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THE EFFECTS OF SEGMENTING WORKSHEETS AND BEHAVIOR SPECIFIC PRAISE ON INDEPENDENT SEATWORK WITH ELEMENTARY STUDENTS

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THE EFFECTS OF SEGMENTING WORKSHEETS AND BEHAVIOR SPECIFIC PRAISE ON INDEPENDENT SEATWORK WITH ELEMENTARY STUDENTS

by

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ABSTRACT

While the education system has seen many changes over the years due to COVID-19, one constant is that students must complete independent seatwork at certain times throughout the day. As teachers accommodate the many students in their classroom, an intervention that could increase students' amount of academic production when doing independent seatwork would be mutually beneficial. For students, the increased contact with learning opportunities would provide the students means to increase fluency for that skill. Examining the effects of segmented and whole worksheets on production would, therefore, create additional learning opportunities.

This study sought to assess the effectiveness of the strategy on academic production using completed problems and digits correct per minute across four conditions including whole worksheets with behavior specific praise, whole worksheets independent of praise, segmented worksheets with behavior specific praise, and segmented worksheets independent of praise using an alternating treatments design with a choice verification condition. Overall, this study did not find any new or consistent effects across the four conditions and four participants. The data did show a slight increase of completed problems when behavior specific praise (O'Handley et al., 2020) and the power of choice (Schmidt et al., 2009) was used, which both intervention components have a long-standing evidence base. The students rated all four conditions as acceptable.

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LIST OF ABBREVIATIONS

USM	*The University of Southern Mississippi*
DCPM	*Digits Correct per Minute*
BSP	*Behavior Specific Praise*
ADHD	*Attention Deficit Hyperactivity Disorder*
CIRP	Children's Intervention Rating Profile

CHAPTER I INTRODUCTION

Completing tasks in the school setting builds upon the foundational skills for which academic skills and functional life skills are built such as completing tasks, cleaning up after oneself, working with others, making friends, and following rules. Success in school is built upon these principles, with the most important being completion of academic tasks. Completion of academic task can be rooted in two main causes a skill deficit presented as students not knowing how to complete the work or motivational deficit presented as students not having the desire or motivation to complete the task (Daly et al., 1997). Both reasons can cause student to struggle academically. Students who struggle academically have a greater likelihood of school failure, which could lead to a greater likelihood of student dropout (Bradshaw, 2008). Consistently poor academic performance is associated with a higher incidence of discipline problems, school suspensions, and ultimately fewer career options (Casillas et al., 2012; Chen & Kaplan, 2003; Christile et al., 2007).

Successfully intervening with students who have work completion issues at the elementary level should be a concern for teachers, parents, and everyday citizens, due to the high stakes and future outcomes that would affect the community. Unfortunately, when considering interventions for students, the school is forced to consider cost-effectiveness and benefits to students receiving these services. Ideally, the student's success would be the ultimate concern, but with the scarcity of financial resources, administrators and teachers are tasked with weighing all the ramifications of every intervention option (Barrett, 2020).

Mathematics in America

Prior to Covid -19 the mathematics assessment scores across the United States had remained stagnant since 2008 (Hussar, 2020). Information is not available on mathematics assessment specifics for the Condition of Education 2021 or 2022 reports (Irwin, 2022). However, the Northwest Evaluation Association was able to obtain test scores in mathematics for the 2020-2021 school year. They report student gains but at a much lower rate than pre pandemic with even larger differences in grades third through fifth compared to those in middle or high school grades (Lewis, 2021). This information highlights the important loss of progress since the pandemic started. Prior to the pandemic the United States was the ranked 15th in average mathematic scores for 4th grade students, being out ranked by countries like Singapore, Canada, Ireland, Hungary, and Israel (National Center for Educational Statistics, 2019). The United States was underperforming in mathematics prior to the pandemic, but with the transition to virtual education or in lower economic schools sending packets of work home has exacerbated the problem. This highlights the importance of maximizing students' academic time particular around mathematics.

Instructional Time

Many studies have examined the amount of time spent on academic tasks, transitions from one activity to another, and other interruptions throughout the school day that interfere with available instructional time (Kraft & Monti-Nussbaum, 2020; Rosenshine, 2015). Of the typical eight hours students spend at school, Rosenshine (2015) found that, second grade students, on average spend only two hours and fifteen minutes actively engaged in academic tasks. This is barely 40% of the school day. Of that time, second graders spend about 35 minutes on math-related tasks. Other time is

spent on activities such as recess, lunch, PE, and transitions. These activities are beneficial to both students and teachers for building social skills, compliance, physical fitness, and allowing students a break in between learning. Relatedly Rosenshine's study found that fifth grade students have only a slight increase of time, on average, spending two hours and fifty minutes per school day on academic tasks. A fifth-grade student spends 45 minutes on math tasks daily, and 75% of that time is allocated to independent seatwork, indicating that thirty minutes of independent work is spent on math daily. With students working independently the majority of the time, the need to increase motivation and production to maximize the opportunities to respond and consequently success during that time is imperative (Rosenshine, 2015). Additionally, a school district in Rhode Island used data from observations and surveys found and reported that classrooms are interrupted on average over 2,000 times per year which led to an estimated loss of 10-20 instructional days over a school year (Kraft & Monti-Nussbaum, 2020). When considering the limited amount of time students spend learning math because they are engaged in other activities or on independent math work, techniques and interventions designed to increase time on-task and academic engagement to support all students is pivotal but addressing those who experience difficulty with an academic tasks or difficulty with staying on-task is even more critical.

Academic Assessment

The academic assessment literature suggests there are a few main reasons students are struggling to perform academically. These include insufficient motivation, lack of support, task difficulty, or not having the generalization skills to perform the academic task in a new format (Daly et al., 1997). If completing a task is reinforcing, students who

work more slowly experience fewer opportunities to be reinforced than their peers. This may create a motivation deficit, given the lower rate of reinforcement. Students who are naturally successful with academic tasks may be more highly motivated by them, whereas other students may benefit from additional supports designed to enhance academic success, thereby increasing their motivation to engage in academic pursuits (Richotte et al., 2014).

Opportunities to respond or practice trials are any time a student is presented with a problem and asked to respond. This can be verbally or in the case of a worksheet where it is requested the student complete the worksheet. Then each individual problem on the worksheet is an opportunity to respond (Skinner, 1998). Research has shown a correlation between academic achievement, specifically accuracy, maintenance of the skill, and academically engaged behaviors when students are provided more opportunities to respond (Albers & Greer, 1991; Haydon et al., 2012; MacSuga-Gage & Simonsen, 2015). Additionally, students show an increase in academic completion and behavioral outcomes when teachers pair opportunities to respond with praise (Partin et al., 2009). Providing more learning opportunities across a multitude of settings and stimuli will enhance skill generalization across people, settings, and stimuli. Skinner (1998) noted that a skill set is not considered mastered until the student is able to complete the skill within any setting or with any stimulus.

Independent Work

Independent seatwork is a frequently occurring academic activity that happens in the classroom. With only limited time to complete academic tasks each day and multiple students needing individual teacher support, independent seatwork is necessary for

students to make progress on academic tasks. Researchers have created strategies to increase student production. Hart et al. (2010) assessed the impact of small group, whole class instruction, and independent work with students diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD). They found that students were more on-task during small group instruction. Additionally, the researchers also found a decrease in work production during the small group test condition. Across all three testing conditions, independent work, small group, and class-wide, there was no increase in work production. Even though these students appeared to have more time on-task during the instructional period, it did not equate to more correct answers in the testing condition (Hart et al., 2010).

Teaching students specific self-management skills may be one approach to increasing student work production. Todd et al. (1999) suggested that self-management skills may be highly correlated with improved academic performance and a reduction in problem behavior. When a self-management package including self-monitoring, self-evaluation, and self-recruitment of a reinforcer was implemented with one student in multiple class settings, the results demonstrated an increase in teacher praise, an increase in on-task behavior, an increase in work completion, and a decrease in problem behaviors (Todd et al., 1999).

Other strategies to improve self-management, including self-monitoring strategies, have been shown to be effective in children as young as first grade and across other types of students, including students with ADHD, and across achievement levels (Levendoski & Cartledge, 2000; Rock, 2005; Vanleuvan & Wang, 1997). The following studies have demonstrated the effectiveness of self-monitoring in combination with other

behavioral strategies. There was a positive relationship with self-monitoring in regard to on-task behavior and number of problems completed with four elementary students (Levendoski & Cartledge, 2000). Using the ACT-REACT method to self-monitor for attention and performance, including productivity and accuracy, in both reading and math seatwork was effective with seven elementary students across different inclusion classrooms (Rock, 2005). King et al. (2017) found the manualized curriculum, *On Task in a Box* ® (2014), which contains self-monitoring and video modeling, to be effective in increasing time on-task. Additionally, there was an increase in work accuracy and academic productivity when *On Task in a Box* ® (2014) was implemented.

Increases in academic production are found in non-contingent reinforcement and contingent reinforcement interventions. For example, when both contingent reinforcement and non-contingent reinforcement were implemented across three participants, the results showed a larger effect on digits correct per session in the contingent reinforcement condition compared to the combination of non-contingent and contingent reinforcement. This study did not assess non-contingent reinforcement alone. It provides support that a form of contingent reinforcement such as behavior specific praise could be enough to evoke an increase in academic work production (Panahon & Martens, 2012).

Other studies were designed to increase percentage of time on-task (McCurdy et al., 2001) and digits correct (Montarello & Martens, 2005) by simply interspersing easier math problems throughout the assignment. This creates a schedule of reinforcement that is obtainable throughout the assignment. Behavioral momentum allows the student to receive reinforcement for completing a small task and creates the motivating operation to

complete the next task quickly to receive reinforcement again (Cooper et al., 2007; Fisher, 2021).

Behavior-Specific Praise

A low-cost but highly effective evidence-based intervention is the use of Behavior-Specific Praise (BSP) as reinforcement. Flores et al., (2017) defined BSP as "praise that explicitly describes the student's behavior and the approval of that behavior" (p.231). In this review of twenty-nine articles surrounding praise research and trends, seventeen of them resulted in positive outcomes when praise was implemented with integrity. BSP can be introduced individually or in a treatment package. There have been a multitude of studies providing evidence across settings, age ranges, and diagnoses or IDEA disability categories that when praise is increased, disruptive behavior decreases (Dufrene et al., 2012; Ennis et al., 2014; Ennis et al., 2018; Haydon & Musti-Rao, 2011; Hollingstead et al., 2016; Krank et al., 2017; O'Handley et al., 2020; Richard, 2012; Sutherland et al., 2000). The rates of praise across these studies varied greatly, with the suggested rates averaging once per minute to the actual rate of praise in kindergarten and first grade classrooms as once in two hundred and fifty minutes (Dufrene et al., 2014; Jenkins et al., 2018). BSP has the power to change both the student and teacher's mindset when praise focuses on effort and behavior (Mueller & Dweck, 1998; Yeager & Dweck, 2012). For example, teacher's mindset can grow as they focus their time and energy on finding what the student is doing right and stating that specifically. Students can experience and see a model of growth mindset by teachers showing and praising motivation and performance instead of intelligence (Zhang et al., 2017). It is important to

note that BSP is an evidence-based intervention that can create positive change in several behaviors.

Previous Studies

Wallace et al. (2003) reported increased problems completed and accuracy by a single student who received educational services in a comprehensive developmental classroom. These effects were found when the student's work was modified into smaller parts of an assignment. Completion of each smaller assignment connected him to the contingency of a praise statement and a high five from his teacher. Originally, 30 problems were divided into six segmented worksheets consisting of five problems each. After the first twenty minutes, observers collected data on problems completed and problems correct. Additionally, behavioral observations to assess teacher interactions, teacher approvals, and teacher disapprovals were conducted. The visual analysis of teacher interactions, teacher approvals, and teacher disapprovals was variable, and there was no significant change in level across the segmented worksheets with praise and physical reinforcement conditions. The study provided no graph of the problems completed correctly but reported that the averages of both intervention phases increased from 5.75 to 18.75 problems completed in the first intervention phase and 10.33 to 17 problems completed in the second intervention phase. Visual analysis of problems completed depicted a stable baseline, and both intervention phases ended with an increasing trend. Averages during intervention increased from six in baseline to nineteen problems completed, with the return to baseline averages dropping to eleven and increasing to twenty when intervention was re-implemented (Wallace et al., 2003).

