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On-Task Behavior for Students in a Resource Classroom Setting: Effects of Activity Schedules on On-Task Behavior

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ON-TASK BEHAVIOR FOR STUDENTS IN A RESOURCE CLASSROOM SETTING: EFFECTS OF ACTIVITY SCHEDULES ON ON-TASK BEHAVIOR

by

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ABSTRACT

On-Task Behavior for Students in a Resource Classroom Setting: Effects of Activity Schedules on On-Task Behavior

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Students who receive special education services in resource classroom settings often engage in low levels of on-task behavior during independent work time. Given the independent work demands in middle school classrooms, it is crucial for students who receive services in a resource classroom to engage in high levels of on-task behavior. Research indicates activity schedule are an effective, low-effort intervention to increase on-task behavior for individuals with disabilities. The researchers examined the effects of activity schedules on on-task behavior, on-schedule behavior, and percentage of work problems correct in four middle school students receiving special education services in a resource math classroom. A multiple baseline across four participants design with an embedded reversal was used to assess the effects of the activity schedule intervention. Results of the study indicate that on-task and on-schedule behavior increased for all participants following the implementation of the activity schedule in both math and

language arts classroom settings. Both students and teachers indicated that they liked the intervention and the activity schedule improved on-task behavior. Results of this study corroborate existing literature demonstrating that activity schedules can be an effective tool for increasing on-task behavior in individuals with disabilities, and also extend the use of activity schedules to a novel setting and participant population.

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PUBLIC ABSTRACT

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Students who receive special education services in resource classroom settings often engage in low levels of on-task behavior during independent work time. Given the independent work demands in middle school classrooms, it is crucial for students who receive services in a resource classroom to engage in high levels of on-task behavior. The researchers examined the effects of activity schedules on on-task behavior, on-schedule behavior, and percentage of work problems correct in four middle school students receiving special education services in a resource math classroom. Results of the study demonstrate that on-task and on-schedule behavior increased for all participants following the implementation of the activity schedule in both math and language arts classroom settings. Both students and teachers indicated that they liked the intervention and the activity schedule improved on-task behavior. Results of this study extend the use of activity schedules to a novel setting and participant population.

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Stephanie L. Mattson

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CHAPTER I

INTRODUCTION

A large portion of students who qualify for special education services under the Individuals with Disabilities Education Act (IDEA, 2004) receive special education services in a resource classroom setting, and more than half of these students spend 80% or more of the school day in general education classrooms (Cortiella & Horowitz, 2014). As students enter middle school, it is crucial for them to engage in high levels of on-task behavior, as general education middle school teachers require students to follow complex directions, work independently, and finish assignments in a timely manner. Research shows students with disabilities struggle to meet work expectations in many classroom environments (Cooper & Valentine, 2001) and have difficulty engaging in on-task behavior (Flower, McKenna, Muething, Bryant, & Bryant, 2014; Reid & Harris, 1993.)

Common interventions shown to be effective at increasing on-task behavior include token systems (Cavalier, Ferretti, & Hodges, 1997) and group contingencies (Maggin, Johnson, Chafouleas, Ruberto, & Berggren, 2012). While these interventions are effective, they require a lot of teacher involvement and prompting, which may not be a possibility in middle school classrooms due to large class sizes and limited resources. As an alternative to interventions that require extensive teacher involvement, researchers have investigated methods of increasing on-task behavior such as self-monitoring (Yücesoy Özkan & Sonmez, 2011) and activity schedules (Cirelli, Sidener, Reeve, & Reeve, 2016), which transfer responsibility from the individual implementing the intervention to the student. Because it is crucial for students with disabilities to become

as independent as possible, it is necessary for researchers to explore interventions that students can implement and monitor with minimal teacher support.

Researchers have used self-monitoring interventions to increase on-task behavior for students who receive special education services across many settings, including self-contained settings (Amato Zech, Hoff, & Doepke, 2006**;** Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999), and general education settings (Falkenberg & Barbetta, 2013; Rock, 2005). The results of many studies indicate that self-monitoring interventions are effective in increasing both on-task behavior (Reid & Harris, 1993), and academic productivity during independent work time (Axelrod, Elizabeth, Haugen, & Klein, 2009; Falkenberg & Barbetta, 2013).

Activity schedules, defined as a "set of pictures or words that cue a person to engage in a sequence of activities" (McClannahan & Krantz, 1999, p. 3), have also been used to increase on-task behavior in settings where sustained teacher involvement in an intervention is not feasible. Research has shown that activity schedules can be used to teach independence in many areas including on-task behavior (e.g., MacDuff, Krantz, & McClannahan, 1993), social behavior (e.g., MacDuff et al., 1993), and daily living skills (e.g., Pierce & Schreibman, 1994; Wacker, Berg, Berrie & Swatta, 1985). One distinct advantage of using activity schedules is that once students begin using the schedules, the intervention requires less prompting and involvement from classroom teachers than other research-based interventions for on-task behavior (MacDuff et al., 1993).

Although several studies have investigated the effects of self-monitoring procedures on on-task behavior of high-functioning middle school students with

disabilities (e.g., Rock & Thead, 2007; Shimabukuro et al., 1999), none of them involved activity schedules. Alternatively, many researchers have used activity schedules to increase on-task behavior, but the majority of these studies have been conducted with individuals with autism and other developmental disabilities (e.g., Bryan & Gast, 2000; Carson, Gast, & Ayres, 2008; Spriggs, Gast, & Ayres, 2007). To date, no researchers have implemented activity schedules with individuals with disabilities in a middle school resource classroom setting. Yet, activity schedules fit the middle school environment because intensive supervision from teachers is not possible, teachers expect students to remain on-task and complete classwork independently, and busy classrooms demand that students be time sensitive. This study evaluated the effects of an activity schedule during independent work time on on-task behavior, on-schedule behavior, and percentage of work problems correct in four middle school students receiving special education services in a resource classroom setting.

CHAPTER II

LITERATURE REVIEW

The researcher used PsycINFO via EBSCOhost and found 85 activity schedule articles and 377 self-monitoring articles using the search terms *activity schedule, activity schedule and on-task behavior,* and *self-monitoring and disabilities.* Articles were eliminated if they were not a match based on factors such as age and disability classification of participants, setting, and dependent variables. The researcher found 10 self-monitoring articles that were relevant based on the participants and dependent variables, and eight activity schedule articles that were relevant based on the dependent variable. Of the eight activity schedule studies, four were conducted in a middle school classroom. However, all four of the studies conducted in a middle school setting were with various disability populations that did not match the characteristics of the participants in this study.

In order to ensure a comprehensive search of research related to activity schedules, the researcher conducted a descendants search by entering the study conducted by MacDuff et al. (1993) in the Google Scholar search engine, and found the study was cited 381 times. Articles were eliminated if they examined other picture-based forms of prompting, if the researchers did not measure on-task or on-schedule behavior as the dependent variable, and if they were not a match in setting and population of participants. The researcher selected 18 articles to read and cite in the introduction (8 were the same articles pulled from the search in EBSCOhost and 10 were new studies). Four articles were selected for review because the dependent variables matched the dependent

variables measured in this study.

While the majority of self-monitoring studies have been conducted in elementary and high school settings, some researchers have examined the effects of self-monitoring procedures on middle school students. Shimabukuro et al. (1999) implemented a self-monitoring of performance intervention for three middle school boys with specific learning disabilities and ADHD. The researchers used a multiple baseline across academic areas to examine the effects of self-monitoring on academic accuracy, academic productivity, and on-task behavior. The self-monitoring system was implemented during independent work time, using work materials that were already in the classroom. The students recorded and graphed completion and accuracy scores during work time in reading, math, and written expression. Data showed moderate, variable levels of responding in the baseline condition, followed by increased levels of responding in the self-monitoring condition across all participants and academic areas. The findings of this study indicated that self-monitoring of performance may result in increased academic productivity, increased academic accuracy, and increased levels of on-task behavior for middle school students with specific learning disabilities and ADHD.

MacDuff et al. (1993) used activity schedules and graduated guidance to increase on-task behavior for four boys with autism, so they could acquire and maintain longer response chains. The researchers used a multiple baseline across participants design to determine the effects of photographic activity schedules on on-task and on-schedule behaviors. Activity schedules included a combination of academic tasks and leisure tasks, and the researchers used graduated guidance to teach the participants how to use an

activity schedule. In the baseline condition, researchers gave general directions, but did not provide any prompts or further instruction. In the teaching pictorial schedules condition, the researchers used manual prompts and graduated guidance to train the participants. Once participants were on-task and on-schedule for 80% of the momentary time samples across five sessions, they moved to a maintenance condition. In the maintenance condition, the teacher was present in the classroom, but participants were not given any prompts. The researchers also conducted a generalization condition, where the teacher was not present, and the participants engaged in novel activities throughout the activity schedules. Based on the results of the study, the researchers concluded that activity schedules effectively increased on-task behavior across all participants, the increases in on-task behavior maintained over time, and the increases in on-task behavior generalized to a situation where the participants had to engage in novel tasks.

