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Promoting attention in the classroom using the Play, Learn, and Enjoy curriculum

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Promoting Attention in the Classroom Using the *Play, Learn, and Enjoy* Curriculum

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Abstract

This study examined the effects of the *Play, Learn, and Enjoy* curriculum on on-task behavior among a sample of second-grade students identified as displaying attention regulation difficulties. The *Play, Learn, and Enjoy* curriculum trains children a broad range of self-regulation skills through game-based activities. The curriculum bridges neurocognitive perspective on self-regulation with the Vygotskian socio-cultural framework. Six children participated in the study. An A-B-A^1 concurrent baseline across participants single-case design was utilized. Pre- and post-intervention direct measures of attention and inhibition control were also employed for each participant using selected tests from the NEPSY-II. Results showed declines in off-task behavior for all participants and increases in on-task behavior among students whose participation and attendance during the intervention phase was unimpeded. Improvements in direct measures of selective and sustained attention were apparent for all participants. Inhibition skill improvements varied across participants; however, all participants demonstrated an increase in their ability to engage in self-monitoring, as evidenced by improvements in the ability to self-correct errors.

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CHAPTER I: INTRODUCTION

A report from the United States Department of Education (2018) indicates that three to five percent of the population of school-aged children have symptoms related to inattentiveness. Diagnoses of attention deficit hyperactivity disorder (ADHD) increased by two million between 2003 and 2011 (Visser et al., 2014). Among undiagnosed and at-risk students, school support personnel and teachers report that youth who display inattentiveness and engage in off-task behavior receive frequent referrals to school mental support staff for skills development, formal services (Barkley, DuPaul, & McMurray, 1990; Roberts, 2003), and individualized interventions in the classroom (Roberts, 2003). Approximately half of students with attentional difficulties receive services or accommodations under the Individuals with Disabilities Education Act (IDEA); of these students, the majority of their instructional time (approximately 80%) is in the general education setting (Gureasko-Moore, DuPaul, & White, 2006; Mulrine, Prater, & Jenkins, 2008).

Inattentive behavior has been linked to adverse academic and social outcomes (Multine et al., 2008; Rabiner, Carrig, & Dodge, 2016; Roberts, 2003). Children with attention dysregulation exhibit higher rates of off-task behaviors, especially during self-directed or passive classroom tasks (e.g., working independently on a worksheet, reading to self, listening to teacher directions, etc.; Vile Junod, DuPaul, Jitendra, Volpe, & Cleary, 2006). Vile and colleagues (2006) found that children who displayed difficulties with attention and inhibition were more than twice as likely to engage in passive off-task

behaviors. Attention difficulties in the first grade have lasting impacts on academic skills acquisition (Rabiner et al., 2016). Furthermore, children with attention difficulties perform, on average, 10 to 30 points lower on norm-referenced achievement measures than their on-task peers (Barkley et al., 1990; Brock & Knapp, 1996).

Attention, impulsivity, and activity dysregulation predict concurrent and future academic struggles (DuPaul, 2007; DuPaul & Stoner, 2014; Fergusson & Horwood, 1992). Students with behavior problems are less likely to matriculate into postsecondary education opportunities, even when their academic achievement is similar to peers who do not experience this dysregulation (Rabiner et al., 2016). Because of poor academic performance, children with attention dysregulation and related symptomatology are at greater risk than their peers for grade retention, disciplinary action referral, receipt of special education services, and high school dropout (Fischer, Barkley, Edelbrick, & Smallish, 1990).

In addition to academic performance impacts, children who exhibit difficulties with self-regulation are at-risk for social problems, finding trouble attending to or accessing and implementing social conventions that lead to less satisfying and appropriate social interactions (Carroll et al., 2006). Carroll et al. (2006) found that children with or at risk for ADHD displayed more frequent and severe off-task behaviors and were more self-isolating, preferring solitary, off-task behaviors over social engagement. In addition, younger children displayed more frequent and extreme inappropriate responses than did older children. A meta-analysis of 109 studies (N = 104,813), Ros and Graziano (2018) revealed that children with ADHD and at risk of ADHD experience more peer rejection, have less developed social skills, and struggle

with social thinking. Furthermore, children who demonstrated attention difficulties also showed weaknesses in social-information processing; accordingly, they were more likely to attribute aggressive intent in others when the objective observations or stimuli were neutral. They also overestimated their own social intent and viewed their interactions as more positive than either objective or observer evaluations would indicate.