Wallace et al.'s (2003) study provided a meaningful starting point for this line of research; however, there were some limitations. With only a single participant, it does not provide enough replications to prove a treatment effect according to the standards set forth by What Works Clearinghouse (2020). This study was able to assess data of problems completed, problems per minute, problems completed correctly, and teacher behavior, including approvals and disapprovals. Although meaningful, this study does not allow for the data to parse out if the heavy reinforcement schedule, the segmenting, or the combination resulted in the effect and therefore cannot conclude which condition of this intervention caused the effect. Furthermore, there was no pretreatment assessment of performance level, therefore, intervention effect could not be determined. All the problems presented were subtraction with answers from zero through ten on each of the worksheets or sets of segmented worksheets. Therefore, problems had to repeat across worksheets, which could have resulted in practice effects throughout the study. Although the problems completed increased during the intervention phases, there was also an increase from baseline one to baseline two.

A dissertation evaluated seatwork "chunking" which is equivalent to segmenting or breaking work down so that a smaller portion is presented at one time (Jerome, 2018). These students were part of an academic competency program for students in first through eighth grades with Attention-Deficit/Hyperactivity Disorder (ADHD). These students were part of the Academic Competency Enabling program, which is an eight-week treatment program for students with ADHD where students were provided daily expectations, a daily behavior report card with built-in contingencies, and praise

throughout the day. No effects on productivity, rates of rule violations, or on-task behavior were found (Jerome, 2018).

Peak (2021) examined the effects on academic work production of providing segmented worksheets or a whole worksheet in the home setting with four elementary-aged participants utilizing the parent as the interventionist. Each participant in the study was assessed using Math Computation AIMSweb probes (PsycCorp/Pearson, 2004), to determine their instructional level and provided with individualized segmented and whole worksheets. Using an alternating treatment design with a verification phase, both whole worksheet and segmented worksheet conditions were assessed. Variables assessed in this study consisted of completed problems, digits correct per minute, on-task behavior, and off-task behavior. All observations were conducted using a direct behavioral observation over the Zoom platform (Yuan, 2011). Overall, visual analysis of the data showed very variable data with little divergence across conditions for three of the four participants. Although a treatment effect for all dependent variables was determined for one participant, no effects were found for the other three participants. The home environment posed many threats to internal validity; for example, many sessions were interrupted by unexpected visitors, accidents resulting in injuries, and home remodel activities (Peak, 2021). This study was conducted one year after the beginning of the COVID-19 pandemic, meaning that students' academic instruction greatly varied in the year prior (Viner et al. 2020).

Although data were unstable, extension of phases were not conducted due to worksheets being mailed prior to the being of data collection, to the participant's home. Additionally, all the worksheets designed for this study were comprised of only

horizontally presented problems (i.e., 2 + 4 = 6) (Peak, 2021). Additional studies should assess treatment effects with both horizontally and vertically presented math problems to assess possible differences. This study, unlike the case study by Wallace et al. (2003), had 100 math problems per worksheet and per set of segmented worksheets. In Wallace et al. (2003), their student was provided 30 math problems. Additionally, their participant was able to work until each sheet was completed, but data were only collected during the first 20 minutes. In Peak (2021), students were given 10 minutes for the whole worksheet and up to 10 for all five segmented worksheets. Additionally, the student in the Wallace et al. (2003) study had a diagnosis of a mild intellectual disability, and although he was in third grade, his instructional math level was at first grade. The students in the Peak (2021) study were typically developing second and third grade students, with instructional levels of second, third, fourth and fifth grade. Additionally Peak (2021) was conducted virtually with the parent as the interventionist.

The current study addressed these limitations by assessing the effects of whole versus segmented worksheets and behavior specific praise on academic work production. Additionally, the setting of the study allowed for greater scientific control, thereby addressing previous threats to internal validity. The current study consisted of four separate conditions, segmenting worksheets with BSP fixed interval of every minute, segmenting worksheets without BSP, whole worksheets with BSP every minute, and whole worksheets without BSP. This allowed the impact of BSP to be assessed in both the whole worksheet condition and segmented worksheet condition. Due to the brevity of the intervention, BSP was implemented every minute to ensure adequate BSP was provided within that limited time frame. Additionally, the worksheets were modified so

that an even mixture of vertical and horizontal problems were presented on each sheet, so that the presentation of the problems did not appear to be a confounding variable.

Purpose

To date, only three studies, Peak (2021), Jerome (2018), and Wallace et al. (2003), have investigated the effect of using multiple shorter assignments, rather than a single long assignment on academic production, and they have all been conducted with different populations in different settings. Although Wallace et al. (2003) found socially and clinically significant treatment effects in academic production, the studies by Peak (2021) and Jerome (2018) did not report a treatment effect. This could be due to a multitude of reasons, such as participant differences and locations. Specifically, Peak (2021) was a virtual study conducted with students in second and third grades, and Jerome (2018) conducted his study with an ADHD Saturday Skills program providing services to first to eighth grade students.

Except for the Wallace (2003) case study, the other studies did not use BSP as a contingency for work production. The current study sought to determine if segmented or whole worksheets with or without BSP can be an effective intervention within the Tier II setting with students who are struggling to perform academically. It was hypothesized that segmented worksheets combined with BSP would show the largest effect on math problems completed. The following research questions were addressed:

1. **Research Question 1:** When segmented worksheets are delivered with BSP provided once every minute, does the student's average number of math problems completed and digits correct per minute increase compared to whole worksheets with praise, segmented without praise or whole worksheets without praise?

2. **Research Question 2:** When segmented worksheets are delivered without BSP, does the student's average number of math problems completed and digits correct per minute increase compared to whole worksheets or whole worksheets with praise?
3. **Research Question 3:** When whole worksheets are delivered with BSP provided once every minute, does the student's average number of math problems completed and digits correct per minute increase compared to whole worksheets without praise, segmented worksheets or segmented worksheets without praise?
4. **Research Question 4:** When whole worksheets are delivered without BSP, does the student's average number of math problems completed and digits correct per minute increase compared to whole worksheets with praise, segmented worksheets or segmented worksheets without praise?

CHAPTER II Methods

Participants and Setting

Study participants were four students enrolled in second to fifth grade, performed at an instructional level for mathematics in second to fifth grade, and were referred by their teacher or administrators for low academic production in mathematics. Participants were recruited at their school through teacher or administrator referral. After a student was referred, parent consent was obtained (Appendix A). Parents were able to ask additional questions during the consent process. Additionally, student assent was required for participation, and they were informed they could withdraw at any time during the study (Appendix B). After the consent and assent process, students were given curriculum-based measurements in math to find their instructional level. Students who were not considered instructional at least the second-grade level for mathematics were excluded from this study due to the limited number of different problem types within lower grade levels. However, the first four participants all met the requirements to participate in this study.

All materials were provided for each student, so there were no additional requirements for the family, teacher or student, except the student's participation. Participants were exclude from the current study if they were determined to be chronically absent, which is considered 10% of the calendar school days or 18 days (Gottfried, 2015). This was assessed by report from administration. Students who had a prior diagnosis of Intellectual Disability, a Specific Learning Disability in mathematics, or Orthopedic Impairment that negatively impacted writing were excluded because these students require additional support not provided by this intervention. Additionally,

students with a high rate of non-compliance in the classroom were excluded from this study to prevent unnecessary confounds. High rates of non-compliance are considered 65% and higher (Kalb & Loeber, 2003). High rates of non-compliance were assessed by administrator report.

The participants attended a public school that emphasized supports for language and speech disorder in a rural, southeastern region of the United States. Students attending the school ranged from 3 to 13 years old. The class sizes were smaller than typical public-school, averaging about 10 students per classroom.

Participants included a Caucasian nine-year-old female in the fourth grade (Allison), a ten-year-old Caucasian female in the fifth grade (Emma), an African American eleven-year-old male in the fifth grade (Titus) and a Caucasian ten-year old male in the fifth grade (Jaxson). All participants names are pseudonyms to protect participants' privacy. Along with the langue and speech disorders that allowed them access to the services provided by this school participants had other diagnoses of ADHD, moderate sensorineural hearing loss that required a cochlear implant, and other forms of developmental delays. Students at the school are placed in classes based on age, language and reading skill level. All grades reported are estimated based on students age and trajectory prior to beginning this school.

The study was conducted in an observation room between the two classrooms. The room was 9ft by 12ft with two windows, two counter tops and four chairs. Although the windows could be used to observe in the classroom during this study the curtains remained closed, and the sound equipment turned off.

Instruments and Materials

AIMSweb Curriculum-Based Measurement Probes.

To determine approximate skills for fluency practice, AIMSweb math computation probes were administered. For third grade probes included addition, subtraction, multiplication, and division. Fourth-grade probes included all of the skills listed above, along with fractions, and decimals. Fifth-grade probes included adding, reducing fractions, percentages, converting decimals, adding and subtracting fractions. Each probe was administered according to standardization guidelines and was administered for eight minutes (Appendix C). Upon completion and scoring of each probe, the score was used to identify students mathematics level as frustrational, mastery, or instructional level for that skill (PsycCorp/Pearson, 2004). Further detail about how the instructional level was obtained can be found in the procedures section of this document.

Integrity Checklists and Scripts.

A treatment integrity form for all four intervention phases, including a list of steps, can be found in the appendices (Appendices D, E, F, and G). Each treatment integrity form includes a prescribed script for that condition. For example, for the segmented worksheet conditions, the script read, "It's time to do your math. Today we are going to do smaller assignments. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get started." Whereas, for the whole worksheet conditions the script read, "It's time to do your math. Today we are going to do one larger assignment. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get

started." The treatment integrity forms included time setting, BSP, and directions as to when to administer the next segmented sheet, if required. Treatment integrity forms also covered steps including scoring the worksheet, if IOA was required, and a space to account for the digits correct and completed problems.

Whole Worksheets and Segmented Worksheets.

Each whole worksheet consisted of 100 problems on 8.5 by 11inch paper labeled with an A or B and a set number in the header of each worksheet (Appendix H). Condition A worksheets were blue while condition B worksheets were green. Each segmented worksheet was labeled with a letter C or D, a set number along with a segmented worksheet number, and consisted of five equal segments of 20 problems, each on one-half of a standard piece of paper. Worksheets for condition D were yellow, while worksheets for condition C were gray (Appendix I). Segmented and whole worksheets were created using a randomly selected bank of instructionally equivalent problems. The bank of problems followed the skill sequence derived from Burns, VanDerHeyden, and Jiban (2006). A copy of the skill sequence provided in their paper can be found in Appendix K. The sequence had a list of 14 skills that should be taught in the second grade, 14 skills that should be taught in the third grade, 12 skills that should be taught in fourth grade, and 12 skills that should be taught in fifth grade. The problem bank consists of one thousand five hundred problems at each grade level. Every worksheet consisted of the same percentage of each type of problem (e.g., addition, subtraction, multiplication, division, fractions, or decimals). The exact amount of vertically presented problems and horizontally presented problems was alternated to prevent formatting from becoming a confounding variable. Numbers were randomly generated to determine which problems

were chosen for each worksheet. For the verification worksheets, one set of problems was randomly pulled per grade to create a segmented or a whole worksheet depending upon which intervention phase was verified.

Blank Paper and Pencils.

Pre-sharpened pencils and blank paper were provided if a student needed a secondary pencil or expanded workspace. These materials were readily available and, on the desk, so the student did not need to ask or use work time to secure them if needed.

Children's Intervention Rating Profile (CIRP).

The Children's Intervention Rating Profile, referred to as the CIRP, is a modification of the Intervention Rating Profile (IRP) (Elliot, 1986). This modification allows children to communicate their level of acceptability of an intervention. The CIRP only consists of 7 Likert scale items, as not to overwhelm the student (Appendix J). The coefficient alpha of the CIRP is .89 (Elliot, 1986). This level of internal consistency assures that items on the scale systematically refer to the same concept. The CIRP effectively shows discrimination of acceptability between interventions and has adequate levels of internal consistency (Waas & Anderson, 1991). The CIRP was provided to the student in written format at the end of their last session of each condition. This scale is written at a fifth-grade level, so the administrator read a separate copy and answered any questions students had while answering the CIRP.