Researchers have since replicated the results of the MacDuff et al. (1993) study in different experimental settings, and with different research designs. Bryan and Gast (2000) extended the research conducted by MacDuff et al. to a different population and setting by using an ABAB reversal design to examine the effects of graduated guidance and activity schedules on on-task and on-schedule behaviors for school-aged children with autism, who received special education services in a resource classroom setting. The researchers included literacy-based skills in the activity schedules, and experimental sessions took place during the centers portion of a language arts instructional block. In the baseline condition, the classroom teacher gave the regular directions for the centers without the activity schedule book present. In the first treatment condition, researchers

used manual prompting and graduated guidance to teach the participants how to use the activity schedules, which was followed by a book only condition with no prompting. The researchers then returned to the baseline condition without the activity schedule book. The final condition was a book only treatment condition where the students used the activity schedules, but researchers did not provide any prompting. The data from the study show variable levels of on-task and on-schedule behaviors in the baseline conditions, and high, stable levels of on-task and on-schedule behaviors in the treatment conditions across all participants. The results of this study replicated the findings of MacDuff et al. by showing similar increases in on-task and on-schedule behaviors after researchers implemented activity schedules. Bryan and Gast also showed that activity schedules could increase on-task and on-schedule behaviors for high-functioning students with autism in an elementary school setting.

Cirelli et al. (2016) examined the effects of an activity schedule on on-task behavior for first and second grade students at-risk for ADHD. The researchers measured on-task behavior and on-schedule behavior for two participants in a regular education classroom during independent work time. In the baseline conditions, both participants were on-task about 50% of the time and neither of the participants used the schedule. In the schedule teaching and post-teaching conditions, on-task behavior increased to 90-100% across both participants. The results of this study indicate that implementing an activity schedule during independent work time can be an effective intervention for increasing on-task behavior for individuals with ADHD. In addition, the researchers showed that activity schedules can be implemented effectively in a regular education

classroom environment.

The results of the research studies described above indicate that self-monitoring strategies and activity schedules can be effective tools for increasing on-task and on-schedule behaviors in self-contained settings (MacDuff et al., 1993; Shimabukuro et al., 2000), special education resource settings (Bryan & Gast, 2000), and regular education settings (Cirelli et al., 2016). The studies described informed the current research study in several ways. For example, the operational definition of on-task behavior used in the current study was modelled after the definition used by MacDuff et al. Additionally, the researcher based the methods section procedures in the current study on the procedures used by Cirelli et al.

Though several researchers measured the effects of activity schedules on on-task behavior during independent work time (Bryan & Gast, 2000; Cirelli et al., 2016), no studies have been conducted with middle-school students with disabilities who receive services in a resource classroom setting working on independent academic tasks. There is a need to address efficacy of activity schedules for monitoring on-task behavior of students with disabilities who receive special education services in resource classrooms.

The purpose of this study was to examine effects of an activity schedule on student behavior during independent work time in a resource classroom. The research question was: *What effect will the implementation of an activity schedule during independent work time have on on-task behavior, on-schedule behavior, and percentage of work problems correct for 12- to 14-year-old students with disabilities in a resource classroom?*

CHAPTER III

METHOD

Participants

Participants included four students in the researcher's resource math classes. Participants were selected based on predefined inclusion criteria. To be included in the study, participants had to (a) receive special education services in a resource classroom setting, (b) engage in low levels of on-task behavior during independent work time, (c) return informed consent and youth assent documents, (d) attend school regularly (no excessive absences) and (e) engage in on-task behavior in 69% or less of intervals across three initial classroom observations as measured by momentary time sampling.

To identify potential participants, the researcher selected students who engaged in low levels of on-task behavior during independent work time based on her repeated interactions with the students in her role as resource math teacher and member of the school's Student Assistance Team. The Student Assistance Team was a team of administrators, counselors, and teachers that teachers could refer students to when they had low grades, low attendance, engaged in problem behavior, engaged in low levels of on-task behavior, had difficulty turning in class work, etc. The researcher based the inclusion protocol of referral through repeated interactions with students off the procedures used by Cirelli et al. (2016).

Once potential participants were identified, the researcher obtained informed consent and youth assent by sending a recruitment flyer and the informed consent

document home with students. If the parent agreed to allow their child to participate in the study, they signed the informed consent document and sent it back to school with the student. To obtain student assent, the researcher sent the assent document home with the students and the student reviewed the assent document with their parents. When the student returned the informed consent/youth assent documents, the researcher reviewed the assent document with the student individually. The researcher sent informed consent/youth assent documents home with four students and received the documents back from all of those students.

After the researcher obtained consent from parents and assent from participants, she checked attendance to ensure participants did not have excessive absences (12 or more absences in the previous trimester) and conducted three initial classroom observations during independent work time in the participants' math classes to determine if participants met inclusion criteria for participation in the study. The researcher used momentary time sampling to collect data on on-task behavior during three 15-min sessions divided into 10 s intervals. If participants engaged in on-task behavior in 69% of intervals or fewer across all three initial classroom observations, they qualified to continue with the study. See Appendix A for the observation form used during the initial classroom observations. The researcher selected 69% as a cut-off score for inclusion based on experience with students during independent work time, and recommendation of school-based professionals on the school Student Assistance Team. Following the attendance check and initial observations, the researcher would have excluded potential participants if absenteeism rates were high (12 or more absences in the previous

trimester) or if initial observations yielded percentages of on-task behavior that were high (70% of intervals or higher). See Table 1 for on-task behavior data from the initial classroom observations. Based on the criteria listed above, four students receiving special education services in three of the researcher's resource math classrooms participated in this study.

Ronald was a 13-year-old white male student in seventh grade. Ronald was an English-speaking student who did not qualify for free and reduced school lunch. Ronald received special education services for math, writing, and study skills in a resource classroom setting under the classification of specific learning disability. Prior to the study, Ronald demonstrated mastery across ratio, proportion, and geometry math skills as shown by scores on teacher-administered curriculum-based assessments. Ronald also performed several language arts skills proficiently including answering figurative language questions, answering text structure questions, and answering text-dependent comprehension questions in multiple choice, sentence, and paragraph format. As shown in Table 1, Ronald's on-task behavior during the three initial classroom observations was 26%, 21%, and 21% of 10 s intervals.

Table 1

Initial Observation Scores for Ronald, Adam, Miles, and Anna

Participant	Observation 1 (%)	Observation 2 (%)	Observation 3 (%)
Ronald	26	21	21
Adam	48	44	29
Miles	42	51	55
Anna	59	46	43

Adam was a 13-year-old white male student in seventh grade. Adam was an English-speaking student who qualified for free and reduced school lunch. Adam received special education math services in a resource classroom setting under the classification of specific learning disability. Aside from his math class, Adam spent the remainder of his school day (language arts, science, college and career, and elective classes) in general education classrooms. Prior to the study, Adam demonstrated mastery across integer operation, expression, equation, ratio, rate, proportion, and geometry math skills as demonstrated by scores on teacher-administered curriculum-based assessments. Adam also performed the following language arts skills proficiently: answering figurative language questions, answering text-dependent comprehension questions in multiple choice, full sentence, and paragraph format, and writing 5-paragraph informational and argumentative essays. As shown in Table 1, Adam's on-task behavior during the initial classroom observations was 48%, 44%, and 29% of 10 s intervals.

Miles was a 14-year-old white male student in seventh grade. Miles was an English-speaking student who did not qualify for free and reduced school lunch. Miles received special education math services in a resource classroom setting under the classification of specific learning disability. Aside from his math class, Miles spent the remainder of his school day (language arts, science, college and career, and elective classes) in general education classrooms. Prior to the study, Miles demonstrated mastery across integer operation, expression, equation, ratio, rate, proportion, and geometry math skills as demonstrated by scores on teacher-administered curriculum-based assessments. Miles also performed the following language arts tasks proficiently: answering figurative

language, answering text-dependent comprehension questions in multiple choice, full sentence, and paragraph format, and writing 5-paragraph informational and argumentative essays. As shown in Table 1, Miles' on-task behavior during the initial classroom observations was 42%, 51%, and 55% of 10 s intervals.

Anna was a 13-year-old white female student in seventh grade. Anna was an English-speaking student who did not qualify for free and reduced school lunch. Anna received special education services for math, reading fluency, reading comprehension, and writing in a resource classroom setting under the classification of other health impairment (for ADHD). Prior to the study, Anna demonstrated mastery across integer operation, expression, equation, ratio, rate, and proportion math skills. Anna also performed several language arts skills proficiently including answering figurative language questions, answering text structure questions, and answering text-dependent comprehension questions in multiple choice, sentence, and paragraph format. As shown in Table 1, Anna's on-task behavior during the initial classroom observations was 59%, 46%, and 43% of 10 s intervals.

Setting

The study took place in the researcher's resource math classroom and two other teachers' language arts classrooms, all on a public middle school campus serving seventh and eighth grade students in the Intermountain West region of the U.S. Approximately 1,000 students attended the middle school and about 10% of the students enrolled received special education services. All experimental conditions took place in the

researcher's resource math classroom (10 m by 8 m) that contained 15 student desks, a teacher's desk, and a large rectangular table (2 m by 1 m). The researcher was a special education teacher with four years of teaching experience in a middle school setting. The researcher taught five resource math classes (class sizes ranged from five to nine students) and she used a token economy class reinforcement system. Under the token economy system, students earned tickets towards a class drawing or party for following the classroom rules. A typical lesson during the resource math instructional block during the time the researcher conducted this study included review, presentation of new material, guided practice, independent practice, and independent practice with previously mastered tasks. The researcher used a teacher-developed curriculum based on seventh grade regular education math standards. Generalization probes occurred in the participants' language arts classrooms (10 m by 8 m). For Ronald and Anna, this was a resource language arts classroom with a special education teacher who had four years of teaching experience in a middle school setting. The resource language arts classroom contained 15 student desks, a teacher's desk and two large rectangular tables (2 m by 1 m). For Adam and Miles, generalization probes were conducted in a general education language arts classroom with a secondary education language arts teacher who had one year of teaching experience in a middle school setting. The general education language arts classroom had 35 student desks, a teacher's desk, and a large rectangular table (2 m by 1 m). A typical lesson during the language arts instructional blocks during the time the researcher conducted this study included review, novel reading, novel discussion, and answering text-dependent questions. The language arts teachers used teacher-developed

novel study curricula based on seventh grade regular education language arts standards. In all classrooms (resource math, resource language arts, and general education language arts) and for all sessions, participants sat in student desks with attached chairs.