Most students with ADHD-related behaviors receive their academic instruction in the general education environment; however, their rate of referral for special education services (IDEA/IDEIA; Individuals with Disabilities Education Improvement Act) is higher than their peer population (Barkley, 2006). Children with problems with inattention, regardless of disability designation, may receive specialized interventions, including special education services; alternately, they may exhibit difficulties that require specialized interventions or supports beyond the standard general education curriculum or classwide supports (Schnoes, Reid, Wagner, & Marder, 2006). Regardless of the service delivery model, the Every Student Succeeds Act (ESSA) and the Individuals with Disabilities Education Improvement Act (IDEIA) require educational practitioners to use evidence-based research to guide their decisions about which interventions to implement.

Among the many interventions proposed for youth who experience attention regulation difficulties are Attention Training Techniques (ATT), Attention Training(AT), Attention State Training (AST) and mindfulness (Tamm, et al., 2016; Jenson & Sprick, 2014; Tang & Posner, 2009; Semrud, et. al, 1999; Bowman, 1998). Attention Training Techniques utilize didactic instruction and student self-monitoring (Tamm, et al., 2016). Attention Training utilizes a discrete skills-teaching approach which is often facilitated by computer programs (Tang & Posner, 2009). Attention State Training and mindfulness

interventions have traditionally focused on directing attention to sensory inputs as a way of self-monitoring physiological changes in attention direction (Tang & Posner, 2009).

Despite the strengths of each approach, these interventions might not be developmentally appropriate for early elementary school children; therefore, they may be less engaging for young children. During the elementary school years, games and imagination-based activities are important for the development of self-regulation (Vygotsky, 1978). The *Play, Learn and Enjoy* curriculum (Savina, Anmuth, Atwood, Giesing, & Larsen, 2018) is a game-based intervention that engages children's imagination to foster a broad range of self-regulation skills. The current study was a means to evaluate the effectiveness of *Play, Learn, and Enjoy* curriculum (PLE; Savina, et al., 2018) in improving students' on-task behavior and inhibition control in the classroom.

Research Questions

Two research questions guided this study:

- Would the *Play, Learn, and Enjoy* curriculum intervention lead to increased on-task and decreased off-task behavior among identified second-graders?
- Would *Play, Learn, and Enjoy* interventions lead to improved performance on direct measures of executive functions including attention and inhibition control?

CHAPTER II: LITERATURE REVIEW

Theories of Attention

Researchers have explored attention from several of vantage points. A common definition of attention is that it is the ability to selectively attend some stimuli while ignoring others (Gazzaniga, Ivry, & Mangun, 2009). Korkman and colleagues ((2007) conceptualized attention as a necessary process to engage in other cognitive processes such as memory, language, and inferential reasoning. When our attention is over-taxed, we are more prone to distraction and carelessness. Individuals need attention regulation in order to focus on a particular object or stimulus while ignoring irrelevant input in order to pursue a desired goal or outcome (Miller, 2013).

Broadbent (1971) developed a model of attention that involved early selection. In his work, he distinguished between "automatic" and "controlled" attention and posited that automatic attention occurs when a sensory stimulus catches an individual's reflexive attention; this process occurs outside of conscious awareness (Gazzaniga et al., 2009). Automatic attention tends to be fast and efficient, requires minimal cognitive effort, and is difficult to suppress (Hammar, 2012). Friedenberg and Silverman (2012) found that sensory information often triggers automatic attention; triggers might include a sound's pitch or loudness or a visual stimulus's color and direction. In expanding upon Broadbent's work, Ruff and Rothbart (1996) suggested that automatic attention does not require intentional effort; instead, automatic attention occurs outside of overt conscious awareness.