Dependent Measures and Data Collection

Similar to the procedures in Peak (2021), the primary dependent variable was the number of math problems completed. The number of problems completed was operationally defined in the same manner as Peak (2021, p. 14). **"**A problem was

counted as completed if the student has written a numerical answer on the answer line. Non-examples included a blank answer line, a letter, or an unidentifiable squiggle." Additionally, a problem was counted as answered correctly "if the student marked an accurate solution to the math problem" (Peak, 2021, p.14).

The secondary dependent variable was digits correct per minute (DCPM). This variable allowed the researcher to account for the combination of accuracy and speed, also referred to as fluency. Fluency is a significantly more reliable variable than accuracy or speed alone (Burns, VanDerHeyden, & Jiban, 2006). "DCPM are operationally defined as every accurate digit in the accurate place value per problem per minute (Peak, 2021, p.14)". The total of digits correct were added and divided by the number of overall work minutes per session, which was 10. At the end of each ten minutes session, DCPM were scored and written at the bottom of the worksheet along with the number of problems completed. To prevent disagreement on DCPM, an answer sheet and very clear rules on what counts as a digit and does not were provided to all scorers. In Peak (2021), the DCPM were extremely low which, is why DCPM was not used as the primary dependent variable. Additionally, modifications to the formatting of the worksheets and easy access to blank paper was planned to support higher DCPM.

Interobserver Agreement and Treatment Integrity

Treatment integrity data were collected for every session through permanent products such as the completed worksheet. Treatment integrity checklist (appendix D, E, F, and G) included a frequency count of BSP and was completed in vivo by the interventionist for every session. The interventionist wrote the date on the top of each worksheet and segmented sheet presented. Dated copies of student's work and treatment

integrity forms were a natural byproduct of each intervention session. A minimum of one session per condition was recorded for treatment integrity in vivo by both the researcher and a secondary researcher who was trained on the four intervention conditions. There was a minimum of 20% IOA (range=20%-50%) for treatment integrity, DCPM, and completed problems for the four conditions and verification, meeting the standards set forth by Kratochwill et al. (2021) and What Works clearinghouse (2020). IOA was calculated by dividing the number of agreements by the total number of agreements and disagreements and multiplying by 100. Treatment Integrity was collected for every session and averaged 99% (range=88-100). The one treatment integrity sheet that had 88% integrity, did not check one step "when the 10-minute timer sounded the worksheet and scratch paper was collected". Although the worksheet and scratch paper were collected, there is no way to know if it was done at exactly 10 minutes. This was one of the first session and after reviewing the importance of following and documenting all steps with all the interventionists this did not happen again. Treatment integrity IOA was an average of 100%. Completed problems IOA was conducted on 20-50% of all worksheets for each condition per participant and averaged 98% (range=94-100). DCPM IOA was conducted on 20-50% of all worksheets for each condition per participant and averaged 98.4% (range=94-100).

Experimental Design

The present study utilized an alternating treatments design and followed all the standards set forth by Kratochwill et al. (2021) and What Works clearinghouse (2020). This study had four alternating conditions, (A) whole worksheets with behavior specific praise, (B) whole worksheets without praise, (C) segmented worksheets with behavior

specific praise, and (D) whole worksheets without praise. Each condition had at least five data points. Verification was determined by student preference and consisted of two to three additional data points for the condition of their choice. Data were visually analyzed to determine which intervention phase had the greatest amount of divergence. Due to overlap and limited stable divergence, student preference was assessed.

In this design, there is not a separate baseline; rather, condition B, whole worksheets without BSP, serves as the control as this condition is most similar to the procedure used in typical academic settings. This study meets the requirements set forth by What Works Clearinghouse, including a minimum of 80% interobserver agreement, an independent variable picked by the researcher, removed residual effects, and a minimum of five data points per condition and at most two data points per phase (Kratochwill et al. 2021, Standard Handbook 4.1., 2020, What Works clearinghouse. 2020). The potential to see the effect repeated three times with five repetitions of alternating sequence per participant occurred, meeting requirements by Kratochwill et al. (2021) and What Works clearinghouse (2020). The treatment conditions were chosen by assigning a number to each condition and using a random number generator. This occurred prior to any participants being selected. The sequences were assigned to the order in which participants were selected; for example, the first premade selection was assigned to participant number one and so on. When these sequences were created, no condition repeated more than twice consecutively, or the researcher would have regenerated another number for a different condition. As a result, this design minimizes multiple treatment interference, order effects, and controls threats to internal validity.

Data Analysis

Data were analyzed using level, trend, variability, non-overlap of data points, the immediacy of effect, the consistency of effect, and the divergence of data between the conditions (Kratochwill et al., 2021; What Works clearinghouse, 2020). Data were analyzed for each participant to determine if there was divergence in the DCPM and problems completed in each condition. The primary dependent variable of completed problems was used to determine which condition would be verified. Since there was no clear divergence among the four conditions, student preference determined which condition was verified. Participants were asked verbally and provided physical-colored copies (condition A was blue, condition B was green, condition C was gray, and condition D was yellow) of condition sheets and an explanation of each condition.

Procedure

Curriculum-Based Measurement Benchmarking

After receiving consent from parents and teachers, and assent from students, the researcher scheduled the most convenient time with the school to conduct the Curriculum-Based Measurement benchmarking (CBM). Upon arrival to the session, the researcher brought pencils and probes for each grade. Administration followed the standardization format set forth by AIMSweb (PsycCorp/Pearson, 2004). Students had eight minutes to complete each probe. The researcher then scored the probes and adjusted as needed until the student's skill level was determined. This pattern of assessing continued until the student's instructional skill level was determined. The instructional level had to be second grade or above in order to provide new problems on each whole worksheet and segmented worksheets. Answers were compared to the AIMSweb norms

2014-2015 to obtain a percentile. A percentile of 75th-100th represents a mastery level for that grade's math work. For the purpose of this study, percentiles of 25th- 74th were considered instructional for that grade's math work.

Designing Intervention Materials

After determining instructional level during the CBM session, the primary investigator created whole worksheets and segmented worksheets for each instructional level using the problem bank of 1,500 problems. All worksheets and segmented worksheets were made using an equal amount of vertical and horizontal presented problems alternated always starting with a horizontal problem, and additional workspace was provided on a spare sheet of paper to be used by the participant if needed. This modification was made to the study by Peak, 2021 to remove potential extraneous variables. Each whole worksheet consisted of 100 problems with the same proportional makeup for each problem type. Condition A worksheets were printed on blue paper, whereas condition B worksheets were printed on green paper. Condition C worksheets were printed on gray paper and condition D worksheets were printed on yellow sheets of paper. Both condition C and D worksheets were cut into five smaller sections making each segment one half of standard page of copy paper.

Interventionist Training

The intervention was administered by the primary researcher and additional graduate-level students in school psychology. All interventionists were trained by the primary researcher to ensure treatment integrity and interobserver agreement throughout all intervention sessions. A treatment integrity checklist was designed for each condition (Appendices C, D, E, and F). Training also occurred in one session and covered accessing

and scoring materials, a description of the four conditions, and every step required to complete the intervention under each condition. Training included a review of BSP, some provided examples of BSP, and the opportunity for the additional interventionist to provide a minimum of two different examples of BSP. At the end of the training, interventionists were expected to score an example worksheet and calculate IOA. If the IOA was below 80%, the procedures were reviewed, and all questions were answered.

Intervention

Upon arriving at the school at the scheduled time, and securing the previously agreed upon location, the interventionist asked for the student. The interventionist greeted the student. The interventionist then provided the student with the individual and specific to that condition worksheet. After the student was seated with a pencil, worksheet, and spare paper for scratch work, the interventionist read the script associated with the condition A, B, C, or D (Appendices D, E, F, and G) and completed every step on the treatment integrity checklist (Appendices D, E, F, and G).

In treatment condition A, the student was given the whole worksheet and an interval timer was set to change color or chime in the interventionist's ear at each one-minute interval. At every minute mark, the interventionist provided a BSP statement, if appropriate; if not, the interventionist waited until a behavior compatible with academic production was available to praise. In treatment condition B, the student was provided the whole worksheet and a timer was set for ten minutes. In condition C, the first segmented worksheet was provided and an interval timer was set to ring every two minutes. At every minute mark or as quickly after the minute mark as expected work behavior occurred, the interventionist provided one varied BSP statement based on

behavior compatible with academic production such as “I love the way you are staying so focused.”, “Great job using your scratch paper.”, or “Excellent job working through all of the problems.” Additionally, in this condition, every two minutes the previous segmented sheet was removed and a new segmented sheet was provided until the completion of the passage of ten-minutes. In condition D, the first segmented worksheet was provided and a two-minute timer was set. Upon completion of each segmented worksheet the student was provided another segment worksheet every two minutes until all five had been administered independently. At the end of ten minutes across all four conditions, the interventionist took the worksheet. After returning the student to class the interventionist scored the worksheet and calculated DCPM, the number of problems completed, and the number completed correctly. IOA was calculated at this time, by dividing the number of disagreements by the number of agreements and disagreements and multiplying that answer by 10.

CHAPTER III Results

Instructional levels were determined for all four participants prior to intervention implementation. Instructional levels were determined using AIMSweb Math Computation probes and the 2014-2015 normative standards (PsycCorp/Pearson, 2004). Every participant was administered their grade level probe first. Following the results of that probe, participants were administered either a higher or lower-level probe to determine their instructional level, which was between the 25th-75th percentile based on AIMSweb's 2015 national norms (PsycCorp/Pearson, 2004). Based on these assessments, Allison was provided fourth grade level worksheets. Emma's worksheets consisted of third grade level problems. Titus's worksheets consisted of fifth grade level problems and Jaxson's worksheet consisted of third grade level problems. Of note, 2 participants were considered on grade level instructional and two were below. All worksheets were designed using problems that correlate with the standards set forth by Burns, VanDerHeyden and Jiban (2006), which align with Common Core Standards.

Table A1. *Participant Information*

Participant	Age	Grade	Instructional level	Average Dose of intervention
Allison	9	4th	4th	5 days a week
Emma	11	5th	3rd	5 days a week
Titus	11	5th	5th	5 days a week
Jaxson	11	5th	3rd	5 days a week

Completed Problems

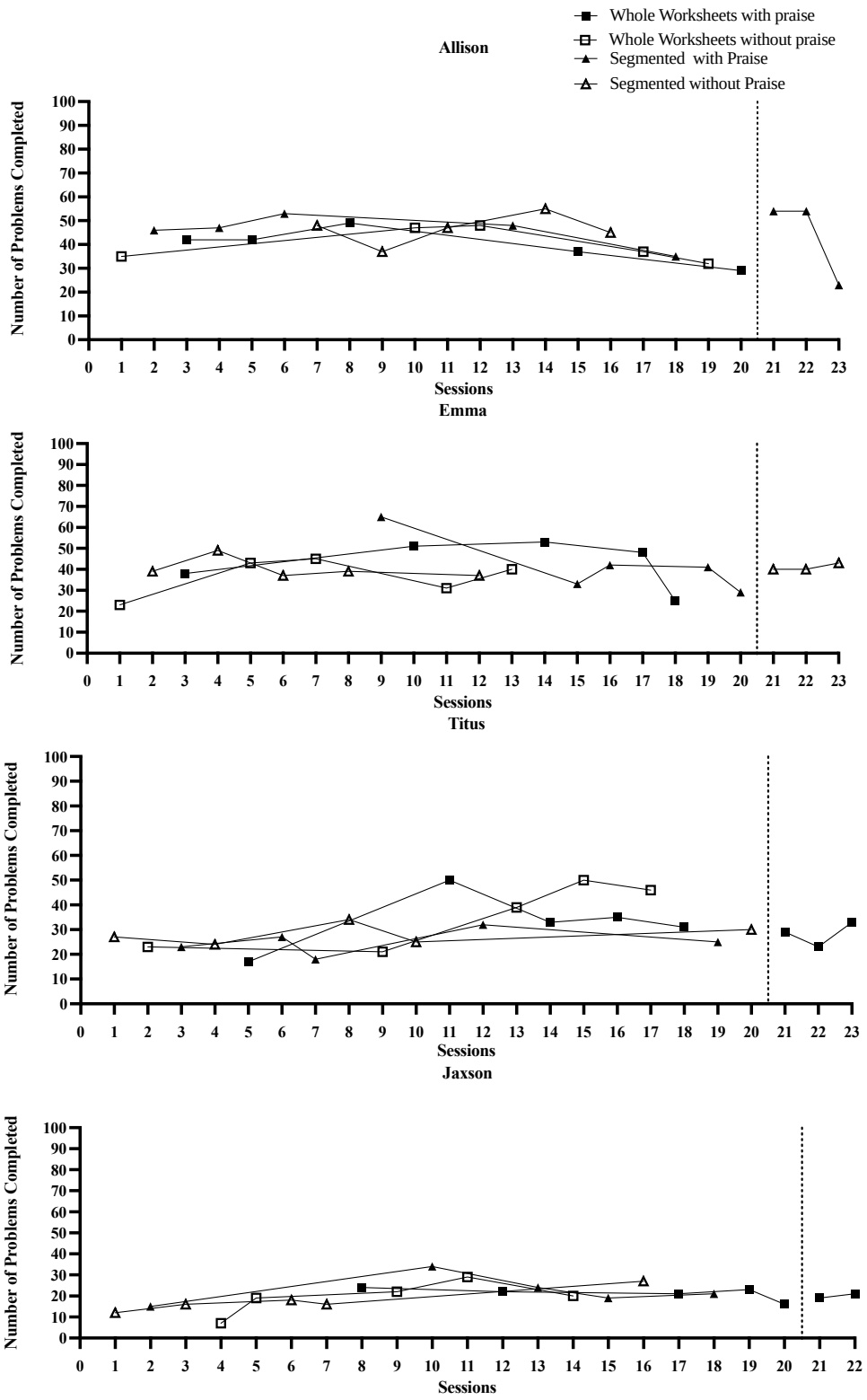
As the primary dependent variable, completed problems graphs were assessed daily to make decisions for verification purposes. Due to a lack of divergence amongst conditions, participants were allowed to choose their favorite condition for verification. Participants were asked verbally and provided physical-colored copies (condition A was blue, condition B was green, condition C was gray, and condition D was yellow) of condition sheets and an explanation of each condition. Verified conditions for each participant are located in the table below A2.