All students at the school attended six 52-min instructional class periods Monday-Friday and a 49-min study hall period Monday-Thursday. Primary data collection occurred during the independent practice portion at the end of the math instructional block and generalization probe data were collected during the independent practice portion at the end of the language arts instructional block. To ensure participants did not miss any instructional time, the researcher trained participants to use the activity schedule during a study hall class period. During study hall, students worked individually on homework and independent practice assignments.

Materials

The researcher used the following materials in this study: activity schedule binders, vibrating timers, math worksheets, pencils, erasers, and calculators. The researcher created the activity schedules with standard binders that were also used by other students in the school to limit social stigmatization of participants. Each binder consisted of six pages: three pages that corresponded to math skill worksheets (or language arts worksheets for generalization probes), and three pages that corresponded to break pages. The researcher placed strips of paper in the activity schedule with a header that matched the header on the math worksheet that was on the participants' desks. See Appendix B for an example of worksheet strips and the corresponding worksheets. The

researcher placed cards that said “Break – 3 minutes” in the schedule for the break pages. See Appendix C for an example of a break page. Although the researcher did not complete a Functional Behavior Assessment to determine the function of participant off-task behavior, offering breaks contingent on work completion is typical practice in middle school classrooms. A break duration of three min was used to allow participants to contact reinforcement for work completion, but not so long that satiation could potentially occur, and students might seek out other sources of reinforcement (e.g. peer attention, preferred items). Three minutes of break time also reflects the typical educational environment. When middle school students request a break or teachers give class breaks, the breaks are typically from 3 to 5 minutes in duration.

Because the participants used the activity schedules during independent work time, the researcher selected math tasks that the participant had previously mastered. Mastery criteria was 80% or higher across three consecutive curriculum-based assessments. Curriculum-based assessments were short (no more than 10 questions) teacher-developed assessments used to measure student progress on, and mastery of, math objectives such as operations with integers, solving equations, and ratios. After a student completed a curriculum-based assessment, the researcher graded the assessment and converted the score to a percentage by dividing problems completed correctly by the total number of problems and multiplying by 100. The researcher recorded the curriculum-based assessment scores on each student’s math progress sheet. After a student had three scores at or above 80% for an objective, the teacher considered that objective mastered. See Appendix D for examples of curriculum-based assessments.

Throughout the study, participants had three worksheets with previously mastered skills. The researcher controlled for potential differences in response effort by using previously mastered targets and ensured that math problem types were uniform across all worksheets in the activity schedule and across all sessions. Adam, Miles, and Anna worked on solving two-step equations and simplifying algebraic expressions. A typical set of worksheets for Adam, Miles, and Anna included two worksheets with 6-8 two-step equation problems and one worksheet with 6-8 simplifying expression problems. The researcher designed the two-step equation and simplifying expression worksheets so problems aligned with the expression and equation section of their teacher-developed seventh grade math curriculum. Problem types were the same across all conditions (baseline, schedule use, no schedule, and final schedule use), but the specific problems were different for each worksheet. See Appendix E for examples of the math worksheets Adam, Miles, and Anna completed throughout the study. Ronald worked on unit rate and proportional relationship problems. A typical set of worksheets for Ronald included three worksheets with 9-12 proportional table, graph, and equation problems. The researcher designed the proportional table, graph, and equation worksheets so problems aligned with the proportional relationship section of her teacher-developed seventh grade math curriculum. Problem types were the same across all conditions (baseline, schedule use, no schedule, and final schedule use), but the specific problems were different across worksheets. See Appendix F for examples of the math tasks Ronald completed throughout the study.

The researcher used mastered language arts skills for generalization probes with

the same mastery criteria as outlined above for the math tasks (80% or greater across three consecutive curriculum-based assessments). Adam and Miles answered text-dependent comprehension questions based on a novel they were reading in class. The regular education language arts teacher required a typed one-sentence response for all text-dependent comprehension questions. Ronald and Anna also answered text-dependent comprehension questions based on a novel they were reading in class. The resource language arts teacher required a written one-sentence response to comprehension questions. See Appendix G for examples of language arts tasks participants completed throughout the study.

Students used a standard timer with a vibration setting to time breaks throughout the activity schedule. In addition to the materials described above, the researcher provided participants with pencils, erasers, and calculators as needed for them to complete the academic tasks in their activity schedules.

Dependent Variables

Dependent variables included on-task academic behavior, on-schedule behavior, on-break behavior, and percentage of work problems correct. On-task academic behavior was defined as visually attending to the academic worksheet and/or appropriate materials (i.e., head orientation within approximately 45 degrees of the worksheet/materials, head and shoulders oriented towards materials, eyes open, and body positioned within 3 feet of materials) for a minimum of 3 s. This included manipulating any work materials such as a chart, calculator, etc. as they were designed to be used. The researcher based the

definition of on-task behavior on the on-task definitions used by MacDuff et al. (1993) and Cirelli et al. (2016).

On-schedule behavior was defined as (a) using any part of either hand to open the schedule at the beginning of the session or turn a page in the schedule following the completion of the previous page, (b) using either hand to match any part of the worksheet strip to the top heading of the corresponding worksheet on the desk. (c) completing worksheet problems (see definition for on-task behavior), (d) using either hand to place the completed worksheet in either pocket of the folder, or (e) using any finger on either hand to click the minute button on a timer three times, and then click the start button, followed by taking a break on a break page (see definition for on-break behavior).

On-break behavior was defined as the participant sitting in his or her desk with his or her buttocks making contact with the chair and his or her feet on the floor, without making any vocalizations, including whispering, talking, or yelling, during an activity schedule indicated break time. The participant could also be reading or drawing during break time. Reading on break behavior was defined as visually attending to reading materials (i.e., head orientation within approximately 45 degrees of reading materials, with his or her head and shoulders oriented towards reading materials, and body positioned within 3 feet of reading materials) without making any vocalizations, including whispering, talking, or yelling. Drawing on-break behavior was defined as manipulating any writing utensil to come into contact with any piece of paper, without making any vocalizations, including whispering, talking, or yelling.

The researcher defined percentage of work problems correct as the number of

independent work problems completed correctly out of the total number of problems assigned to participants.

Response Measurement

The researcher served as the primary data collector and trained two additional data collectors to record on-task behavior, on-break behavior, on-schedule behavior, and calculate percent correct. The secondary data collectors were CITI-trained professionals who worked in resource classrooms at the school. One of the secondary data collectors was a school-based instructional aide who worked in the resource math and language arts classrooms and the other was a practicum student who worked in the researcher's resource math classroom.

The researcher trained the IOA data collectors in the school setting. Training sessions included a description of the data collection procedures, modeling, and role-playing. During the role-playing portion of the training, the researcher asked the data collector to take data according to the procedures, and the researcher provided feedback on performance. If the data collector collected data accurately, the researcher gave positive feedback in the form of praise statements. (e.g., "Nice work. Thank you for remembering to record the data in the correct corresponding box.") If the data collector did not collect the data accurately, the researcher gave corrective feedback, (e.g., "Please record the data in this box rather than this box.") followed by an opportunity to engage in data collection independently, and a praise statement when the data collector completed the step accurately. Data collectors were required to obtain accuracy scores of 90% or

higher between themselves and the researcher across three consecutive 15 min training sessions in order to collect data for the study.

Data collectors used paper and pencil to record momentary time sampling data for on-task academic, on-break, and on-schedule behaviors. Each interval box on the data sheet included the following codes: OTA for on-task academic behavior, OB for on-break behavior, and OS for on-schedule behavior. The data collectors observed a 15-min session divided into 10 s intervals. Data collectors used a MotivAider timer to alert them to look at the participant every 10 s and record a circle around the corresponding code on the data sheet if they were engaging in the behavior at that time. If the participant was not on-task, on-break, or on-schedule the data collector recorded an "x" through the corresponding interval of the data collection sheet. See Appendix H for the data sheet.

Percentage of intervals on-task was derived by dividing the number of intervals on-task by the number of intervals a participant was working on academic tasks (not on break) and multiplying the result by 100. The researcher scored on-break behavior under the umbrella of on-schedule behavior for the purposes of graphing and data analysis. Percentage of intervals on-schedule was derived by dividing the number of intervals on-schedule by the total number of intervals and multiplying the result by 100. The researcher used permanent products to score percent correct. Data collectors scored percentage of work problems correct by grading academic work problems. Math problems were scored as correct or incorrect (participants did not get credit for partially correct problems). Language arts questions were scored as correct or incorrect and based on whether the participants answered the comprehension question correctly. The

researcher did not grade language arts questions for punctuation, spelling, grammar, etc. Percentage of work problems correct was derived by dividing the number of problems completed correctly by the total number of problems available and multiplying the result by 100.

