adding

reinforcement to the PF procedure is that the reinforcer does not need to be elaborate. In the current study reinforcement was provided in the form of escape from a contrived meeting situation.

Student Outcomes

Regarding student reading fluency outcomes, the current results provides a direction for future research, suggesting that a possible link between paraeducator training and student outcomes should be investigated further. Although the effects of the two types of PF on student ORF data were not tested directly and observed, it is promising that four out of six students met or exceeded their ORF goals by the end of the study, and that five out of six maintained a positive growth trajectory throughout PALS implementation.

Subsequent studies should also examine the suggestions from Causton-Theoharis et al. (2007), who recommended that paraeducators provide supplementary instruction that is overseen by the classroom teacher. Results from the URP-IR indicated that Mr. C's supervising teacher lacked understanding of the purpose and procedures involved in the current study. If teacher involvement in paraeducator supervision had been a component of the current study, it would have been interesting to examine its effects on all of the outcome variables. Future research could evaluate a model of service delivery where the classroom teacher manages and is consultant to her paraeducators, providing them with guidance and performance feedback.

The exception to these findings was Ralph's ORF performance, which may have been impacted by poor attendance relative to his peers and lower than average levels of

engagement with PALS instruction. This particular result may highlight a need for paraeducators to receive some training on behavior management to maximize student engagement. Although PALS does have a built-in point system that is meant to reinforce on-task behaviors, it may take a greater understanding of applied behavior analysis for paraeducators to realize the full potential of this point system and other types of behavioral contingencies.

Limitations

It is important to acknowledge several of the current study's limitations. First, only one paraeducator participant was recruited for the current study. The paraeducator was associated with a class of students that had participated in a larger study, and hence was inclined to participate in the current study. The author did not have the resources to recruit other paraeducators. Had more paraeducators participated, a multiple-baseline design could have been utilized to generate results that may have been more generalizable.

A second limitation was the lack of teacher involvement indicated by the teacher's low rating on the Understanding domain of the URP-IR (see Table 1.4.). As mentioned previously, future research could evaluate the effect of teacher involvement within the PF process on paraeducator TI and how that affects the classroom environment.

A third limitation was that the effects of the types of PF and overall levels of TI on student outcome were not measured directly. This limitation is related to the small amount of student participants in the study. Since reading fluency skills improve with

practice (Samuels, 1979; Therrien, 2004), ORF outcome data could not be compared against a counterfactual condition without staggering PALS implementation for the pairs of students. Although the current design was able to assess the effect of an independent variable on Mr. C's level of TI, it did not allow for inferences beyond that. It is possible that a larger study with additional students and paraeducators could utilize either a multiple baseline or a group design to evaluate those relations.

Additional concerns of the current study involve data that were not collected. Specifically, baseline data for student progress monitoring was only collected for one session. Had baseline data been collected at multiple timepoints before the A phase and averaged, there would have been more accurate estimates of preintervention student performance. Since baseline data are used to calculate a projected goal of student performance, stable preintervention data would have provided more precise and perhaps more attainable goals. This is illustrated most clearly with Wendel, who seemed to make no growth over his baseline score. However, had an average of multiple baseline timepoints been used to calculate his projected goal, it is possible that positive progress may have been observed. Another oversight in data collection occurred during consultation sessions with Mr. C. These sessions were not audio recorded, which affects the overall transparency and replicability of the current study.

Conclusion

In conclusion, the current study provides promising preliminary evidence to suggest that both paraeducators and students may benefit if paraeducators receive additional training on academic instruction. The results of the current study suggest that

consultation sessions as brief as five minutes can improve fidelity of implementation. Additionally, adding meaningful reinforcement may maximize performance. More research is necessary to determine the best ways to involve teachers, the exact impact paraeducator TI has on student outcomes, and what other content areas may be productive environments for increased paraeducator involvement.

It is often the case that instructional practices are validated by whole lines of research before they are implemented in the schools. However, despite a sparse literature base, paraeducators are already in schools to fulfill a variety of support roles. Since they are extant resources in many classrooms, it is my hope that more studies are conducted to expand the research surrounding paraeducators. More research on utilizing paraeducators to deliver academic instruction may suggest ways to unlock the potential of these seemingly untapped resources and ultimately maximize the types of supports we offer our students.