Participant	Instructional level	Verification Choice
Allison	4th	Segmented with Praise
Emma	3rd	Segmented without Praise
Titus	5th	Whole with Praise
Jaxson	3rd	Whole with Praise

Table A2. *Verification Choice*

Across all four participants and all four conditions, there was a significant amount of data overlap. Additionally, the means also showed no pattern in this study. In this alternating treatments design, there is no baseline; however, condition B or whole worksheets without praise, is traditionally what occurs in a classroom and therefore was used for comparison. The number of problems completed for all participants across all four conditions are depicted in Figure 1. Allison's number of completed problems graph

Figure 1. Completed Problems



shows low variability and high overlap across all four conditions. All conditions ended in a decreasing trend. For Allison's verification condition, she chose to continue segmented worksheets with behavior specific praise. There was some separation in level for the first three data points of segmented worksheet with behavior specific praise, but the last two merge into the other condition's data. During verification there was some separation again; however, at the third data point, the level dropped. Even in reviewing the means there is no significant difference between condition A or whole worksheets with BSP (M=39.8; range=29-49) and condition B or whole worksheets without BSP (M=39.8; range=32-48). Although there is a slight increase in means when segmenting was implemented compared to the control condition B (M=39.8) such as in condition C (M=45.8; range=35-53), condition D (M=46.4; range= 37-55), and the verification of condition C (M=43.66; range=23-54), it is not substantial. Based on the visual analysis and means, there is no evidence in this case that whole worksheets with or without BSP produced more problems completed. Although there is some variability and overlap, there is a small divergence between whole worksheets without praise compared to the segmented worksheets condition D and segmented with praise condition C.

As depicted in Figure 1, Emma's completed problems graph shows high ranges of variability including the control condition or whole worksheets without praise. There is significant overlap of data points. With the exception of the control condition B or whole worksheets without praise (M=36.4; range=23-45), all other means are larger. Although there is not a significant difference in means among the other three conditions, they do stand out compared to condition B. Condition A or whole worksheets with behavior specific praise (M=43; range=25-53), condition C or segmented with behavior specific

praise (M=42; range=29-65), and condition D (M=40.2; range=37-49) all have higher ranges and means compared to condition B. Emma chose to continue condition D for verification (M=41; range=40-43). Based on visual analysis and means, there is a small difference in the control compared to condition A, C and D. However, no other clear differences were found.

As depicted in Figure 1, Titus' number of completed problem graph depicts the control condition (M=35.8; range=32-48) as variable and overlapping with the data from other conditions. Although Titus preferred condition A (M=33.2; range=17- 50) or whole worksheets with praise, all of the data points overlapped with another condition and indicated a lack of divergence. Initially, the level began low and increased. Then, the data began a downward trend and stabilized some for the next four data points. The verification of condition A (M=28.3; range=23-33) ended with an upward trend. Condition C or segmented worksheets with behavior specific praise (M=25; range=18-35) has some slight variability but remained at a low level throughout. Condition D or segmented worksheets without behavior specific praise (M=28; range=24-30) was similar in means and ranges to Condition A. There was slight separation from whole worksheets to segmented worksheets, but no separation between segmented worksheets with or without praise, showing no increase of completed problems for segmented worksheets but a slight effect for whole worksheets.

As depicted in Figure 1, Jaxson's completed problems graph depicted a low level across all four conditions. The control condition B or whole worksheets without behavior specific praise (M=19.4; range=7-29) started out low with a slight increase and then ended in a downward trend. Jaxson also choose to continue Condition A or whole

worksheets with behavior specific praise (M=21.2; range=16-24) and verification (M=20; range=19-21). The researcher was only able to obtain two of the verification data points due to the end of the school year and participant absences. Across the condition A data and the verification data, the level remained low, with little variability. Condition C or segmented worksheets with behavior specific praise (M=22.6; range=15-34) had one datum that did not overlap with other conditions. Aside from that outlier, the level remained low, and the trend was stable with limited variability. Condition D or segmented worksheets without behavior specific praise (M=17.8; range=12-27) was marked by low variability and level. There was one outlier that suggested an upward trend. Based on the visual analysis and the means, there was no difference found between whole worksheets without behavior specific praise or whole with behavior specific praise, or either condition of segmented worksheets.

Digits Correct Per Minute

DCPM, depicted in Figure 2, were calculated by identifying all digits correct and within their correct placement, counting them and dividing by 10 to account for the minutes worked so that an assessment of accuracy and speed can be made. As depicted in Figure 2, Allison's DCPM graph shows condition B or whole worksheets without behavior specific praise (M=1.7; range=1.2-1.9) with relatively stable data, at a low level, and with no remarkable trend. The data did trend downwards and ended on an upward trend with the same DCPM both starting and finishing the data path. Condition A (M= 1.76; range=1.3-2.1) showed relatively stable and low-level data. There was no visible divergence, but there were many overlapping data points. Since there was no evidence of

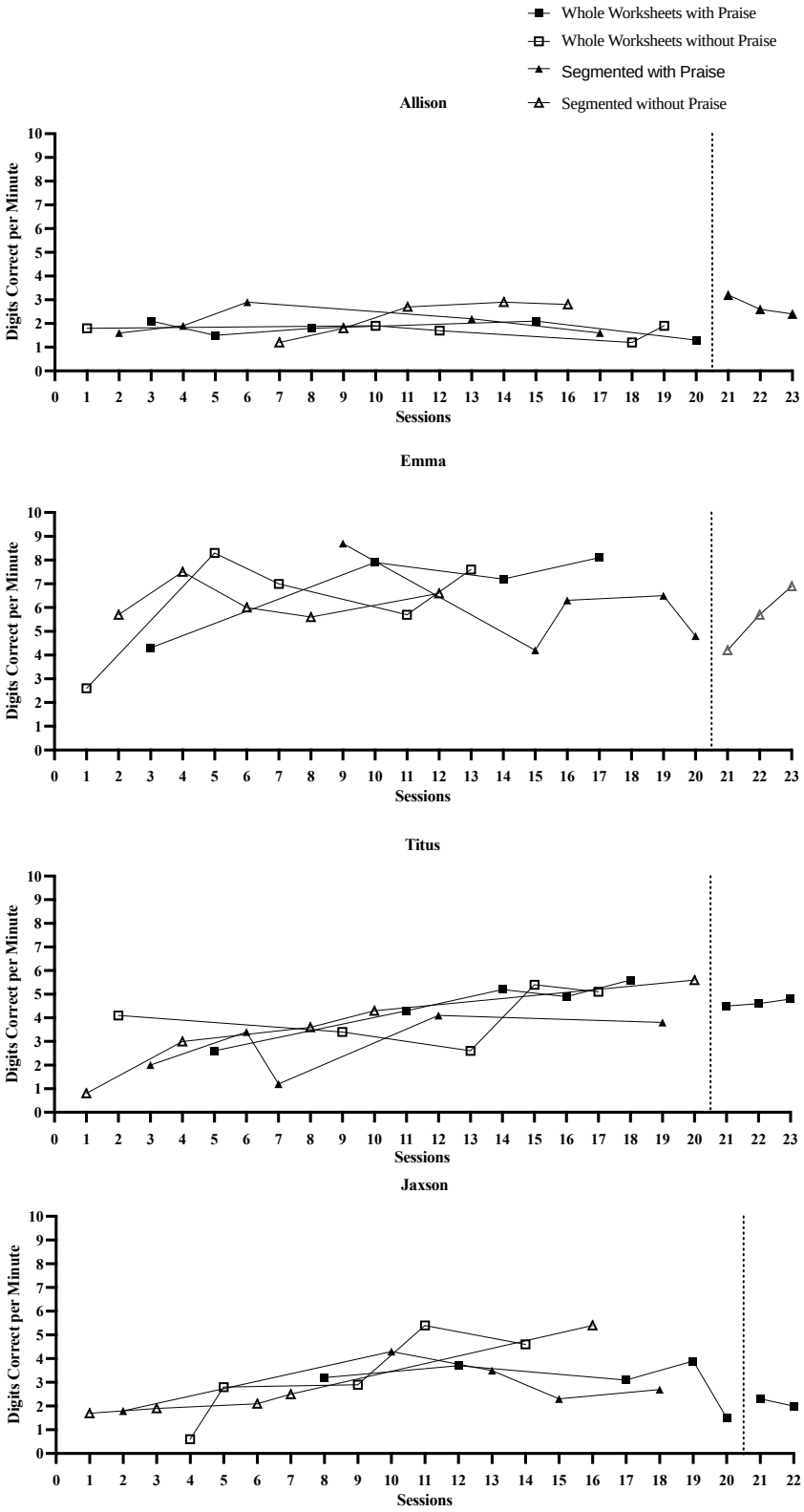


Figure 2. Digits Correct Per Minute

an effect, the immediacy and consistency of effect were not visible. Condition C (M= 2.04; range=1.6- 2.9) maintained many overlapping data points but does have one outlier, although the verification (M=2.7; range=2.4-3.2) of this condition appears to have one outlier as well. There is no clear divergence. Both condition C and the verification ended in a decreasing trend. Condition D (M=2.28; range=1.2-2.9) showed some divergence in the last three data points. They did overlap with condition C or segmented with behavior specific praise.

There was no immediacy of effect since the increase did not occur during the first two data points. While the data did indicate a slight divergence when comparing whole worksheets to segmented worksheets, there was not enough consistency or difference of results to justify an effect on whole worksheets with or without praise, or segmented worksheets with or without praise.

As depicted in Figure 2, Emma's DCPM graph indicated high rates of variability and overlap across all four conditions. Condition B or whole worksheet without behavior specific praise (M=6.24; range=2.6-8.3) suggested no consistency of effect, high levels of variability and consistent overlap, and therefore, no divergence was present. Condition A (M= 5.7; range=1-8.1) also showed a wide range of variability and ended in a downward trend. Condition C (M=6.1; range=5.6-7.5) showed less variability than other conditions but still posed many overlapping data points. Although starting at a higher level, the trend began downward at the second datum and ended in a downward trend as well. Condition D (M=6.28; range=5.6-7.5) had slightly less variability than the other conditions but had many overlapping data points and a low level. There was no immediacy and consistency

of an effect since there was no visible effect. Emma chose to continue this condition for verification (M=5.6; range= 4.5-4.8) which reflected an upward trend, but the data still overlapped with other conditions. Based on the visual analysis and means, there was no evident difference among conditions with the exception of condition D being slightly more stable. However, there was not enough evidence to justify that either condition produced more digits correct per minute.