Interobserver Agreement

Secondary observers collected data on on-task academic behavior, on-schedule behavior, and percentage of work problems correct for 41% of sessions for Ronald, 42% of sessions for Adam, 42% of sessions for Miles, and 34% of sessions for Anna. A second independent observer also collected data on all dependent variables for language arts generalization probes. Observers collected IOA data for 40% of generalization probes for Ronald, 60% of generalization probes for Adam, 50% of generalization probes for Miles, and 75% of generalization probes for Anna. See Appendix I for data sheet.

IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. The researcher calculated IOA for each participant as an average across all sessions for each dependent variable. Overall IOA percentages for Ronald were 97% for on-task academic behavior (range 83% to 100%), 99% for on-schedule behavior (range 94% to 100%), and 100% for percent correct scores. Overall IOA percentages for Adam were 95% for on-task academic behavior (range 91% to 99%), 98% for on-schedule behavior (range 94% to 100%), and 100% for percent correct scores. Overall IOA percentages for Miles were 96% for on-task academic behavior (range 88% to 100%), 98% for on-schedule behavior (range 98%

to 100%), and 100% for percent correct scores. Overall IOA percentages for Anna were 90% for on-task academic behavior (range 87% to 96%), 98% for on-schedule behavior (range 90% to 100%), and 100% for percent correct scores.

Overall generalization probe IOA for Ronald was 88% (range 81% to 96%) for on-task academic behavior, 98% for on-schedule behavior (range 97% to 100%), and 100% for percent correct scores. Overall generalization probe IOA for Adam was 96% (range 90% to 100%) for on-task academic behavior, 96% for on-schedule behavior (range 92% to 100%), and 100% for percent correct scores. Overall generalization probe IOA for Miles was 90% (range 87% to 93%) for on-task academic behavior, 100% for on-schedule behavior, and 100% for percent correct scores. Overall generalization probe IOA for Anna was 85% (range 80% to 92%) for on-task academic behavior, 97% (range 91% to 100%) for on-schedule behavior, and 100% for percent correct scores.

Treatment Integrity

An independent observer used a checklist to record whether the researcher (a) had the activity schedule materials ready (activity schedule binder with timer inside underneath the participant's desk and three math worksheets on the desk, (b) gave the initial direction at the beginning of the session ("It is time to do your math problems. If you complete your math problems, you can go on break."), and (c) used the appropriate prompting procedure, if needed. See Appendix J for the treatment integrity data sheet. The independent observer collected treatment integrity data for at least 33% of sessions for each condition across all participants. Treatment integrity scores were 100% across all

conditions for all participants.

Social Validity

At the conclusion of the study, the researcher assessed social validity by having participants and the two language arts classroom teachers complete a social validity questionnaire. The participant questionnaire contained seven items such as, “The activity schedule was easy for me to use.” The participants determined whether they agreed or disagreed with each statement by ranking the statement on a scale from 1 to 5 (1 = strongly disagree to 5 = strongly agree). The teacher questionnaire contained five items such as, “The activity schedule intervention was easy for the student to use.” The rating system for the teacher questionnaire was the same as the rating system for the participant questionnaire described above. See Appendix K for social validity questionnaires. Because the researcher was also the resource math teacher, she did not assess social validity for the activity schedule intervention in the resource math classroom.

Experimental Design

A multiple baseline across participants’ design with an embedded reversal (Cooper, Heron, & Heward, 2007) was used to examine the effects of activity schedules on on-task behavior, on-schedule behavior, and percentage of work problems correct during independent work time. This design allowed for a demonstration of effect on the dependent variables at different points in time across participants when the researcher introduced the activity schedule. The multiple baseline design was a good match for the

research question and setting for three reasons. First, the dependent variables in this study were measured for multiple participants in the same setting. Second, it would not have been feasible to return to a true baseline condition, as participants would have been likely to continue using the schedule after schedule training. Finally, a multiple baseline design is similar to the continuous progress monitoring methods many middle school teachers use to compare data over time and across students for a wide variety of skills. Through visual analysis of the multiple baseline data, the researcher was able to draw some helpful conclusions. First, data were analyzed in baseline to determine if they showed a stable and low or decreasing pattern of responding, ensuring that the intervention was necessary. Second, data were analyzed within the baseline and treatment conditions individually to establish and predict patterns of responding within each condition. Third, data across all conditions were used to demonstrate a functional relationship between the activity schedule intervention and the dependent variables when levels of responding differed from the baseline to treatment conditions across participants.

The researcher embedded a no schedule reversal within the multiple baseline design to determine if on-task behavior would return to baseline levels or maintain at high, stable levels if participants no longer used the activity schedule. The no schedule reversal condition allowed for a determination as to whether it was necessary to continue the activity schedule following the schedule use condition, or if on-task behaviors would maintain at high, stable levels when the researcher removed the activity schedule. The no schedule reversal also allowed for another demonstration of effect for each participant, which enhanced the demonstration of a functional relation between the implementation of

the activity schedule and the dependent variables.

Procedures

The researcher implemented a baseline condition, a schedule use condition, a no schedule condition (reversal), and a final schedule use condition in a multiple baseline design across the four participants. All of these conditions occurred in the resource math classroom during the independent practice portion of the math instructional block. Generalization probes occurred in all conditions and were conducted in participants' language arts classrooms. Participants were either in different class periods or different work groups for all conditions. Most participants were in the resource math classroom and the two language arts classrooms during different times of the day. Ronald and Anna were in the resource math classroom during the same class period, but they were in different instructional groups in different locations in the classroom throughout the study.

Baseline

Before students arrived in the classroom, the researcher placed three math worksheets on each student's desk (both participants and other students in the class) and the activity schedule binder under each participant's desk with their class materials. At the beginning of independent practice time (the last 20 min of the 52 min class period), the researcher gave the direction to the entire class, "It is time to do your math problems. If you complete your math problems, you can go on break." The directions were the same for all of the students in the math class because the researcher designed this study to align with typical classroom routines. No additional prompts were provided. Observers

collected data on on-task academic behavior, on-schedule behavior, and percent correct scores. Participants remained in baseline for a minimum of 5 sessions and until data on the dependent variables showed a stable or decreasing trend.

Schedule Training

Schedule training occurred following the last baseline data point, but prior to the first intervention data point. The researcher conducted schedule training sessions in the math resource classroom during a study hall period, so that participants did not miss any classroom instruction or independent work time. The researcher trained participants on the activity schedule individually. The researcher separated participants for schedule training by ensuring participants who had not yet been schedule-trained worked in other classrooms during the study hall period she conducted schedule-training sessions. To begin, the participant sat at a desk, and the researcher sat at a desk next to him or her. The researcher explained how to use the schedule using these directions: (a) when the teacher says, “It is time to do your math problems. If you complete your math problems, you can go on break,” get your schedule from under your desk, (b) open the schedule, (c) turn a page in the schedule, (d) find the worksheet on your desk that matches the worksheet strip in the schedule, (e) complete your worksheet, (f) put the completed worksheet in your activity schedule binder, (g) turn the page in your schedule to the break page, (h) set the timer on your desk for 3 minutes, (i) when the timer goes off, stop the timer, (j) turn the page in your activity schedule, (k) repeat the process for finding the corresponding worksheet and completing it and taking a break for the remaining pages of the schedule. Following the directions, the researcher gave an in vivo model of completing the activity

schedule. If the participants asked questions during the initial explanation and modeling of the activity schedule, the researcher answered them.

After providing directions and a model of completing the schedule, the researcher instructed the participants to complete the schedule with her and provided corrective feedback as necessary throughout the steps of the schedule. Finally, the researcher had participants move through the schedule independently after providing the direction from the baseline condition, "It is time to do your math problems. If you complete your math problems, you can go on break." Participants mastered schedule training when they completed three consecutive sessions with on-task and on-schedule behavior at 80% of intervals or higher and percent correct at 70% or higher. When participants met criteria, they moved on to the schedule use condition. In the case of errors, the researcher provided prompting and feedback using the prompting hierarchy described below.

If a participant made an error at any time, the researcher used a most-to-least prompting hierarchy (MacDuff et al., 1993). An error occurred when the participant turned to the wrong page in the activity schedule, engaged in behavior that matched a different page of the activity schedule, or was oriented towards the materials, but not making contact with the paper to answer a question within 60 s. If a participant made an error, the researcher provided prompts as follows: (a) gestural prompt, (b) indirect verbal prompt, (c) direct verbal prompt. For example, if a participant did not turn the page of the activity schedule after he or she finished the first academic worksheet task, the researcher walked over to the participant's desk and pointed to the page of the activity schedule. If the participant made the same error again, the researcher used an indirect verbal prompt

such as, “What do you do next?” to attempt to correct the participant’s error. If the participant made the same error, the researcher used a direct verbal prompt such as, “I need you to turn the page in your activity schedule.” Each prompt was followed by the opportunity for the participant to engage in that particular step of the schedule independently. The researcher selected a most-to-least prompting hierarchy because she wanted to minimize errors and minimize the possibility of participants becoming dependent on verbal prompts in the classroom. The researcher did not include any physical prompts in the procedures because the participants were high-functioning middle school students, and it would not have been socially acceptable for the researcher to use physical prompts in that setting. Though the researcher had a prompting hierarchy in place, she never had to move past a gestural prompt for any participant. Miles and Anna did not require any prompting beyond the initial schedule training session (before they had a chance to use the schedule independently), and Ronald and Adam required very infrequent gestural prompts.