In contrast to automatic attention, voluntary (controlled) attention is a conscious process by which an individual attends to stimuli that aid in the achievement of a specific

goal (Broadbent, 1958; Gazzaniga et al., 2009). Voluntary attention is intentional and requires effort (Norman & Shallice, 1986; Ruff and Rothbart, 1996). Therefore, if an individual is involved in goal-directed behavior, his or her attention is guided by an intended or desired outcome.

Broadbent (1958) also introduced the notions of selective and switching attention, which apply regardless of whether an individual's attentional processes are automatic or controlled. Accordingly, individuals attend to only one stimulus at a time, which requires focused or selective attention. Individuals target selective attention toward the most salient information. The sensory buffer allows for the selection of information that requires further processing. To reduce information overload, the pieces of information not selected by the buffer remain for a short period but ultimately degenerate, indicating that individuals can pay attention to, or select, only one system at a time. Broadbent concluded that individuals use this process as an adaptive mechanism, with the filter preventing cognition or information-processing from becoming overwhelming.

Posner and Snyder (2004) expanded upon Broadbent's (1958) work by utilizing specific sensory tasks to delineate features of attention. They determined that individuals have limited attention in both capacity and duration. Posner and Petersen (1990, 2012) described three major attentional networks: alerting, orienting, and executive networks. The alerting network involves the process by which individuals secure and sustain a state of awareness. Alerting is a signal that cues the need for the detection of important stimuli. Alerting is arousal "producing and maintaining optimal vigilance and performance during tasks" (Petersen & Posner, 2012, p. 74).

After alerted, individuals activate the orienting network while attending to a specific object, person, or event (Mullane, Lawrence, Corkum, Klein, & McLaughlin, 2016; Posner & Rothbart, 2007). The initial orienting aspects of these processes form the foundation of selective attention. After the selection reflex occurs, in conjunction with orienting and investigation, individuals' learning progresses to sustained interest or attention in an object, event, or person (Mullane et al., 2016; Ruff & Rothbart, 1996). Development of the parietal lobes accompanies further refinements in visual attention, which leads to the development of selective attention (Posner & Petersen, 1990). Subsequently, when object recognition and receptive language come online, individuals experience further refinements of auditory and visual selective attention.

The alerting and orienting systems come online in the first year of life, and humans continue to improve and refine these regulatory skills throughout infancy (Posner & Rothbart, 2007; Ruff & Rothbart, 1996). The developmental underpinnings of these processes allow infants to notice and explore novel aspects of their environment. Infants in the early stages of development already have many of their arousal functions available. The brainstem helps to regulate basic functions such as the sleep/wake cycle, which are tied to individuals' levels of alertness (Posner & Rothbart, 2007; Ruff & Rothbart, 1996). Children adequately develop these systems by early elementary-school age, with further system development through adolescence and adulthood (Mullane et al., 2016).

The third network, the executive network, activates several processes that allow an individual to attend to the correct stimulus or response when competing stimuli are simultaneously active (Mullane et al., 2016; Posner & Rothbart, 2007). Executive attention is necessary when tasks involve planning, error detection, novelty, complex

processing, or conflict (Posner & DiGirolamo, 1998). Executive attention allows one to voluntarily focus attention on selected aspects of the environment, while ignoring irrelevant stimuli that are not linked to goal directed behavior. Individuals activate a separate "executive" branch of the attentional system to regulate attention, especially in situations with several stimuli where several responses are possible (Posner & Rothbart, 2007; Holmboe & Johnson, 2005). When a conflict arises between two possible responses to an event, the executive network suppresses activity in other areas of the brain for individuals to control behavior and regulate attention. As such, the executive attention subsystem involves inhibition.

Executive attention emerges in between 3 to 4 years of age, with development of executive attention continuing into middle and late childhood. Younger children demonstrate less effective executive attention than older children (Mullane et al., 2016). The anterior cingulate region of the midbrain and the frontal and prefrontal cortices mediate executive attention (Posner & Rothbart, 2007). These systems begin to emerge in earnest around 4 to 5 years of age (Ruff & Rothbart, 1996). Children need this maturation for planning and goal-directed behavior to occur; accordingly, they maintain and refine these systems from interactions with the environment. These developments occur when individuals interact with the environment and others more knowledgeable than they (Ruff & Rothbart, 1996).