As depicted in Figure 2, Titus's DCPM graph indicated overlap across all four conditions, suggesting less variability than other participants. Condition B or the whole worksheets without behavior specific praise (M=4.12; range=2.6-5.4) began at a higher level and then proceeded into a decreasing trend, and after a sudden increase in level the data finished in a decreasing trend. The high of overlap with other conditions, creating no divergence, depicted that even though this was the control condition there were no substantial differences between condition B and the other conditions. Condition A (M=4.52; range=2.6-5.6) had a steady increasing trend, with low variability. However, the level continued to overlap with other conditions indicating no divergence. Titus chose to continue condition A for verification (M=4.63; range=4.5-4.8) and within those three data points there was an increasing trend. The data did overlap with other conditions. Maintaining or increasing that level reflected consistency of effects. Condition C or segmented worksheets with behavior specific praise (M=2.9; range=1.2-4.1) showed some variability and overlap with data from other conditions. The data path started low with an increasing trend, but was marked by another outlier before a stable two data points finished the path. Condition D (M=3.46; range=0.8-5.6) started out as the lowest data point on the graph but continued to depict an increasing trend. There was overlap

among four of the five data points. However, there was consistency of effect since the data continued to increase. As for immediacy of effect, there was none visible initially. Based on visual analysis and means there was no clear effect that demonstrated one condition was better than any other.

As depicted in Figure 2, Jaxson's DCPM shows variability and an increasing trend for condition B or whole worksheets without behavior specific praise, which is most similar to a control condition (M=3.26; range=0.6-5.4). This demonstrates overlap and non-divergence when compared with other conditions. Condition A or whole worksheets with behavior specific praise (M=3.08; range=1.5-3.9) demonstrates overlap with data from other conditions. Condition A starts out and remains moderately stable at a moderate level until the end where it shows a decreasing trend. Jaxson chose to verify or continue with condition A (M=2.15; range=2-2.3). The verification condition starts out at a higher level than the previous condition A but ends in a decreasing trend. It is difficult to justify calling this a trend though since there are only two data points in the verification phase. Due to uncontrollable circumstances, such as absences and the end of the school year, a third verification data point was unable to be obtained. Condition C (M=2.92; range=1.8-4.3) had many overlapping data points and slight variability through out, overall there was a small increasing trend. Due to the overlap, no immediacy of effects, consistency of effects, or divergence was noted with condition C. In Condition D (M=2.72; range=1.7- 5.4) an increasing trend was maintained throughout with one non-overlapping data point at the end. However, there was no immediacy of effects and divergence cannot be determined by one data point. Based on visual analysis and the means there was no clear significant distinction between any of the four conditions.

Social Validity

A modified Children Intervention Rating Profile (CIRP) adapted from Elliott (1986) was administered via paper and pencil on the last day of each condition to capture the students' thoughts and concerns about each condition. The results were not reviewed until all four participants had completed all four CIRP forms in order to keep their opinions anonymous. When administered, students were told to think about that day's work or any worksheets that were the same color as the CIRP. The CIRP has seven Likert scale items where students choose from one or "I agree" to six or "I do not agree." Therefore, higher scores depicted a higher level of relative preference. Means of acceptability can be found in Table A3. Although all four conditions have high levels of acceptability, it is of interest that both segmented conditions received lower acceptability rates compared to the whole worksheet conditions. It is also of interest that the control condition had the greatest level of acceptability across all four participants despite none of the participants choosing to verify or continue this condition. The high level of validity could be due to the rich learning history associated with his condition. Lastly, the behavior specific praise condition of segmented worksheets had equal acceptability as the no praise segmented condition by the student's report. In Table A3. The means for each participant and condition are available. The highlighted mean is the verification choose by each participant. This table also shows that one participant had the same mean every condition. This could be representative of a misunderstanding of the questions or answers when the students were choosing their answers for the CIRP.

Since all intervention procedures were provided by graduate students outside of the regular classroom, teachers were not asked to complete an intervention rating profile.

Table A3. *Mean Student Rating on the Children's Intervention Rating Profile*

	Condition			
Mean	A	B	C	D
Allison	42	27	42	42
Emma	37	37	37	37
Titus	33	42	21	21
Jaxson	32	42	37	37
Total	36	37	34.25	34.25
All items	5.14	5.28	4.89	4.89

CHAPTER IV - Discussion

The purpose of this research study was to identify any effect in completed problems or digits correct per minute when students were presented with worksheets or segmented worksheets and when provided behavior specific praise or without praise. Participants preferences and intervention acceptability were assessed for each condition.

Research question 1 assessed whether there was an increase in completed problems or digits correct per minute when presented segmented worksheets with BSP provided once every minute compared to other conditions. Data demonstrated limited differences in this condition compared to the other conditions across all four participants. Although some outlying data suggested an increase, the data were not stable and consistent across participants to support an effective change due to the intervention implemented.

Research question 2 assessed whether problems completed, and digits correct per minute increased compared to other conditions when the student was presented with segmented worksheets without BSP. Data demonstrated a lack of effect due to limited separation from other conditions. However, this data path remained more stable than other conditions. This showed that extraneous variables might be better controlled for by shortened presentations of work so that students consistently respond the same.

Research question 3 assessed whether the average number of completed problems and digits correct per minute increased compared to other conditions when whole worksheets were delivered with BSP provided every minute. Data demonstrated a variety of responses, as some decreased and some increased slightly with a lack of differentiation among conditions.

Research question 4 assessed whether the students' average number of completed math problems and digits correct per minute increased when whole worksheets were presented without BSP. Data demonstrated very little separation from other conditions suggesting, no effect among the conditions compared to whole worksheets without praise. This was expected due to this condition acting as a control condition and being most similar to what happens in the classroom.

Despite the consistent lack of effect throughout this study for one condition increasing academic production, relevant information was produced. It appears, based on this information, that different students responded differently to the conditions. Although this would not be an intervention suggested to a whole class due to the time required and little effect, this could be a choice provided to students as a means for them to engage in an active role in their intervention choices. Research has shown over many decades that choice may have a positive effect in decreasing problem behaviors and increases in on-task behaviors related to academic, social or vocational learning. (Kern et al., 1998; Schmidt et al., 2009; and Shogren et al., 2004). Although this study did provide students the opportunity to choose their favorite condition, to verify once for the next two-three sessions, it would be of interest to see if given the opportunity to choose a different condition each session would they always pick the same one. Future studies should evaluate whether choice could be a factor in increasing academic production.

Additionally, this study does highlight the use of behavior specific praise as a means to increase behaviors compatible with academic production by praising such as "I love the way you are staying so focused.", "Great job using your scratch paper.", or "Excellent job working through all of the problems." With two of the four participants.

Of note, only one participant chose to continue in a condition without behavior specific praise.

The results from this study differ from Wallace et. al. (2003), where the participant did increase completed problems when segmented worksheets paired with behaviors specific praises and high fives were implemented. The results from this study were more similar to Peak (2021), where an effect was only found for one of the four participants on the variables of completed problems, digits correct per minute, on and off-task and Jerome (2018) who found no effect on productivity, rates of rule violations or on-task behavior.

The CIRP shows that students reported all four conditions were acceptable. Interestingly, the control condition or whole worksheets without praise was reported as the most acceptable. This could have simply been the condition participants were accustomed to and had the most experiences creating a history of reinforcement. Even though the results were higher for the control condition the differences were minimal. When asked to choose a condition to continue the majority of students did pick a condition with BSP.

Limitations

This study, although meaningful, has some limitations. The level of overlap across conditions, in the data with all four participants was high, and due to the end of the school year, there was not enough time to extend conditions until stability was reached. Secondarily, although this study improved upon the worksheets used in the Peak (2021) study, there continued to be concerns with certain types of problems. For example, students would answer fractions using only one number instead of setting up the fraction

bar or would solve the addition correctly but leave the decimal out making the answer completed but would receive no DCPM credit due to the place value not aligning. These patterns of concern were seen across all four participants. Although these types of problems were on the initial curriculum-based measures to detect instructional level, it is possible that a measurement system that was more specific on individual skill set versus grade level probes could be more appropriate in future studies. Ways in which this could be remedied in the future might include having decimals or fraction bars pre-marked on the answer line as a stimulus prompt and allowing students to fill them in instead of just a blank space to write the answer. Although not possible within the confines of this study, an additional teaching component could be added to help with these skills, and the stimulus prompt then could be faded.

Thirdly, participants often stopped working, looked up and said thank you to praise statements being provide to them, which could have equated to lost academic production time. Specifically, Titus did this frequently and his averages of completed problems during praise conditions were slightly lower compared to conditions that did not include praise. This could be modified by spacing behavior specific praise statements out further or seeing the difference in a classroom setting where students have peer models and typically do not respond to teacher statements aloud.

Additionally, ten minutes and 100 problems, with nine behavior specific praise statements could be too large of a task to clearly see any difference. Perhaps a difference would be more apparent using 50 problems with five minutes of work. The praise of compatible behaviors with academic production could need to be spaced more when only one student is present as to not distract the student from completing the problems. Due to

the large number of problems students were permitted to skip around or come back to problems when time permitted. This could have affected the schedule of reinforcement and could be manipulated in future studies.

Lastly, this study did not include a skills verses performance assessment when finding the instructional level for these students. BSP and segmented worksheets should be most effective with performance deficits. Students with a skills deficit would be best served with an intervention that provides feedback and teaching. With the two students on grade level and two below grade level they could have had a long history with skill deficits in mathematics.

Future Directions

At this time, three studies have shown little to no effect when work is segmented; however, this study did support the line of choice research (Kern et al., 1998; Schmidt et al., 2009; Shogren et al., 2004) and BSP research (Dufrene et al., 2012; Ennis et al., 2014; Ennis et al., 2018; Floress et al., 2017; Haydon & Musti-Rao, 2011; Hollingstead et al., 2016; Krank et al., 2017; O'Handley et al., 2020; Richard, 2012; Sutherland et al., 2000). Future research should focus on using a smaller sample of problems for each session, having the time of completed worksheet as a variable, potentially looking at preference for individual intervention. Wallace et. al (2003) allowed the participant unlimited time but did not collect specific data on completion rates, rather stating that work prior to intervention did not get completed in a whole day, but during intervention the students would be able to complete the task within an hour. Which is quite a large difference, is it possible this intervention would be more powerful over a standard assignment time such

as 30 minutes for the class to complete their worksheet, due to the available distracting stimuli across that time span and setting.

Additionally, a class wide study could provide more insight for use in the classroom setting. In this study, most distracting stimuli were removed, but inside the classroom would offer more distractions and therefore show if segmenting worksheets could be beneficial in motivating students to produce more academic work despite these everyday classroom variables. Additionally in the Wallace et. al (2003) study, researchers individualized this intervention to the child. Researchers could have conducted some observations before implementing the intervention, and his motivating factors, or preferences were evaluated before choosing to implement segmented work, behavior specific praise and high fives. Without this individualize motivation preference piece, the intervention seems to lack a consistent and stable differentiation from the other conditions.

This research is meaningful to informing continuing research but did not show enough differentiation between conditions to justify this currently as a systematic individual intervention. However, this intervention could be beneficial for individual students to actively help choose their materials and intervention structure but segmenting alone, or segmenting with behavior specific praise under such a controlled setting did not establish that this intervention alone is the mean for the increase in academic production.

APPENDIX A- Guardian Consent Form

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

PARENTAL CONSENT FORM

PARENTAL CONSENT PROCEDURES

- ***Use of this template is optional.*** However, by federal regulations (45 CFR 46.116), all consent documentation must address each of the required elements listed below (purpose, procedures, duration, benefits, risks, alternative procedures, confidentiality, whom to contact in case of injury, and a statement that participation is voluntary).
- This document must be completed by the Principal Investigator and signed by the parent or guardian of each potential research participant.
- Signed copies of the long form consent should be provided to a parent or guardian of every participant.

Last Edited July 7th, 2021

Today's date:

PROJECT INFORMATION

Project Title: The Effects of Segmenting Worksheets and Behavior Specific Praise on Independent Seatwork with Elementary Students

Principal Investigator: Lauren Peak M.S. and Joe Olmi Ph.D.	Phone:	Email: lauren.douglas@usm.edu d.olmi@usm.edu
College: Education and Human Sciences	School and Program: School Psychology Doctoral Program	

RESEARCH DESCRIPTION

1. **Purpose**:
   This study will seek to determine if segmenting work into smaller task and pairing those task with Behavior Specific Praise will increase academic production (problems completed) and accuraccy (digits correct per minute). This study will seek to determine if the combination is more effective than smaller work task alone.