Schedule Use

During independent practice time (the last 20 min of the 52 min class period), the researcher gave the same instruction as during baseline, “It is time to do your math problems. If you complete your math problems, you can go on break.” If a participant made an error (see definition of error above), the researcher used the most-to-least prompting hierarchy described in the schedule training condition to correct the error. The researcher delivered two gestural prompts across all participants in the schedule use condition. The researcher prompted Adam once during observation session 12 to turn the

page in the schedule before starting on the next math task page, and she and prompted Ronald once during observation session 10 to turn the page in the schedule from the first math task page to the first break page.

No Schedule (Reversal)

The no schedule condition was the same as the baseline and schedule use conditions except that the activity schedule was not under the participants' desks. Prior to the class period beginning, the research placed three math worksheets on their desks and gave the same instruction as in previous conditions ("It is time to do your math problems. If you complete your math problems, you can go on break.). No error correction prompts were provided.

Return to Schedule Use

This condition was identical to the schedule use condition described above. The researcher delivered two gestural prompts across participants in the final schedule use condition. The researcher prompted Adam twice to turn the page in the schedule before starting on the next math task page, once during observation session 19 and once during observation session 22.

Generalization Probes

The researcher conducted generalization probes in the language arts classrooms with two different language arts teachers during all conditions. Ronald and Anna had the same resource language arts teacher for different class periods and Adam and Miles had the same regular education language arts teacher for different class periods. The activity

schedule was set up in the same manner as the schedule use conditions, but the academic tasks were language arts tasks instead of math tasks and the language arts teachers provided the instruction to complete independent work. Each language arts teacher gave the following directions: “It is time to do your language arts work. If you complete your language arts work, you can go on break.” The researcher collected data following the procedures outlined above. The language arts teachers did not provide any prompts during the generalization probes.

CHAPTER IV

RESULTS

Table 2 presents schedule training data for all four participants. Figure 1 displays data on on-task academic behavior and on-schedule behavior for all participants across all conditions (baseline, schedule use, no schedule, and final schedule use). Figure 1 also displays data from the language arts generalization probes for all participants across all conditions. Figure 2 provides percentage of work problems correct for all participants across all conditions.

Schedule use data were not collected for Ronald on sessions six and seven because he was in schedule training until session eight. Due to absences, data were not

Table 2

Schedule Training Scores for On-Task, On-Schedule, and Percent Correct Schedule Training Scores for Ronald, Adam, Miles, and Anna

Participant	% on-task	% on-schedule	% correct
Ronald			
Session 1	90	92	72
Session 2	90	94	88
Session 3	88	93	79
Adam			
Session 1	93	95	72
Session 2	98	99	72
Session 3	100	100	72
Miles			
Session 1	98	98	72
Session 2	100	100	94
Session 3	100	100	88
Anna			
Session 1	92	94	72
Session 2	91	94	72
Session 3	91	94	71

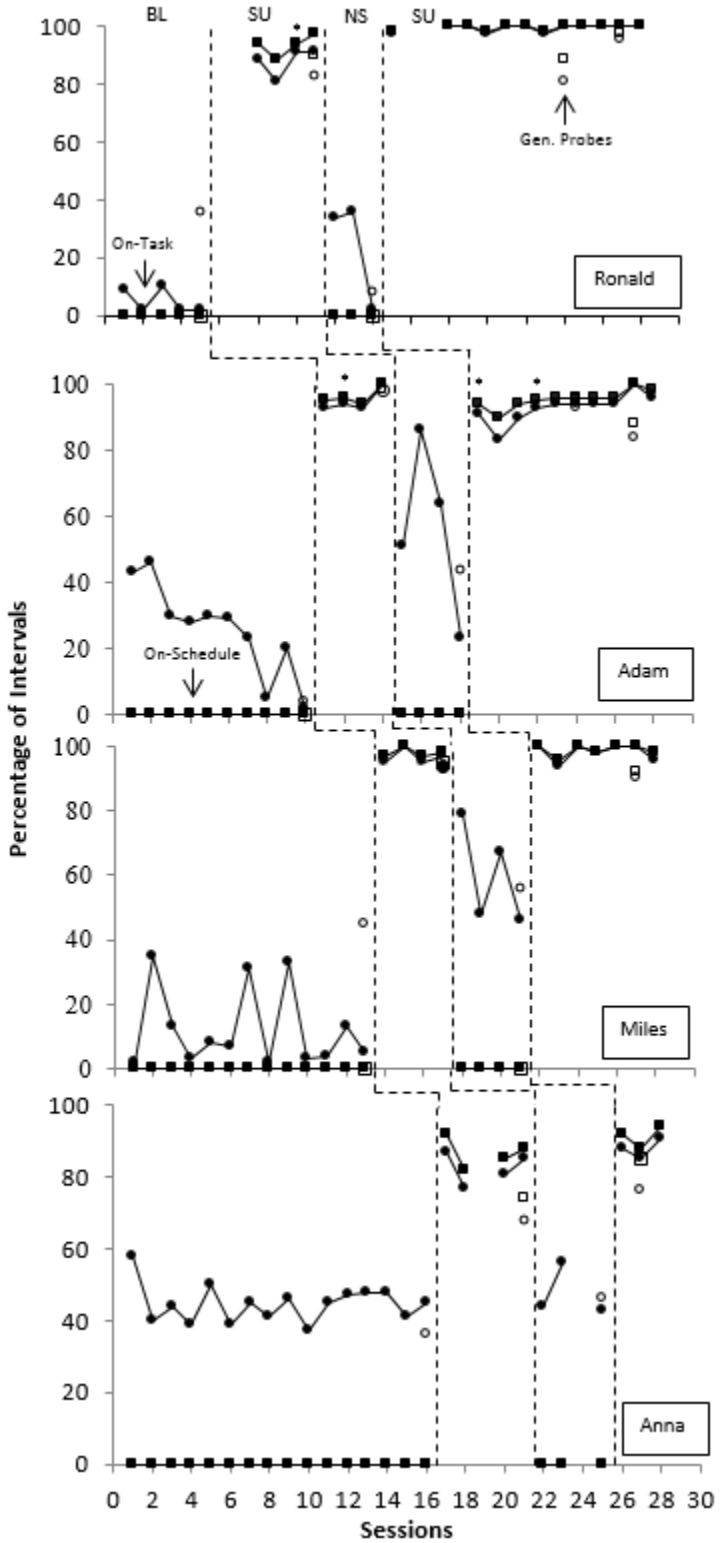

Figure 1. On-task academic data, on-schedule data, and generalization probes results for Ronald, Adam, Miles, and Anna. * represents sessions with a prompt.

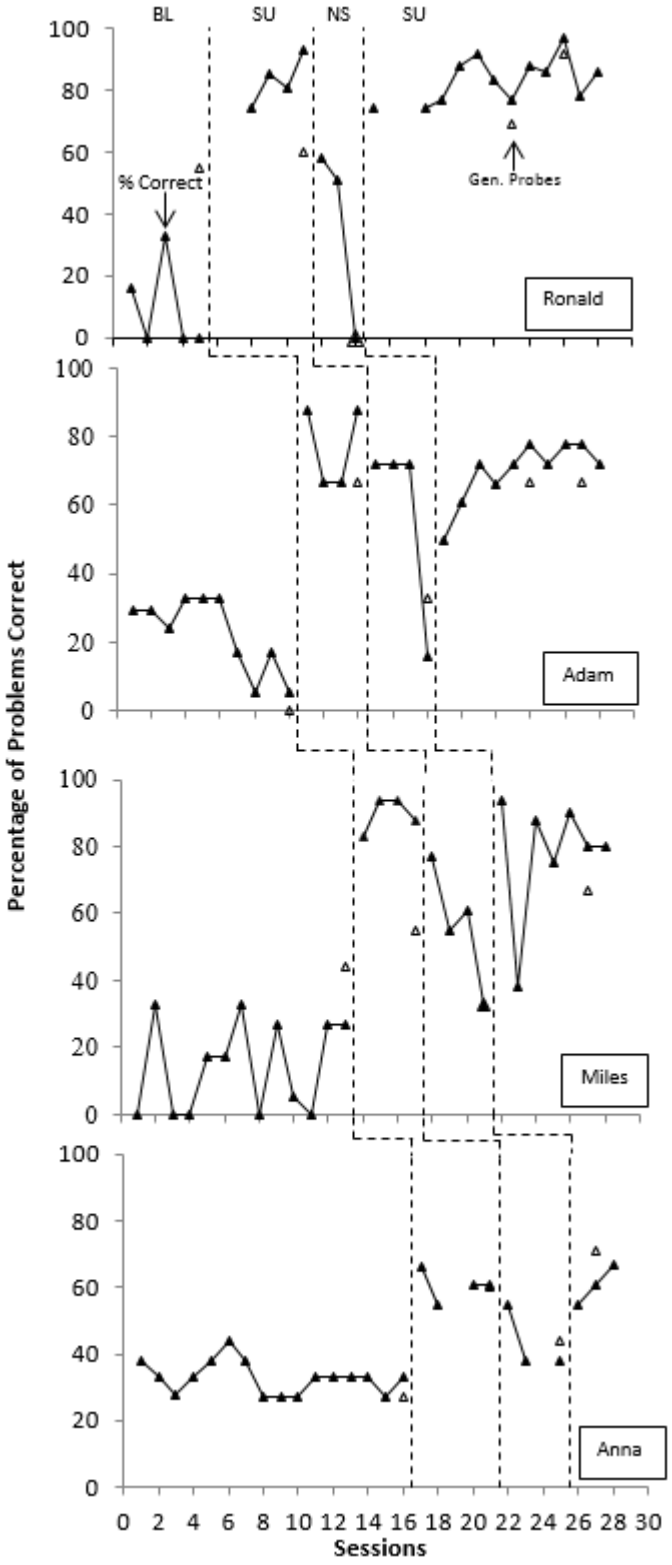

Figure 2. Percentage of problems correct and generalization probe percentage of problems correct scores for Ronald, Adam, Miles, and Anna.

collected for Ronald on sessions 16 and 17 or for Anna on sessions 19 and 24. For all participants, final generalization probes were conducted on session 28, one day prior to the last schedule use session, because the language arts teachers were not holding typical classes with independent work time on the final session (session 29) given the end of the school year was approaching.