Subtypes of Attention

Attention is multifaceted. Several related subtypes of attention have been identified, including selective, sustained, and attentional switch (Barkley, 1997; Lane, 2012; Miller, 2013). Selective attention is foundational for more complex cognitive

processes. External stimuli can drive selective attention: what individuals see, hear, smell, or feel, as well as specific events or occurrences. Individuals also use selective attention to focus on internal thoughts or feelings (Ruff & Rothbart, 1996). From infancy, children develop selective attention. As discussed previously, alerting and orienting behaviors underlie the initial stages of selective attention (Petersen & Posner, 2012; Posner & Rothbart, 2007; Ruff & Rothbart, 1996). During the initial phases of selective attention development, distractions may easily draw young children's attentional resources; however, as children develop goal-driven, voluntary attentional control, they move beyond the primary purposes of orienting and investigating, to voluntary attention regulation. In the early stages of development, selective attention narrows such that children can maintain it for longer periods. As children mature and engage in selective attention, they begin to maintain focus on the factors that matter most. In the classroom, this might include students focusing their attention on teacher-led discussions while resisting the distractions of hallway noises. Students also employ selective attention while engaging in small group discussions without distraction from happenings on the playground outside of the window.

A second subtype, sustained attention, permits an individual to stay focused on an object or idea for a certain amount of time (Lane, 2012). Ideally, sustained attention occurs over a prolonged period. Students need this attention subtype to stay on task. Activities that require sustained attention might include listening to a teacher give or multistep instructions, completing independent reading, engaging in writing expression tasks, solving multistep word problems, and engaging in standardized state testing. Students also need sustained attention to complete any repetitive task.

Focused attention, a related function to sustained attention, occurs when individuals direct voluntary attention to one target, task, event, or person over others (Ruff & Rothbart, 1996). Several factors impact how long children pay attention (Ruff & Rothbart, 1996). These factors include the level of initial arousal elicited, familiarity, and complexity. Appropriate amounts of complexity, neither too simple nor too complex, demand and facilitate engagement. Additionally, students need arousal, including emotional arousal, in appropriate doses. Events or tasks with limited emotional value or events that are too exciting or distracting can cause students to compromise their sustained attention.

Individuals need alternating attention (or attentional switch) to change the focus of attention from one activity or stimulus to another in an intentional manner (Miller, 2013). Children require attentional switch when engaging in whole-group work in the classroom. Activities that require attentional switch include moving from one task to another. A common example in elementary classrooms includes moving from one reading or math center to another during guided and independent instructional center-based tasks.

Role of Inhibition in Attentional Processes

Inhibition plays an important role in attention regulation. Inhibition involves the ability to suppress responses that are not compatible with goal-oriented actions (Hofman, Schmeichel, & Baddeley, 2012). Singh, Laub, Burgard, and Frings (2018) argue that although attentional regulation and inhibition are distinct processes, an individual needs both processes when engaged in active or direct employment of either skill.

When thinking about attention regulation and impulse inhibition, the dual pathway model is an important conceptual model that is tied to these processes (Fergusson, Lynskey, & Horwood, 1997; Rapport, Scanlan, & Denney, 1999). This model posits that there are two pathways: the cognitive pathway and the behavioral pathway. Each are integral in the development of attention regulation and impulse inhibition. The cognitive pathway is concerned with interference control, which is inherent in the deployment of voluntary, executive attention. (Fergusson, et al., 1997; Rapport, et al., 1999). Cognitive interference control (or cognitive inhibition) facilitates goal-oriented behavior, filtering out interfering or counterproductive stimuli or thoughts. As mentioned previously, when individuals engage in executive attention, they must exert controlled or voluntary regulation of their attention, as well as cognitive flexibility (Mullane et al., 2016; Pozuelos et al., 2018). In order to engage in this process effectively, individuals must engage in interference control, filtering out irrelevant information that is contrary to the demands of the goal or task (Mullane et al., 2016; Pozuelos et al., 2018).