2. **Description of Study:**
   One curriculum based measurement session that should take about thirty minutes and 13 twenty to thirty minute intervention sessions. There will be 4 participants, in a school setting,in grades 2nd-5th.

3. **Benefits:**
   The potential benefits of this study included academic production, accuracy, and at the very least an increase opportunity to respond which should support their learning of math computation.

4. **Risks:**
   The risk with this study is limited. The student might not enjoy doing extra mathwork but the time per session is minimial.

5. **Confidentiality:**
   Participants confidentiality is of the utmost importance. After this consent form no additional data will be attach to a specific childs identiy. Pseudo names will be used in documentation of results to protect the students identity.

6. **Alternative Procedures:**
   Participation in this study is voluntary. If parents do not wish to have their student participate there will be no consequences and they will still be able to qualify for futurue studies or services with USM.

7. **Participant's 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 Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5125, Hattiesburg, MS 39406-0001, 601-266-5997.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

PARENTAL CONSENT INFORMATION	
Participant's Name:	Participant's Age:
Parent or Guardian's Name:	
Person Soliciting Parental Consent:	

AGREEMENT TO ALLOW PARTICIPATION IN RESEARCH

I hereby consent to participate in this research project. All research procedures and their purpose were explained to me, and I had the opportunity to ask questions about both the procedures and their purpose. I received information about all expected benefits, risks, inconveniences, or discomforts, and I had the opportunity to ask questions about them. I understand my participation in the project is completely voluntary and that I may withdraw from the project at any time without penalty, prejudice, or loss of benefits. I understand the extent to which my personal information will be kept confidential. As the research proceeds, I understand that any new information that emerges and that might be relevant to my willingness to continue my participation will be provided to me.

(Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval:) The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

_____	_____
Parent or Guardian of Research Participant	**Person Explaining the Study**
_____	_____
Date	**Date**

APPENDIX B-Minor Assent Form

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

MINOR ASSENT FORM

MINOR ASSENT PROCEDURES
• ***Use of this template is optional.*** However, by federal regulations (45 CFR 46.116), all consent documentation must address each of the required elements listed below (purpose, procedures, duration, benefits, risks, alternative procedures, confidentiality, whom to contact in case of injury, and a statement that participation is voluntary). • Documentation must be completed by the Principal Investigator and signed by each assenting minor. • Parental consent must be obtained before soliciting the assent of any minor participating in the study. • Signed copies of the IRB approved assent form should be provided to a parent or guardian of every assenting minor. Last Edited July 7th, 2021

Today's date:		
PROJECT INFORMATION		
Project Title: The Effects of Segmenting Worksheets and Behavior Specific Praise on Independent Seatwork with Elementary Students		
Principal Investigator: Lauren Peak M.S. and Joe Olmi Ph.D.	Phone:	Email: lauren.douglas@usm.edu d.olmi@usm.edu
College: Education of Human Sciences	School and Program: School Psychology Doctoral Program	
RESEARCH DESCRIPTION		

1. **Why am I being asked to participate?**
   This study will seek to determine if segmenting work into smaller task and pairing those task with Behavior Specific Praise will increase academic production (problems completed) and accuraccy (digits correct per minute). This study will seek to determine if the combination is more effective than smaller work task alone.

2. **What will I have to do?**
   Simply put all you will have to do is answer some math problems, you already know how to do a couple of times a week for about a month.

3. **What do I get if I agree to participate?**
   This study gives you the opportunity to practice your math and become an even better student.

4. **Can anything bad happen if I participate?**
   There is very little risk of something bad happening.

5. **Who will get to see information about me?**
   Aside from this form, the form your teacher, and parent complete, none of the other work will have your name on it. Additional when writing up results of the study your name will be changed so no one will know it is you! This help protect your identiy.

6. **What if I do not want to participate?**
   If you choose not to participate in the study nothing bad will happen and you will still have the opportunity to be apart of other studies and services at USM.

7. **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 protect research participants.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

CONSENT TO PARTICIPATE IN RESEARCH

Participant's Name: _____

I hereby consent to participate in this research project. All research procedures and their purpose were explained to me, and I had the opportunity to ask questions about both the procedures and their purpose. I received information about all expected benefits, risks, inconveniences, or discomforts, and I had the opportunity to ask questions about them. I understand my participation in the project is completely voluntary and that I may withdraw from the project at any time without penalty, prejudice, or loss of benefits. I understand the extent to which my personal information will be kept confidential. As the research proceeds, I understand that any new information that emerges and that might be relevant to my willingness to continue my participation will be provided to me.

(Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval:) The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

_____	_____
Research Participant	**Person Explaining the Study**
_____	_____
Date	**Date**

M–COMP ADMINISTRATION DIRECTIONS

These directions are for group administration—adapt as needed for individual administration.

Say to the students:
We're going to take an 8-minute math test.

Read the problems carefully and work each problem in the order presented, starting at the first problem on the page and working across the page from left to right. Do not skip around.

If you do not understand how to do a problem, mark it with an X and move on. Once you have tried all of the problems in order, you may go back to the beginning of the worksheet and try to complete the problems you marked. Although you may show your work and use scratch paper if that is helpful for you in working the problems, you may not use calculators or any other aids. Keep working until you have completed all of the problems or until I tell you to stop.

Do you have any questions?

Answer any questions the students may have, then hand them their probes, and say:
Here are your tests.

Write your name, your teacher's name, and the date on the first page only in the space provided. Do not start working until I tell you to begin.

Allow the students time to write their information. When everyone in the class is done, say:
Begin. *Start timing.*

Walk around the room to make sure that the students are working the problems in order. If you notice that a student is skipping ahead without attempting each problem, say:
Try to work each problem. Do not skip ahead unless you do not know how to work a problem.

If a student asks a question or requests clarification, say:
I can't help you. Work the problem as best you can. If you don't understand the problem, you may move on to the next problem.

After 8 minutes, say:
Stop and put down your pencil.

Remind them to make sure they have their name, the teacher's name, and the date written on their probe in the correct place. Then collect the probes and any scratch paper.

APPENDIX D- Treatment Integrity Form for Intervention Condition A

The interventionist read the segmented script: "It's time to do your math. Today we are going to do one larger assignment. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get started."	
The interventionist set a timer for 10 minutes	
Scratch paper was visible and on the table.	
The interventionist set an interval timer to notified them at every minute.	
The interventionist gave the child the whole worksheet.	
At every minute mark, a BSP was provided to the student up to 9 times. (Tally number of BSP provided per session in the box)	
When the 10-minute timer sounded, the whole worksheet and any scratch paper was collected.	
The interventionist scored the worksheet.	
Completed problems were counted.	
Digits correct per minute were counted.	
If necessary, IOA was calculated.	
Steps Completed:	
Percent Completed:	

Date: _____ Participant Code: _____

Problems Completed: _____ Digits correct per minute: _____

APPENDIX E- Treatment Integrity Form for Intervention Condition B

The interventionist read the segmented script: "It's time to do your math. Today we are going to do one larger assignment. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get started."	
The interventionist set a timer for 10 minutes	
Scratch paper was visible and on the table.	
The interventionist gave the child the whole worksheet.	
When the 10-minute timer sounded, the whole worksheet and any scratch paper was collected.	
The interventionist scored the worksheet.	
Completed problems were counted.	
Digits correct per minute were counted.	
If necessary, IOA was calculated.	
Steps Completed:	
Percent Completed:	

Date: _____ Participant Code: _____

Problems Completed: _____ Digits correct per minute: _____

APPENDIX F- Treatment Integrity Form for Intervention Condition C

The interventionist read the segmented script: "It's time to do your math. Today we are going to do smaller assignments. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get started."	
The interventionist set a timer for 10 minutes	
Scratch paper and a spare pencil was visible and on the table.	
The interventionist set an interval timer to notified them at every minute.	
The interventionist gave the child segmented worksheet one.	
At every minute mark, a BSP was provided to the student up to 9 times. (Tally number of BSP provided per session in the box)	
Upon completion of the first worksheet, the interventionist collected the 1st and gave the 2nd.	
Upon completion of the 2nd worksheet, the interventionist collected the 2nd and gave the 3rd.	
Upon completion of the 3rd worksheet, the interventionist collected the 3rd and gave the 4th.	
Upon completion of the 4th worksheet, the interventionist collected the 4th and gave the 5th.	
When the 10-minute timer sounded, the last worksheet and any scratch paper was collected.	
The interventionist scored the worksheets.	
Completed problems were counted.	
Digits correct per minute were counted.	
If necessary, IOA was calculated.	
Steps Completed:	
Percent Completed:	

Date: _____ Participant Code: _____

Problems Completed: _____ Digits correct per minute: _____

APPENDIX G- Treatment Integrity Form for Intervention Condition D

The interventionist read the segmented script: "It's time to do your math. Today we are going to do smaller assignments. You are not expected to complete all the problems but try your very best to answer as many as you can. Scratch paper is available if you need it. Here is your paper; get started."	
Scratch paper and a spare pencil was visible and on the table.	
The interventionist set a timer for 10 minutes	
The interventionist gave the child segmented worksheet one.	
Upon completion of the first worksheet, the interventionist collected the 1st and gave the 2nd.	
Upon completion of the 2nd worksheet, the interventionist collected the 2nd and gave the 3rd.	
Upon completion of the 3rd worksheet, the interventionist collected the 3rd and gave the 4th.	
Upon completion of the 4th worksheet, the interventionist collected the 4th and gave the 5th.	
When the 10-minute timer sounded, the last worksheet and any scratch paper was collected.	
The interventionist scored the worksheets.	
Completed problems were counted.	
Digits correct per minute were counted.	
If necessary, IOA was calculated.	
Steps Completed	
Percent Completed	
Date: _____ Participant Code: _____	
Problems Completed: _____ Digits correct per minute: _____	

APPENDIX H - Whole Worksheet

Participant 4 Form A 5.1

$\frac{9}{14}+\frac{13}{14}=$	$\begin{array}{r} 0.9 \\ +3.5 \\ \hline \square \end{array}$	$\frac{7}{10}+\frac{7}{10}=$	$\begin{array}{r} 9.5 \\ +4.0 \\ \hline \square \end{array}$	$\frac{19}{20}+\frac{19}{20}=$
$\begin{array}{r} 0.30 \\ +0.17 \\ \hline \square \end{array}$	$\frac{2}{3}+\frac{2}{3}=$	$\begin{array}{r} 0.70 \\ +0.20 \\ \hline \square \end{array}$	$\frac{99}{100}+\frac{28}{100}=$	$\begin{array}{r} 0.90 \\ +0.09 \\ \hline \square \end{array}$
$\frac{8}{11}+\frac{2}{11}=$	$\begin{array}{r} 0.40 \\ +0.04 \\ \hline \square \end{array}$	$\frac{2}{14}=\frac{6}{14}=$	$\begin{array}{r} 0.80 \\ +0.05 \\ \hline \square \end{array}$	$\frac{11}{14}+\frac{9}{14}=$
$\begin{array}{r} 0.10 \\ +0.01 \\ \hline \square \end{array}$	$\frac{5}{7}-\frac{3}{7}=$	$\begin{array}{r} 0.30 \\ +0.09 \\ \hline \square \end{array}$	$\frac{3}{4}-\frac{2}{4}=$	$\begin{array}{r} 1.1 \\ +0.4 \\ \hline \square \end{array}$
$4\times93=$	$\begin{array}{r} 0.19 \\ +1.9 \\ \hline \square \end{array}$	$4\times37=$	$\begin{array}{r} 0.16 \\ +0.12 \\ \hline \square \end{array}$	$5\times18=$
$\begin{array}{r} 1.9 \\ +1.5 \\ \hline \square \end{array}$	$9\times97=$	$\begin{array}{r} 1.1 \\ +0.05 \\ \hline \square \end{array}$	$7\times71=$	$\begin{array}{r} 1.1 \\ +0.1 \\ \hline \square \end{array}$
$6\times63=$	$\begin{array}{r} 0.20 \\ +0.4 \\ \hline \square \end{array}$	$3\times42=$	$\begin{array}{r} 1.6 \\ +1.7 \\ \hline \square \end{array}$	$7\times96=$
$\begin{array}{r} 6.5 \\ -0.3 \\ \hline \square \end{array}$	$5\times250=$	$\begin{array}{r} 7.8 \\ -1.4 \\ \hline \square \end{array}$	$3\times557=$	$\begin{array}{r} 5.8 \\ -0.5 \\ \hline \square \end{array}$