Schedule Training

As shown in Table 2, all participants engaged in high, stable levels of on-task and on-schedule behavior and had high percent correct scores during schedule training. Average schedule training scores for on-task academic behavior for Ronald, Adam, Miles, and Anna were 89%, 97%, 99%, and 91% of intervals respectively. Average schedule training scores for on-schedule behavior for Ronald, Adam, Miles, and Anna were 93%, 98%, 99%, and 94% of intervals respectively. Average schedule training percent correct scores for Ronald, Adam, Miles, and Anna were 80%, 72%, 85%, and 72% respectively. Ronald was in schedule training for two days. Adam, Miles, and Anna completed schedule training sessions in one day.

On-Task Academic Behavior

Baseline

As shown in Figure 1, all participants engaged in moderate-low levels of on-task academic behavior in baseline. Ronald's data show a low, stable pattern of responding ranging from 0-10% of intervals on-task. Adam engaged in in moderate levels of on-task

academic behavior (40-50% of intervals on-task) in the first two sessions of baseline but decreased throughout the rest of the condition (0-5% of intervals on-task). Miles' data were low but slightly variable, ranging between 2% and 35% of intervals. Anna engaged in moderate, stable levels of on-task academic behavior ranging from 39-60% of intervals on-task.

Schedule Use

During the schedule use condition, levels of on-task academic behavior immediately increased and remained high for all participants. Ronald's average on-task academic behavior was 88% of intervals on-task. Adam's on-task academic behavior increased to an average of 95% of intervals on-task. Miles engaged in on-task academic behavior for an average of 97% of intervals, and Anna was on-task for an average of 82% of intervals.

No Schedule

Levels of on-task academic behavior in the no schedule condition varied slightly across participants, but all participants engaged in less on-task behavior than in the schedule use condition. For the first two sessions, Ronald's behavior immediately decreased, and he engaged in on-task academic behavior in 34% and 36% of intervals. During the third session, Ronald demonstrated on-task academic behavior at a level of responding similar to the baseline condition (0% of intervals on-task). Adam's on-task academic behavior was variable, but his last three data points show a decreasing trend. In the last session, Adam engaged in on-task academic behavior during 23% of intervals,

similar to his level of responding in the baseline condition. Miles' on-task academic behavior immediately decreased to between 46% and 79% of intervals, showing a decrease in level and an overall downward trend. Anna's data from the no schedule condition show that her on-task academic behavior immediately decreased to baseline levels ranging from 43-56% of intervals on-task.

Schedule Use

When the researcher re-introduced the activity schedule intervention, on-task academic behavior immediately returned to high, stable levels for all participants. Ronald engaged in high levels of on-task academic behavior (from 97% to 100% of intervals on-task) and maintained a high, stable level of responding across 12 schedule use sessions. Adam engaged in high levels of on-task academic behavior (from 83% to 100% of intervals on-task) and maintained a high, stable level of responding across 10 schedule use sessions. Miles' on-task behavior increased and stabilized between 94% and 100% of intervals on-task for the seven schedule use sessions. Anna engaged in high, stable levels of on-task academic behavior (85% to 91% of intervals on-task) across three schedule use conditions.

Generalization Probes

As shown in Figure 1, all participants engaged in higher levels of on-task academic behavior during the schedule use generalization probes than during the baseline and no schedule generalization probes. During baseline generalization probes, Ronald was on-task for 36% of the intervals, Adam was on-task for 4% of the intervals, Miles

was on-task for 45% of the intervals, and Anna was on-task for 36% of the intervals. When the participants used the activity schedule in language arts, on-task academic behavior increased. Ronald engaged in on-task academic behavior in 83% of intervals, Adam engaged in on-task academic behavior in 98% of intervals, Miles engaged in on-task academic behavior in 94% of intervals, and Anna engaged in on-task academic behavior in 68% of intervals. For the no schedule generalization probes, percentages of on-task academic behavior for Ronald, Adam, Miles, and Anna decreased to 8%, 44%, 56%, and 46% respectively. During final schedule use generalization probes, Ronald's on-task academic behavior increased to 81% and 95% of intervals, Adam increased to 93% and 84% of intervals, Miles increased to 92% of intervals, and Anna increased to 76% of intervals.

On-Schedule Behavior

Baseline

Because none of the participants used the activity schedule during the baseline condition, on-schedule performance was 0% of intervals for all participants.

Schedule Use

All participants immediately engaged in high, stable levels of on-schedule behavior in the schedule use condition. Ronald was on-schedule for an average of 93% of intervals. Adam's on-schedule behavior increased to an average of 96% of intervals. Miles was on-schedule for an average of 98% of intervals, and Anna engaged in on-schedule behavior for an average of 87% of intervals.

No Schedule

Because participants did not have access to the activity schedule during the no schedule condition, on-schedule performance was 0% of intervals for all participants.

Schedule Use

When the researcher re-introduced the schedule use condition, on-schedule performance immediately increased across all participants. Ronald was on-schedule between 98% and 100% of the intervals for 12 schedule use sessions. Adam was on-schedule an average of 96% of the intervals for 10 schedule use sessions. Miles' on-schedule performance increased to an average of 98% of intervals for the seven schedule use sessions. Anna engaged in high, stable levels of on-schedule behavior ranging from 88% to 94% of intervals for three schedule use sessions.

Generalization Probes

As shown in Figure 1, all participants engaged in higher levels of on-schedule behavior during the schedule use generalization probes than during the baseline and no schedule probes. Because none of the participants used the activity schedule during baseline generalization probes, on-schedule performance was 0% for all participants. When the participants used the activity schedule in language arts, on-schedule behavior increased. Ronald engaged in on-schedule behavior for 90% of intervals, Adam was on-schedule 98% of intervals, Miles engaged in on-schedule behavior for 95% of intervals, and Anna was on-schedule 74% of intervals. Because participants did not have access to the activity schedule in the no schedule condition, on-schedule behavior was 0% for all

participants. During final schedule use generalization probes, Ronald's on-schedule behavior increased to 88% and 97% of intervals, Adam increased to 95% and 88% of intervals, Miles increased to 90% of intervals, and Anna increased to 85% of intervals.

Percentage of Work Problems Correct

Baseline

As shown in Figure 2, all participants had moderate-low percent correct scores in baseline. Ronald's percent correct scores were between 0% correct and 33% correct. Adam's percent correct scores ranged from 5% correct to 33% correct and decreased throughout the condition. Miles' percent correct scores were low and slightly variable, between 0% correct and 35% correct. Anna's percent correct scores were mostly stable, ranging from 27% correct to 44% correct.

Schedule Use

During the schedule use condition, percent correct scores immediately increased for all participants. Ronald's percent correct scores increased to between 74% correct and 93% correct and showed an increasing trend. Adam's percent correct scores ranged from 67% correct to 88% correct. Miles' percent correct scores were high, ranging from 83% correct to 94% correct. Anna's percent correct scores were between 55% correct and 61% correct.

No Schedule

Ronald's no schedule percent correct scores were moderate for the first two

sessions (58% correct and 51% correct) but decreased to 0% correct for the last session. Adam's no schedule percent correct scores were similar to scores from the schedule use condition (67% correct for the first three sessions) until the last session, when his percent correct score decreased to 16% correct. Miles' percent correct scores decreased slightly (ranging 33% correct to 77% correct) from the schedule use condition and his data show an overall decreasing trend. Anna's first percent correct score remained consistent with the schedule use condition, but during the second and third sessions, her percent correct scores returned to baseline levels (38% correct for both sessions).

Schedule Use

When the researcher re-introduced the activity schedule book, percent correct scores increased for all participants. Ronald's final schedule use percent correct scores immediately increased to scores between 74% correct and 97% correct. Adam's scores increased slowly and stabilized between 65% correct and 75% correct. Miles' final schedule use percent correct scores were variable at first, but eventually stabilized between 75% correct and 90% correct. Anna's scores showed an increasing trend (55%, 61%, and 67%).

Generalization Probes

Baseline generalization probe scores for Ronald, Adam, Miles, and Anna were 55%, 0%, 44%, and 27% correct, respectively. When the researcher introduced the activity schedule, percent correct scores increased across all participants. Ronald increased to 60% correct, Adam increased to 67% correct, Miles increased to 55%

correct, and Anna increased to 60% correct. During no schedule generalization probes, percent correct scores for Ronald, Adam, Miles, and Anna decreased to 0%, 33%, 33%, and 44% respectively. During final schedule use generalization probes, Ronald's percent correct scores increased to 69% and 92% correct, Adam increased to 67% and 67% correct, Miles increased to 67% correct, and Anna increased to 71% correct.