The second pathway, the behavioral pathway mediates an individual's performance through the regulation of impulses (Fergusson et al., 1997; Rapport et al., 1999). The behavioral pathway is most concerned with motor inhibition behaviors. Inhibition and attention regulation have a reciprocal relationship. Students require inhibition of motor impulses for attention regulation, and vice versa. To engage in directed and controlled attentional regulation, children must learn to override (i.e., inhibit) automatic responses. Individuals exercise motor inhibition when they stop overlearned or habitual responses that are not associated with the task at hand (e.g.,

excessive fidgeting, leaving one's seat, playing with nonessential materials in another's workspace, etc.). This skill is also necessary in the development of self-monitoring, especially when children must stop themselves from making a mistake, or self-correct errors. Students also use inhibition to facilitate a series of executive functions, including selective attention, planning, and problem-solving, as well as sustained volition and goal-directed behavior, all while simultaneously resisting off-task responses (Barkley, 2000; Carroll et al., 2006). When not inhibited, these impulsive and/or hyperactive behaviors impede individual learning and/or are disruptive to classroom learning (DuPaul & Stoner, 2014). Individual student learning and performance can be impacted by careless errors and failing to effectively attend to instructions or task demands. At its most disruptive, classroom learning may be disrupted by student behaviors such as calling out without permission, engaging with classmates in unrelated activities or discussing unrelated topics, and out-of-seat behavior.

Research confirms the reciprocal relationship between attention and inhibition. In an evaluation of Go/No-Go tasks that involved auditory stimuli for which a motor response or suppression of a motor response was required, Bedoin, Abadie, Krzonowski, Ferragne, and Marcastel (2019) found that successful completion of these tasks required both motor inhibition and auditory selective attention. They determined that in order for response inhibition to take place, participants had to employ voluntary selective attention while suppressing the automatic motor responses to press or not press a computer key. In fact, even when selective attention was facilitated through the suppression of auditory distractors, participants still had to effortfully inhibit automatic motor responses.

Attention Training Interventions

Attention Training Techniques (ATT)

One class of interventions is broadly named Attention Training Techniques (ATT). ATT interventions involve direction instruction of attention regulation strategies (Semrud-Clikeman, Nielsen, Clinton, Leihua, Parke, and Connor, 1999). Children are taught specific strategies to assist with their attention to goal directed classroom-based tasks. Semrud-Clikeman et al. (1999) evaluated the effectiveness of an attention training program to 8-12 years old children who had difficulties with attention and work completion. While all of the participants met the criteria for Attention Deficit/Hyperactivity Disorder according to the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), they were not necessarily formally diagnosed with ADHD. Thirty-three children, ages, were referred for the study. The participants in the intervention met in small groups before or after school for 60 minutes twice per week over 18 weeks. Children were trained in visual attention through increasing complex visual search tasks. Auditory attention training was completed through training children to identify letter sounds and then word targets among distractors. Each small group developed strategies for successful task completion. Following the intervention, the participants who were in the attention training intervention group performed commensurately with the non-identified control group on measures of visual and auditory attention. Reductions in teacher and parent ratings of ADHD symptoms and restless movements were also reported across rating scales. In contrast, the control group did not show significant improvement.

Another example of an ATT program is the *Pay Attention! Stop, Think & Listen* curriculum (Bowman, 1998). *Pay Attention!* trains students' selective, sustained, and divided attention as well as attention switch (Kerns, Eso, & Thompson, 1999). In this curriculum, instructors teach a daily half-hour lesson on voluntary attention to students in the school setting, providing a general explanation of voluntary attention and teaching discrete skills (e.g., stopping, thinking, and listening). Students then engage in self-reflection and task reflection on the effort a given task will require. Children further hone metacognitive skills when teachers ask them to consider the factors that indicate a task's difficulty level. Next, the teacher assists students in developing a plan for addressing specific tasks. Students then verbalize plans and strategies and receive coaching on engaging in silent talk or self-coaching. When students are ready to utilize these skills daily across demands, instructors ask children to self-monitor their attention to the task. Instructors also ask how often students practice their metacognitive verbalizations throughout the day in their daily learning and/or in social situations. Accordingly, students then receive instructor feedback so they can practice self-monitoring skill.