24 ÷ 2 =	7 x 8 ☐	54 ÷ 9 =	12 x 1 ☐	11 ÷ 11 =
9 x 10 ☐	55 ÷ 11 =	12 x 5 ☐	6 ÷ 1 =	2 x 9 ☐
110 ÷ 11 =	7 x 7 ☐	14 ÷ 7 =	6 x 1 ☐	45 ÷ 6 =
3 x 6 ☐	987÷7=	1 x 4 ☐	660÷5=	842 x 95 ☐
945÷7=	554 x 73 ☐	925÷5=	352 x 40 ☐	316÷4=
7036 x 55 ☐	805÷5=	5290 x 87 ☐	603÷3=	9707 x 80 ☐
20÷7=	4.0 +5.6 ☐	5÷4=	5.5 +0.7 ☐	12÷7=
6.3 +1.6 ☐	57÷9=	1.6 +3.6 ☐	60÷7=	6.1 +1.0 ☐

$5\times352=$	$\begin{array}{r} 6.1 \\ -0.3 \\ \hline \square \end{array}$	$8\times769=$	$\begin{array}{r} 8.8 \\ -0.3 \\ \hline \square \end{array}$	$7\times744=$
$\begin{array}{r} 8.4 \\ -4.2 \\ \hline \square \end{array}$	$5\times467=$	$\begin{array}{r} 6.3 \\ -0.8 \\ \hline \square \end{array}$	$5\times691=$	$\begin{array}{r} 8.4 \\ -\ 0.47 \\ \hline \square \end{array}$
$7\times368=$	$\begin{array}{r} 0.44 \\ -0.13 \\ \hline \square \end{array}$	$74x11=$	$\begin{array}{r} 0.44 \\ -0.13 \\ \hline \square \end{array}$	$16\times11=$
$\begin{array}{r} 3.9 \\ -0.7 \\ \hline \square \end{array}$	$77\times22=$	$\begin{array}{r} 0.53 \\ -0.44 \\ \hline \square \end{array}$	$6.0+4.0=$	$\begin{array}{r} 0.66 \\ -0.12 \\ \hline \square \end{array}$

APPENDIX I -Segmented Worksheets

2 + 16 =	225 +4 □	20 + 3 =
696 +7 □	4 + 19 =	9 x 6 □
6 + 13 =	8 x 5 □	4 + 18 =
425 − 20 □	9 - 1 =	70 x 10 □
11 - 0 =	57 x 7 □	15 - 3 =
7.0 + 4.8 □	85+5=	3.9 + 8.2 □
27+4=	7.0 − 2.0 □	**Participant 4** **Form D 4.1**

3 + 17 =	569 +6 □	20 + 19 =
288 +8 □	17 + 15 =	5 x 1 □
3 + 0 =	218 − 10 □	4 + 5 =
30 x 40 □	9 - 7 =	82 x 2 □
4 - 2 =	5.2 + 3.9 □	1 - 1 =
2.4 + 1.6 □	63+7=	8.0 − 7.5 □
447+6=453	5.0 − 3.9 □	**Participant 4** **Form D4.2**

0 + 1 =	968 +6 □	1 + 19 =
0 x 4 □	11 + 1 =	2 x 5 □
12 + 17 =	907 − 70 □	14 + 14 =
218 − 10 □	18 - 10 =	60 x 40 □
20 - 16 =	69 x 9 □	16 - 7 =
4.1 + 1.4 □	41+9=	5.0 − 4.9 □
956+8=	6.0 − 3.0 □	**Participant 4** **Form D 4.3**

17 + 13 =	549 +5 □	19 + 2 =
501 +5 □	4 + 16 =	0 x 5 □
5 + 6 =	61 − 30 □	7 + 10 =
474 − 40 □	12 - 12 =	90 x 70 □
15 - 11 =	92 x 6 □	20 - 19 =
3.9 + 5.3 □	55+5=	9.0 − 7.0 □
539+1=	6.0 − 2.0 □	**Participant 4** **Form D 4.4**

5 + 2 =	748 +3 □	5 + 18 =
447 +6 □	2 + 17 =	6 x 3 □
18 + 4 =	$1\sqrt{2} =$	15 + 13 =
176 − 80 □	10 - 2 =	5 x 30 □
1 - 0 =	3 x 2 □	9 - 5 =
6.6 + 1.5 □	82+9=	9.0 − 4.8 □
568+4=	4.0 − 2.2 □	**Participant 4** **Form D 4.5**

APPENDIX J-Children's Intervention Rating Profile

POST-INTERVENTION

Student:

Date:

Adapted Version of the Children's Intervention Rating Profile

	I agree  ***1***	***2***	***3***	***4***	***5***	***I do not agree***  ***6***
1. The program we used was fair.						
2. I think my teacher was too harsh on me.						
3. Being in this program caused problems with my friends.						
4. There were better ways to teach me.						
5. This program could help other kids, too.						
6. I liked the program we used.						
7. Being in this program helped me do better in school.						
8.						

Comments: _____

_____

_____

Please see Excel file, "Social Validity Adapted CIRP Scoring Tool" and Word document, "Social Validity Adapted CIRP Scoring Guide" for scoring instructions.

Source: Adapted from Witt, J.C. & Elliott, S.N. (1985). Acceptability of classroom intervention strategies. In Kratochwill, T.R. (Ed.), *Advances in School Psychology, Vol. 4*, 251 – 288. Mahwah, NJ: Erlbaum.

APPENDIX K– Skill Sequence set forth by Burns, VanDerHeyden, and Jiban (2006)

Table 7 Skill sequence 2003–2004

2nd Grade	3rd Grade
1. Addition facts 0–20	1. Addition and subtraction facts 0–20
2. Subtraction facts 0–9	2. Fact families addition and subtraction 0–20
3. Subtraction facts 0–12	3. Three-digit addition without and with regrouping
4. Subtraction facts 0–15	4. Three-digit subtraction without and with regrouping
5. Subtraction facts 0–20	5. Two- and three-digit addition and subtraction with and without regrouping
6. Mixed subtraction/addition 0–20	6. Multiplication facts 0–9
7. Fact families addition and subtraction 0–20	7. Division facts 0–9
8. Two-digit addition without regrouping	8. Fact families multiplication and division 0–9
9. Two-digit addition with regrouping	9. Add/subtract fractions with like denominators
9. Two-digit subtraction without regrouping	10. Single-digit multiplied by double/triple digit
11. Two-digit subtraction with regrouping	11. Without regrouping
12. Three-digit addition without and with regrouping	12. Single-digit multiplied by double/triple digit with regrouping
13. Three-digit subtraction without and with regrouping	13. Single-digit divided into double/triple digit without remainders
14. 2nd Grade monthly math probe	14. Add and subtract decimals to the hundredths
4th Grade	**5th Grade**
1. Multiplication facts 0–12	1. Multiplication facts 0–12
2. Division facts 0–12	2. Division facts 0–12
3. Fact families multiplication/division 0–12	3. Fact families multiplication/division 0–12
4. Single-digit multiplied by double-digit with and without regrouping	4. Multiply two- and three-digit with and without regrouping
5. Double-digit multiplied by double-digit without regrouping	5. Single-digit divisor divided into double-digit dividend with remainders
6. Double-digit multiplied by double-digit with regrouping	6. Single-digit divisor divided into double- and triple-digit dividend with remainders
7. Single-digit divisor into double-digit dividend without remainders	7. Reduce fractions to simplest form
8. Single-digit divisor into double-digit dividend with remainders	8. Add/subtract proper fractions/mixed numbers with like denominators with regrouping
9. Single-and double-digit divisor into single- and double-digit dividend with remainders	9. Add/subtract decimals
10. Add/subtract fractions with like denominators no regrouping	10. Multiply/divide decimals
11. Multiply multi-digit numbers by two numbers	11. Double-digit divisor into four-digit dividend
12. Add and subtract decimals to the hundredths	12. Multiply and divide proper and improper fractions

REFERENCES

Albers, A. E., & Greer, R. D. (1991). Is the three-term contingency trial a predictor of effective instruction? *Journal of Behavioral Education*, *1*(3), 337–354. https://doi.org/10.1007/bf00947188

Barrett, C. A., Gadke, D. L., & VanDerHeyden, A. M. (2020). At what cost?: Introduction to the special issue "return on investment for academic and Behavioral Assessment and intervention." *School Psychology Review*, *49*(4), 347–358. https://doi.org/10.1080/2372966x.2020.1817718

Barrish, H. H., Saunders, M., & Wolf, M. M. (1969). Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom1. *Journal of Applied Behavior Analysis*,*2*(2), 119-124. doi:10.1901/jaba.1969.2-119

Bradshaw, C. P., O'Brennan, L. M., & McNeely, C. A. (2008). Core competencies and the prevention of school failure and early school leaving. *New Directions for Child and Adolescent Development*, *2008*(122), 19–32. https://doi.org/10.1002/cd.226

Burns, M. K., VanDerHeyden, A. M., & Jiban, C. L. (2006). Assessing the instructional level for mathematics: A comparison of methods. *School Psychology Review*, *35*(3), 401–418. https://doi.org/10.1080/02796015.2006.12087975

Casillas, A., Robbins, S., Allen, J., Kuo, Y.-L., Hanson, M. A., & Schmeiser, C. (2012). Predicting early academic failure in high school from prior academic achievement, psychosocial characteristics, and behavior. *Journal of Educational Psychology*, *104*(2), 407–420. https://doi.org/10.1037/a0027180

Chen, Z., & Kaplan, H. B. (2003). School Failure in Early Adolescence and Status Attainment in Middle Adulthood: A Longitudinal Study. *Sociology of Education,76*(2), 110. doi:10.2307/3090272

Christle, C. A., Jolivette, K., & Nelson, C. M. (2007). School Characteristics Related to High School Dropout Rates. *Remedial and Special Education,28*(6), 325-339. doi:10.1177/07419325070280060201

Codding, R. S., Livanis, A., Pace, G. M., & Vaca, L. (2008). Using Performance Feedback To Improve Treatment Integrity Of Classwide Behavior Plans: An Investigation Of Observer Reactivity. *Journal of Applied Behavior Analysis,41*(3), 417-422. doi:10.1901/jaba.2008.41-417

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied Behavior Analysis*. Pearson/Merrill Prentice Hall.

Daly, E. J., Martens, B. K., Witt, J. C., & Dool, E. J. (1997). A model for conducting a functional analysis of academic performance problems. *School Psychology Review*, *26*(4), 554–574. https://doi.org/10.1080/02796015.1997.12085886

Deno, S. L., & Mirkin, P. K. (1977). *Data-based program modification: A manual*. Reston, VA: Council for Exceptional Children.

Dufrene, B. A., Parker, K., Menousek, K., Zhou, Q., Harpole, L. L., & Olmi, D. J. (2012). Direct behavioral consultation in head start to increase teacher use of praise and effective instruction delivery. *Journal of Educational and Psychological Consultation*, *22*(3), 159–186. https://doi.org/10.1080/10474412.2011.620817

Dufrene, B. A., Lestremau, L., & Zoder-Martell, K. (2014). Direct behavioral consultation: Effects on teachers' praise and student disruptive behavior. *Psychology in the Schools*, *51*(6), 567–580. https://doi.org/10.1002/pits.21768

Elliott, S. N. (1986). Childrens ratings of the acceptability of classroom interventions for misbehavior: Findings and methodological considerations. *Journal of School Psychology*,*24*(1), 23-35. doi:10.1016/0022-4405(86)90039-7

Ennis, R. P., Royer, D. J., Lane, K. L., & Dunlap, K. D. (2019). BSP in PK–12 Settings: Mapping the 50-Year Knowledge Base. *Behavioral Disorders*, 019874291984307. doi: 10.1177/0198742919843075

Ennis, R. P., Royer, D. J., Lane, K. L., Menzies, H. M., Oakes, W. P., & Schellman, L. E. (2018). BSP: An Effective, Efficient, Low-Intensity Strategy to Support Student Success. Beyond Behavior, 27(3), 134-139. doi:10.1177/1074295618798587

Fisher, W. W., Piazza, C. C., & Roane, H. S. (2021). *Handbook of applied behavior analysis*. New York, NY: The Guilford Press.