Social Validity

Results of the participant social validity questionnaires are presented in Table 3. As shown in Table 3, all participants indicated that the activity schedule was easy for them to use ($M = 4.75$). Adam and Miles reported that they liked using the activity schedule, and Ronald and Anna were neutral about using the activity schedule ($M = 4$). The results of the social validity questionnaire also indicated that all participants agreed

Table 3

Participant Social Validity Questionnaire Results for Ronald, Adam, Anna, and Miles

Question	Ronald	Adam	Miles	Adam	Mean
1. The activity schedule was easy for me to use.	5	5	5	4	4.75
2. I liked using the activity schedule.	3	5	5	3	4.00
3. Other students in the class asked about the activity schedule.	1	1	1	1	1.00
4. The activity schedule helped me get my math work done.	5	5	5	4	4.75
5. I would be willing to continue using the activity schedule in my math class.	5	5	5	5	4.75
6. I would be willing to use the activity schedule in my other classes.	5	5	5	4	4.75
7. The activity schedule would help me get my work done in other classes.	5	5	5	3	4.50

Note. 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

the activity schedule helped them complete their math work ($M = 4.75$). Additionally, all participants agreed that they would be willing to continue using the activity schedule intervention in math class ($M = 4.75$) and in other classes ($M = 4.75$). Finally, all participants indicated they strongly disagreed that other students asked them about the activity schedule ($M = 1$).

Results of the language arts teacher questionnaires are presented in Table 4. As shown in Table 4, both language arts teachers recorded scores of 5 across all items on the teacher questionnaire. Both teachers indicated they strongly agreed that the activity schedule was easy for the students to use, helped the students stay on-task, and helped the students complete more of their class work. Additionally, both language arts teachers reported they strongly agreed that the student seemed to enjoy using the activity schedule, and the student would benefit from using the activity schedule in language arts class.

Table 4

Language Arts Teacher Social Validity Questionnaire Results Ronald, Adam, Anna, and Miles

	Resource LA		Regular education LA		
Question	Ronald	Anna	Miles	Adam	Mean
1. The activity schedule intervention was easy for the student to use.	5	5	5	5	5
2. The activity schedule helped the student using it stay on-task.	5	5	5	5	5
3. The activity schedule helped the student complete more of their class work.	5	5	5	5	5
4. The student seemed to enjoy using the activity schedule.	5	5	5	5	5
5. The student would benefit from using an activity schedule in this class.	5	5	5	5	5

Note. 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

CHAPTER V

DISCUSSION

This study examined the effects of activity schedules on on-task academic behavior, on-schedule behavior, and percentage of work problems correct for middle school students during independent work time in a resource math classroom. A multiple baseline design across participants with an embedded reversal was used to examine the extent to which the intervention affected on-task academic behavior, on-schedule behavior, and percentage of work problems correct. Generalization probes were conducted to determine if the effects of activity schedules on on-task behavior could be generalized to resource and regular education language arts settings. The results of this study showed significant increases in on-task academic and on-schedule behavior for all participants during the schedule use conditions. Data also show overall increases in percentage of work problems correct following the implementation of the activity schedule. Participants and language arts teachers responded positively to questions on social validity questionnaires, indicating activity schedules are a socially valid intervention in a middle school setting.

Implications for Practice

The results of this study are important for practitioners working with students in a middle school setting for several reasons. First, research has shown that students with disabilities have difficulty engaging in on-task behavior (Flower et al., 2014; Reid & Harris, 1993) in self-contained and resource classroom settings. Given the expectations of

typical middle school classrooms and the fact that many students who receive services in a resource classroom setting spend the majority of the school day in regular education classrooms, it is important to provide practitioners with effective interventions to increase on-task behavior. This study demonstrated that activity schedules are an effective intervention in the middle school setting as on-task academic behavior during independent work time increased for all participants and the effects generalized to both resource and regular education language arts settings.

Second, because middle school teachers have minimal resources and they cannot always provide a high level of prompting and support to students, it is important that interventions for on-task behavior are easy to implement and generalize to other settings. Results of this study suggest that activity schedules can be a low-effort intervention tool for classroom teachers, as the intervention required minimal prompting from the researcher. Because of this, activity schedules could prove to be valuable because they are easy to implement and they promote greater student independence. The results of this study also suggest that middle school students with disabilities in a resource classroom setting can generalize the use of activity schedules to a different subject and setting. Following training in the resource math classroom, all participants successfully used the activity schedule in language arts, as demonstrated by the fact that all participants engaged in higher levels of on-task and on-schedule behaviors during the schedule use generalization probes than during the baseline and no schedule probes. These results suggest that middle school students could effectively use the activity schedule intervention to increase on-task behaviors in a variety of academic settings with minimal

teacher support.

Third, while data from the no schedule condition varied slightly across participants, on-task academic behavior was significantly more stable and predictable in the schedule use conditions for all participants. These results indicate that activity schedules could stabilize on-task academic behavior during independent work time for students who receive services in a resource classroom setting. Stability of on-task performance could lead to better academic outcomes for students as they will be able to complete the class work teachers assign, consistently practice academic skills, and frequently access grade-level curriculum. The results of the no schedule condition also suggest that it may be beneficial for teachers working with students in this setting to carefully plan for the systematic removal of an activity schedule intervention in order to maintain stability of on-task responding. During the no schedule condition, level and stability of on-task behavior decreased for all participants. This suggests on-task behavior will not maintain at high, stable levels if the activity schedule is removed, so teachers should develop procedures to systematically fade the intervention.

Finally, participants and language arts teachers responded positively to the activity schedule intervention on the social validity questionnaires. All participants agreed that the activity schedule was easy to use, it helped them get work done, and they would be willing to use it in future classes. Participants also reported that other students did not ask them about the activity schedule, which suggests activity schedules may be less socially stigmatizing that other interventions for increasing on-task behavior. This could be because activity schedules resemble binders, schedules, and planners that all

middle school students access throughout the day. Both language arts teachers indicated that the activity schedule intervention was easy for the students to use, it helped the students complete class work, and the students would benefit from using the activity schedule in a language arts class.

Implications for Research

This study adds to the existing body of activity schedule literature in several ways. First, the findings from this study replicate the findings of school-based activity schedule research conducted by Bryan and Gast (2000) and Cirelli et al. (2016) and extend the use of activity schedules to increase on-task behavior to a novel disability population and setting. While researchers have used activity schedules to increase on-task behavior for students with developmental disabilities (Bryan & Gast, 2000; MacDuff et al.,1993) and students at-risk for ADHD (Cirelli et al., 2016), this is the first study to establish activity schedules as an effective intervention to increase on-task behavior for students with specific learning disability and other health impairment classifications who are served in a resource classroom setting. Second, current activity schedule research supports the generalization of high levels of on-task and on-schedule behavior to novel tasks (Bryan & Gast, 2000; MacDuff et al., 1993). This study extends the generalization findings of previous researchers to individuals receiving special education services in a resource classroom setting, as participants engaged in high levels of on-task and on-schedule behavior when the researcher presented novel tasks (language arts tasks) in both resource and regular education classroom settings. Third, the results of the no schedule

reversal implemented with middle school students using activity schedules in a resource classroom setting extend the findings of previous researchers. Bryan and Gast have shown that participants engage in lower levels of on-task and on-schedule behavior when researchers remove the activity schedule intervention. The results of this study corroborate previous findings, as participants engaged in higher, more stable levels of on-task academic behavior in the schedule use conditions than in the no schedule condition. Finally, because the activity schedule intervention required minimal prompting and support from the researcher, this study adds to the existing body of literature that suggests activity schedules are an effective, low-effort intervention for increasing on-task behavior for students with disabilities (Bryan & Gast, 2000; Cirelli et al., 2016; MacDuff et al., 1993).

Future Research

Replication

To our knowledge, this is the first study to examine the effects of an activity schedule intervention on on-task academic behavior for students who receive services in a middle school resource classroom setting. Thus, future research should consider replication of this study in other middle school classroom settings, particularly classrooms with demanding independent work requirements such as science, history, or computer classrooms. Future research could also replicate these procedures with a different population of middle school students, including students who receive special education services in a co-teaching setting, or students without disabilities who engage in

low levels of on-task behavior.

Fading

Future research should consider fading procedures for activity schedules in a middle school setting. These procedures could include systematically fading the break time within the activity schedule so students are working on academic tasks for an increasing portion of the session time. For example, break times in the activity schedule could be faded in 10 s increments from 3 min to 1 min. Future research might also assess the effects of fading the activity schedule binder. Following the schedule use condition, future studies might fade the activity schedule binder until it is a single sheet of paper, a page in a student planner, or a list kept on a cell phone or other electronic device.

Academic Outcomes

Finally, as this study yielded mixed results regarding the effects of activity schedules on percentage of work problems correct, future research should investigate other ways to measure effects of activity schedules on academic outcomes. For example, future studies could measure other indicators of academic success such as number of independent practice assignments completed, performance on assessments related to independent practice work, or number of teacher prompts required to complete assignments during independent work time. Future research could also include an accuracy criterion as part of the academic page in the activity schedule, and participants could grade work for accuracy before moving on to a break page.