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Appendix A

PALS Implementation Checklist

Classroom Arrangement/Set-up Checklist

Value		
	Getting Ready for PALS	
1	Get Ready in 1-2 minutes	Start Time End Time
1	Higher performing readers are paired with lower performing readers	
1	Students are seated next to their partners and books are placed between them	
1	Students should know who their partner is for the day	
	Teacher Materials	
1	Training Overheads, if applicable	
1	Timer	
	Student Materials	
1 1	Books with page numbers marked (1 pt for book, 1 pt for page marked)	
1	Pencils	
1	Questions Cards	
1	Point Sheets	

Partner Reading

	Teacher Behaviors	
Value		
1	Prompts students to begin activities	
1	Prompts students to switch roles	
1	Keeps students on task and following PALS rules	
1 1	Teacher monitors at *least* two pairs (1 point for each pair)	
1	Teacher awards extra points for good PALS behaviors	
1	Teacher provided positive feedback, if applicable	
1	Teacher provided corrective feedback, if applicable	
1	Partner Reading: Start time	Switch roles End Time
	(Each Reader must have an opportunity to read for 5 minutes to earn 1 point.)	
1	Retell Start time	End Time
	Reader 2 retells the story for 1 minute (2nd-3rd) or 2 minutes (4th-6th)	

Paragraph Shrinking

Value	Teacher Behaviors
1	Prompts students to begin activities
1	Prompts students to switch roles
1	Keeps students on task and following PALS rules
1 1	Teacher monitors at *least* two pairs (1 point for each pair)
1	Teacher awards extra points for good PALS behaviors
1	Teacher provided positive feedback, if applicable
1	Teacher provided corrective feedback, if applicable
1	Paragraph Shrinking: Start time Switch roles End Time (Each Reader must have an opportunity to read and shrink for 5 minutes to earn 1 point.)

Prediction Relay

Value	Teacher Behaviors
1	Prompts students to begin activities
1	Prompts students to switch roles
1	Keeps students on task and following PALS rules
1 1	Teacher monitors at *least* two pairs (1 point for each pair)
1	Teacher awards extra points for good PALS behaviors
1	Teacher provided positive feedback, if applicable
1	Teacher provided corrective feedback, if applicable
1	Prediction Relay: Start time Switch roles End Time (Each Reader must have an opportunity to read and predict for 5 minutes to earn 1 point.)

Teacher Points

_____ ____%

Overall Suggestions/Comments:

Appendix B

Performance Feedback Fidelity Checklist

Date: _____ Session #:_____

Paraeducator:_____ Duration of Meeting: _____

Step Description	**Completed:**
Greeting	
Review most recent graphed data	
Review datasheets, supplies, etc.	
Elicit paraeducator feedback	
Specific praise for components implemented correctly	
Problem-solve for low TI *(if applicable)*	
Confirm next meeting	
Close session	

_____

% of completion

Appendix C

Usage Rating Profile -Intervention, Revised

URP-Intervention-

Directions: Consider the described intervention when answering the following statements. Circle the number that best reflects your agreement with the statement, using the scale provided below.

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	This intervention is an effective choice for addressing a variety of problems.	1	2	3	4	5	6
2.	I would need additional resources to carry out this intervention.	1	2	3	4	5	6
3.	I would be able to allocate my time to implement this intervention.	1	2	3	4	5	6
4.	I understand how to use this intervention.	1	2	3	4	5	6
5.	A positive home-school relationship is needed to implement this intervention.	1	2	3	4	5	6
6.	I am knowledgeable about the intervention procedures.	1	2	3	4	5	6
7.	The intervention is a fair way to handle the child's behavior problem.	1	2	3	4	5	6
8.	The total time required to implement the intervention procedures would be manageable.	1	2	3	4	5	6
9.	I would not be interested in implementing this intervention.	1	2	3	4	5	6
10.	My administrator would be supportive of my use of this intervention.	1	2	3	4	5	6
11.	I would have positive attitudes about implementing this intervention.	1	2	3	4	5	6
12.	This intervention is a good way to handle the child's behavior problem.	1	2	3	4	5	6
13.	Preparation of materials needed for this intervention would be minimal.	1	2	3	4	5	6

USAGE RATING PROFILE

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
14.	Use of this intervention would be consistent with the mission of my school.	1	2	3	4	5	6
15.	Parental collaboration is required in order to use this intervention.	1	2	3	4	5	6
16.	Implementation of this intervention is well matched to what is expected in my job.	1	2	3	4	5	6
17.	Material resources needed for this intervention are reasonable.	1	2	3	4	5	6
18.	I would implement this intervention with a good deal of enthusiasm.	1	2	3	4	5	6
19.	This intervention is too complex to carry out accurately.	1	2	3	4	5	6
20.	These intervention procedures are consistent with the way things are done in my system.	1	2	3	4	5	6
21.	This intervention would not be disruptive to other students.	1	2	3	4	5	6
22.	I would be committed to carrying out this intervention.	1	2	3	4	5	6
23.	The intervention procedures easily fit in with my current practices.	1	2	3	4	5	6
24.	I would need consultative support to implement this intervention.	1	2	3	4	5	6
25.	I understand the procedures of this intervention.	1	2	3	4	5	6
26.	My work environment is conducive to implementation of an intervention like this one.	1	2	3	4	5	6
27.	The amount of time required for record keeping would be reasonable.	1	2	3	4	5	6
28.	Regular home-school communication is needed to implement intervention procedures.	1	2	3	4	5	6
29.	I would require additional professional development in order to implement this intervention.	1	2	3	4	5	6

USAGE RATING PROFILE