Floress, M. T., Beschta, S. L., Meyer, K. L., & Reinke, W. M. (2017). Praise Research Trends and Future Directions: Characteristics and Teacher Training. Behavioral Disorders, 43(1), 227–243. https://doi.org/10.1177/0198742917704648

Ford, A. D. (1998). *An evaluation of the contributions of effective instruction delivery to a compliance training package for children* (Order No. 9901335). Available from Dissertations & Theses @ University of Southern Mississippi; ProQuest Dissertations & Theses Global. (304456352). http://lynx.lib.usm.edu/dissertations-theses/evaluation-contributions-effective-instruction/docview/304456352/se-2?accountid=13946

Gottfried, M. A. (2015). Chronic Absenteeism in the Classroom Context: Effects on Achievement. *Urban Education, 54*(1), 3–34. doi: 10.1177/0042085915618709

Graney, S. B., Missall, K. N., Martínez, R. S., & Bergstrom, M. (2009). A preliminary investigation of within-year growth patterns in reading and mathematics curriculum-based measures. *Journal of School Psychology*,*47*(2), 121-142. doi:10.1016/j.jsp.2008.12.001

Hart, K. C., Massetti, G. M., Fabiano, G. A., Pariseau, M. E., & Pelham, W. E. (2010). Impact of Group Size on Classroom On-task Behavior and Work Productivity in Children With ADHD. *Journal of Emotional and Behavioral Disorders*,*19*(1), 55-64. doi:10.1177/1063426609353762

Haydon, T., Macsuga-Gage, A. S., Simonsen, B., & Hawkins, R. (2012). Opportunities to respond: A key component of effective instruction. *Beyond Behavior*, *22*(1), 23–31. https://doi.org/10.1177/107429561202200105

Haydon, T., & Musti-Rao, S. (2011). Effective use of BSP: A middle school case study. *Beyond Behavior*, *20*(2), 31–39.

Hollingshead, A., Kroeger, S. D., Altus, J., & Trytten, J. B. (2016). A case study of positive behavior supports-based interventions in a seventh-grade urban classroom. Preventing School Failure: Alternative Education for Children and Youth, 60, 278–285. doi:10.1080/1045988X.2015.112483

Hussar (2020). *Condition of education 2020.* National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education from https://nces.ed.gov/pubs2020/2020144.pdf

Irwin. (2022). *Condition of education 2022*. National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. Retrieved November 20, 2022, from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2022144

Jenkins, L. N., Floress, M. T., & Reinke, W. (2015). Rates And Types Of Teacher Praise: A Review And Future Directions. Psychology in the Schools, 52(5), 463-476. doi:10.1002/pits.21835

Jerome, S. (2018). *SEATWORK CHUNKING: EVALUATION OF THE EFFICACY OF A PRESENTATION ACCOMMODATION FOR CHILDREN WITH ADHD* (Unpublished doctoral dissertation). University of New York at Buffalo.

King, B., Radley, K. C., Jenson, W. R., & Oneill, R. E. (2017). On-task in a Box: An evaluation of a package-ready intervention for increasing levels of On-task behavior and academic performance. *School Psychology Quarterly*,*32*(3), 306-319. doi:10.1037/spq0000162

Kraft, Matthew, and Manuel Monti-Nussbaum. (2020). The Big Problem with Little Interruptions to Classroom Learning. (EdWorkingPaper: 20-227). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/6b7g-nm11

Kratochwill, T. R., Horner, R. H., Levin, J. R., Machalicek, W., Ferron, J., & Johnson, A. (2021). Single-case design standards: An update and proposed upgrades. *Journal of School Psychology*, *89*, 91–105. https://doi.org/10.1016/j.jsp.2021.10.006

Kern, L., Vorndran, C. M., Hilt, A., Ringdahl, J. E., Adelman, B. E., & Dunlap, G. (1998). Choice as an Intervention to Improve Behavior: A Review of the

Literature. *Journal of Behavioral Education, 8*(2), 151–169. https://doi.org/10.1023/a:1022831507077

Lewis, K., Kuhfeld, M., Ruzek, E., McEachin, A. (2021). Learning during COVID-19: Reading and math achievement in the 2020-21 school year. NWEA.

Levendoski, L. S., & Cartledge, G. (2000). Self-monitoring for elementary school children with serious emotional disturbances: Classroom applications for increased academic responding. *Behavioral Disorders, 25*(3), 211–224. https://doi.org/10.1177/019874290002500308

MacSuga-Gage, A., & Simonsen, B. (2015). Examining the effects of teacher-directed opportunities to respond on student outcomes: A systematic review of the literature. *Education & Treatment of Children, 38*(2), 211-239.

Martens, B. K., Witt, J. C., Elliott, S. N., & Darveaux, D. (1985). Teacher judgments concerning the acceptability of school-based interventions. *Professional Psychology: Research and Practice, 16*, 191–198.

Mccurdy, M., Skinner, C. H., Grantham, K., Watson, T. S., & Hindman, P. M. (2001). Increasing On-task Behavior in an Elementary Student During Mathematics Seatwork by Interspersing Additional Brief Problems. *School Psychology Review,30*(1), 23-32. doi:10.1080/02796015.2001. 12086098

Montarello, S., & Martens, B. K. (2005). Effects of Interspersed Brief Problems on Students Endurance at Completing Math Work. *Journal of Behavioral Education,14*(4), 249-266. doi:10.1007/s10864-005-8649-3

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology, 75*(1), 3352. https://doi.org/10.1037/0022-3514.75.1.33

National Center for Education Statistics. (2019). International Comparisons: Mathematics and Science Achievement at Grades 4 and 8. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved [11/2022], from https://nces.ed.gov/programs/coe/indicator/cnt.

O'Handley, R. D., Olmi, D. J., Dufrene, B. A., Tingstrom, D. H., & Whipple, H. (2020). The effects of behavior-specific praise and public posting in secondary classrooms. *Psychology in the Schools,57*(7), 1097-1115. doi:10.1002/pits.22375

Panahon, C. J., & Martens, B. K. (2012). A Comparison of Noncontingent Plus Contingent Reinforcement to Contingent Reinforcement Alone on Students' Academic Performance. *Journal of Behavioral Education,22*(1), 37-49. doi:10.1007/s10864-012-9157-x

Partin, T. C. M., Robertson, R. E., Maggin, D. M., Oliver, R. M., & Wehby, J. H. (2010). Using teacher praise and opportunities to respond to promote appropriate student behavior. *Preventing School Failure, 54*(3), 172-178.

Peak, L. M. (2021). *THE EFFECTS OF SEGMENTING WORKSHEETS ON INDEPENDENT SEATWORK WITH ELEMENTARY STUDENTS DELIVERED IN A REMOTE MANNER USING PARENTS AS INTERVENTIONISTS* (Unpublished master's thesis). The University of Southern Mississippi.

PsycCorp/Pearson. (2004). AIMSweb. San Antonio, TX: Author.

Radley, K. C., & Dart, E. H. (2019). *Handbook of behavioral interventions in schools: Multi-tiered systems of support*. New York, NY: Oxford University Press.

Ritchotte, J. A., Matthews, M. S., & Flowers, C. P. (2014). The Validity of the Achievement-Orientation Model for Gifted Middle School Students: An Exploratory Study. Gifted Child Quarterly, 58(3), 183–198. https://doi.org/10.1177/0016986214534890

Richard, Brandon Joseph, "The Effects of Teacher Praise on Engagement and Work Completion of Students of Typical Development" (2012). Dissertations. 630. https://aquila.usm.edu/dissertations/630

Rock, M. L. (2005). Use of Strategic Self-Monitoring to Enhance Academic Engagement, Productivity, and Accuracy of Students With and Without Exceptionalities. *Journal of Positive Behavior Interventions,7*(1), 3-17. doi:10.1177/10983007050070010201

Rosenshine, B. (2015). How Time Is Spent in Elementary Classrooms. *Journal of Classroom Interaction*, *50*(1), 41–53.

Royer, D. J., Lane, K. L., Dunlap, K. D., & Ennis, R. P. (2018). A systematic review of teacher-delivered behavior-specific praise on K–12 student performance. *Remedial and Special Education*, *40*(2), 112–128. https://doi.org/10.1177/0741932517751054

Schmidt, A. C., Hanley, G. P., & Layer, S. A. (2009). A further analysis of the value of choice: Controlling for illusory discriminative stimuli and evaluating the effects of less preferred items. *Journal of Applied Behavior Analysis*, *42*(3), 711–716. https://doi.org/10.1901/jaba.2009.42-711

Shogren, K. A., Faggella-Luby, M. N., Sung Jik Bae, & Wehmeyer, M. L. (2004). The effect of choice-making as an intervention for problem behavior. *Journal of Positive*

Behavior Interventions, *6*(4), 228–237. https://doi.org/10.1177/10983007040060040401

Silva, M. R., Collier-Meek, M. A., Codding, R. S., & Defouw, E. R. (2019). Acceptability assessment of school psychology interventions from 2005 to 2017. *Psychology in the Schools,57*(1), 62-77. doi:10.1002/pits.22306

Skinner, C. (1998). Preventing Academic Skill Deficits. In *Handbook of Child Behavior Therapy* (pp. 61-82). New York, NY: Plenum Press.

Stormont, M. (2012). *Academic and behavior supports for at-risk students: Tier 2 interventions*. New York: Guilford Press.

Sugai, G., & Horner, R. H. (2009). Responsiveness-to-intervention and school-wide positive behavior supports: Integration of multi-tiered system approaches. *Exceptionality*, *17*(4), 223–237. https://doi.org/10.1080/09362830903235375

Sutherland, K. S., Wehby, J. H., & Copeland, S. R. (2000). Effect of Varying Rates of Behavior Specific Praise on the On-Task Behavior of Students with EBD. Journal of Emotional and Behavioral Disorders, 8(1), 2-8. doi:10.1177/106342660000800101

Tindal, G. (2013). Curriculum-Based Measurement: A Brief History of Nearly Everything from the 1970s to the Present. *ISRN Education,2013*, 1-29. doi:10.1155/2013/958530

Todd, A. W., Horner, R. H., & Sugai, G. (1999). Self-Monitoring and Self-Recruited Praise. *Journal of Positive Behavior Interventions,1*(2), 66-122. doi:10.1177/109830079900100201

Vanleuvan, P., & Wang, M. (1997). An Analysis of Students' Self-Monitoring in First- and Second-Grade Classrooms. *Journal of Educational Research*, *90*(3), 132–143. https://doi.org/10.1080/00220671.1997.10543769

Viner, R., Russell, S., Croker, H., Packer, J., Ward, J., Stansfield, C., & Booy, R. (2020). School Closure and Management Practices During Coronavirus Outbreaks Including COVID-19: A Rapid Narrative Systematic Review. *SSRN Electronic Journal*. doi:10.2139/ssrn.3556648

Waas, G. A., & Anderson, G. P. (1991). Outcome expectancy and treatment acceptability: Perceptions of school-based interventions. *Professional Psychology: Research and Practice,22*(2), 149-154. doi:10.1037/0735-7028.22.2.149

Wallace, M. A., Cox, E. A., & Skinner, C. H. (2003). Increasing independent Seatwork: Breaking large assignments into smaller assignments and teaching a student with retardation to recruit reinforcement. *School Psychology Review*, *32*(1), 132–142. https://doi.org/10.1080/02796015.2003.12086187

Welcome to the MTSS Center. (n.d.). Retrieved October 2020, from https://mtss4success.org/

What Works Clearinghouse. (2020). What Works Clearinghouse Standards Handbook, Version 4.1. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Yeager, D. S., & Dweck, C. S. (2012). Mindsets That Promote Resilience: When Students Believe That Personal Characteristics Can Be Developed. Educational Psychologist, 47(4), 302–314. doi:10.1080/00461520.2012.722805

Yuan, E. (2011). Zoom. Retrieved from https://zoom.us

Zhang, J., Kuusisto, E., & Tirri, K. (2017). How teachers' and students' mindsets in learning have been studied: Research findings on mindset and academic achievement. *Psychology*, *08*(09), 1363–1377. https://doi.org/10.4236/psych.2017.89089