Limitations

Although the results of this study demonstrated that the activity schedule intervention was effective, several limitations should be noted. First, only four students participated in this study, and they all received special education services in a resource math classroom setting. Future research should consider replicating these procedures with additional middle school disability populations or in other classroom settings. Second, the researcher did not have time to fade the break component of the activity schedule or the activity schedule binder because the school year ended. Future research should consider fading the break time or fading the use of an activity schedule binder. Third, while the researcher measured the percentage of math problems completed correctly, these data were variable and did not demonstrate clear effects, potentially because the percent correct dependent variable did not account for the time the participants spent on break in the schedule use conditions. Future research should consider ways to measure participant accuracy, productivity, and other indicators of academic success. Fourth, the activity schedule in this study was a multi-component intervention including verbal directions from the teacher, prompts on the activity schedule pages, and both negative and positive reinforcement components (break pages and preferred materials during break times). Because of this, the researcher cannot determine which specific component of the intervention, or which combination of components of the intervention, caused the change in the dependent variables. Future research should consider component analyses to analyze the individual effects of components of the activity schedule intervention. Finally, because the researcher did not collect long-term maintenance data, it is not

possible to determine if the results of the activity schedule intervention would maintain over time. Future research should collect maintenance data and assess the effects of activity schedules in a middle school setting over time.

Conclusion

Given that all participants in this study showed an increase in on-task academic and on-schedule behaviors, these results demonstrate that the implementation of activity schedules could lead to increased academic outcomes during independent work time for students with disabilities in both resource and regular education classroom settings. Independent work time is a common component of middle school instructional blocks, and it is crucial for students to be on-task during these times. Because of this, it is imperative that classroom teachers have access to effective, low-effort, and socially valid interventions to improve the on-task behavior of students who receive special education services in a resource classroom setting.

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APPENDICES

Appendix A

On-Task Classroom Observation Data Sheet

On-Task Classroom Observation Data Sheet

On-Task Behavior: Visually attending to the academic worksheet and/or appropriate materials (i.e., head orientation within approximately 45 degrees of the worksheet/materials) and manipulating any work materials as they were designed to be used.

On-task (+)

Off – task (-)

Intervals on-task: _____

Total intervals: 120

Percentage: ____ ÷ 120 X 100 = _____%

Appendix B

Worksheet Strips and Corresponding Worksheets

3.1 – Two-Step Equations #1

3.1 – Two-Step Equations #1

Two-Step Equations

1. $\frac{k}{4} + 12 = 16$
2. -15m -2 = 58
3. 13a - 12 = 27
4. -2t – 10 = 40
5. $\frac{k}{-1} + 13 = 15$
6. -4x + 2 = -22

3.2 – Simplifying Expressions

3.2 Simplifying Expressions

Simplifying Expressions

1. $-14x + 2 + 9x$

2. $-2(y + 4)$

3. $7(4x - 5)$

4. $-5(-3m + 11)$

5. $-18y + 29x - 4 + 7y$

6. $-35x + 3x - 7 + 120$

Appendix C

Break Page Example

Break –
3 minutes

Appendix D

Integer Addition/Subtraction CBA

Integer Addition/Subtraction CBA

Use a chip model to solve:

1. -5 + (-8) =
2. -1 + 4 =
3. 6 + (-4) =

Draw a number line and solve:

4. 7 + (-4) =

5. -1 + (-3) =

6. Re-write the following subtraction expressions as addition expressions and solve:

a) -5 – 2 =

b) 9 – (-3) =

7. Solve any way you want:

a) -5 + 6 b) 6 – (-10) c) 11 + (-13)

Combining Like Terms Quiz

Simplify each expression:

1. 13b – 9b
2. 4w + 2 + 3 – 6w
3. -2y + 7y
4. 6x – 2 – 3x + 4
5. 5x + 3y + 4y + x
6. -2b + 3x + 4 – 5 + 5x

Appendix E

Simplifying Expressions

Simplifying Expressions

1. -14x + 2 + 9x
2. -2(y + 4)
3. 7(4x – 5)
4. -5(-3m + 11)
5. -18y + 29x – 4 + 7y
6. -35x + 3x – 7 + 120

Two-Step Equations

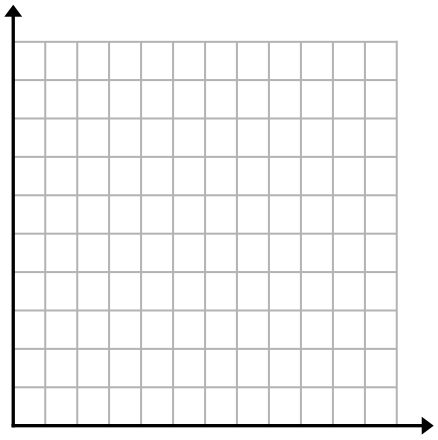
1. $\frac{k}{4} + 12 = 16$
2. -15m -2 = 58
3. 13a - 12 = 27
4. -2t – 10 = 40
5. $\frac{k}{-1} + 13 = 15$
6. -4x + 2 = -22

Appendix F

Math Task Examples for Ronald

Complete the table, graph, and equation for each of the situations below:
Jaden makes $33 for 2 hours of work.

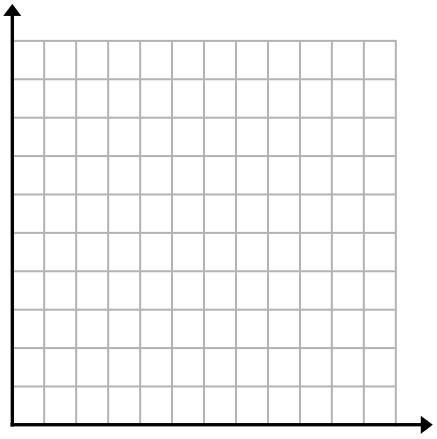
Hours	**$**



Equation:_____

Jace's car can travel 64.5 miles on 3 gallons of gas.

Gallons	**Miles**



Equation:_____

Appendix G

Language Arts Task Examples

Chapter Five

1. Describe the boys' disguise and the reason behind Ponyboy's reaction to his hair.
2. Discuss how the boys' emotional display contrasts with their normal behavior.
3. Explain Ponyboy's sickness at the church.

Appendix H

Direct Observation Data Sheet

Direct Observation Data Sheet

Student ID: _____ Date: _____

Observer: _____ IOA: _____

KEY	On Task Academic - OTA	On Break - OB			
	On Schedule - OS				

Seconds	0-10	11-20	21-30	31-40	41-50	51-60
1	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
2	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
3	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
4	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
5	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
6	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
7	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
8	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
9	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
10	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
11	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
12	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
13	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
14	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS
15	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS	OTA OB OS

Appendix I

IOA Data Calculation Sheet

IOA Data Calculation Sheet

Behavior	Observer A	Observer B	IOA Percentage
1. On-Task Behavior			
2. On-Break Behavior			
3. On-Schedule Behavior			
4. Percent Correct			
5. Percent Incorrect			

Appendix J

Treatment Integrity Data Sheet

Treatment Integrity Data Sheet

Date: _____ Session #: _____ Observer: _____ Researcher: _____

Item	# Correct	# Total
1. All materials were ready at the beginning of the session • Binder under desk • Worksheets on desk	Yes No	
2. The primary researcher gave the correct initial directions	Yes No	
3. The researcher prompted the participant correctly (if needed) • Gestural • Indirect Verbal ("What are you supposed to be doing?" • Direct Verbal ("I need you to…"		

Number of steps completed correctly/Total number of steps x 100 = _____

Appendix K

Social Validity Participant and Teacher Questionnaires

Social Validity Participant Questionnaire

Teacher: _____ Date: _____

There are 7 items on this questionnaire. For each item, please tell me if you agree or disagree with the statement. Look at the key below to help you answer:

Strongly Agree 5	**Agree** 4	**Neutral** 3	**Disagree** 2	**Strongly Disagree** 1

1.	The activity schedule was easy for me to use.	**5**	**4**	**3**	**2**	**1**
2.	I liked using the activity schedule.	**5**	**4**	**3**	**2**	**1**
3.	Other students in the class asked about the activity schedule.	**5**	**4**	**3**	**2**	**1**
4.	The activity schedule helped me get my math work done.	**5**	**4**	**3**	**2**	**1**
5.	I would be willing to continue using the activity schedule in my math class.	**5**	**4**	**3**	**2**	**1**
6.	I would be willing to use the activity schedule in my other classes.	**5**	**4**	**3**	**2**	**1**
7.	The activity schedule would help me get my work done in other classes.	**5**	**4**	**3**	**2**	**1**

Comments:

Thank you for your time! ☺

Social Validity Teacher Questionnaire

Teacher: _____ Date: _____

This questionnaire consists of 5 items. For each item, please indicate the extent to which you agree or disagree with each statement. Refer to the key below to answer:

Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
5	**4**	**3**	**2**	**1**

1.	The activity schedule intervention was easy for the student to use.	**5**	**4**	**3**	**2**	**1**
2.	The activity schedule helped the student using it stay on-task.	**5**	**4**	**3**	**2**	**1**
3.	The activity schedule helped the student complete more of their class work.	**5**	**4**	**3**	**2**	**1**
4.	The student seemed to enjoy using the activity schedule.	**5**	**4**	**3**	**2**	**1**
5.	The student would benefit from using an activity schedule in this class.	**5**	**4**	**3**	**2**	**1**

Please provide any additional information that might be important for us to know regarding the use of activity schedules in classrooms:

Thank you for your time! ☺