A more recent study by Tamm et al. (2016), examined the impact of the *Pay Attention!* curriculum on school-aged children's executive functioning skills. Through the outpatient mental health program, 23 children ages 8 to 14 years participated in 16 sessions. Post intervention measures showed improvements in children's fluid reasoning, cognitive flexibility, and working memory skills across a variety of norm-referenced psychological tests (e.g., the Wechsler Intelligence Scale for Children-Fifth Edition).

Attention Training (AT)

Another type of intervention, attention training (Tang & Posner, 2009), occurs in the context of problem-solving, working memory or other tasks involving executive functions. Rueda and colleagues (2005) examined the effect of a 5-day computer training program on the executive attention of 4-year-olds and 6-year-olds. Researchers used a matched control group for comparison; those in the control group received no intervention. Children using the Attentional Training Network computer program engaged in joystick exercises that trained several executive functions, including visual prediction, visual attention, and working memory. The authors found reported improvements in executive attention and general intelligence in both age groups who received the intervention.

On-Task in a Box

On-Task in a Box (Jenson & Sprick, 2014) is a manualized intervention in which educators utilize self-monitoring and video modeling to teach students attention skills. Students receive training to recognize on-task and off-task behaviors as well as how to monitor their own behaviors. Students also watch self-modeling videos and videos of peers engaging in appropriate on-task behaviors. Then they practice monitoring the behavior of video models who are of a similar age. After that, they begin to self-monitor their own attention. King and colleagues (2014) studied the effect of this intervention on on-task behavior in four highly inattentive students and showed improvement in on-task behaviors. Battaglia, Radley and Ness (2015) implemented the same intervention classwide and found immediate improvements in on-task behavior across all classrooms.

Blood, Johnson, Ridenour, Simmons, and Crouch (2011) utilized single-case design to evaluate the use of an iPod touch for video modeling both alone and combined with a self-monitoring intervention for a ten-year old boy. Although the participant demonstrated an increase in on-task behavior during the video modeling alone phase, results indicated variability and instability across observations. Combined video modeling and instruction showed more stable increases in on-task behavior compared to video modeling alone (Blood et al., 2011).

Mindfulness and Attentional State Training

Mindfulness practices include activities that require individuals to focus attention on personal experiences (e.g., controlled breathing), monitor potential distractions, and utilize an open and nonjudgmental awareness of mental events. Individuals who practice mindfulness increase functional connectivity within and between attentional networks (Hasenkamp & Barsalou, 2012). As such, it improves attentional control and the ability to regulate emotions and cognitions (Malinowski, 2013). A few studies show that individuals who practice mindfulness improve attention, behavioral inhibition, and other executive functions (Napoli, et al., 2005; Flook et al., 2010; Schonert-Reichl et al., 2015). Napoli, Krech, and Holley (2005) saw improvements in attention regulation after implementing a 24-week training program in which students learned breathwork, body-scan, movement, and sensory-motor awareness. Flook et al. (2010) found that school-based mindful awareness practices led to improvements in behavioral regulation and executive functioning for children ages 7 to 9. Schonert-Reichel, et al. (2015) found that a mindfulness enriched program led to improvements in 4th and 5th graders' cognitive control, among other pro-social behaviors.

Attention-state training interventions (Tang & Posner, 2009) utilize mindfulness to change attentional state through meditation or exposure to nature. This intervention presents individuals with the opportunity to focus on directing attention to sensory inputs. By learning to focus attention to physiological changes, students improve on-task and attention-state awareness. These studies have been with young adults rather than young children, so it is not known how young children would respond to this intervention.

Lutz, Slagter, Dunne, and Davison (2008) examined the impacts of meditation on attention and emotional regulation utilizing two styles of attention: focused attention meditation and open-monitoring meditation. Adult participants who practiced focused attention meditation fixed their attention on a particular object, while participants in open-monitoring meditation group were engaged in nonreactive monitoring of the content of the consciousness. Although participants who practiced open-monitoring effectively achieved states of relaxation, those who practiced focused attention meditation improved on behavioral measures of sustained and selective attention (e.g., continuous performance tests) and experienced specific neural changes associated with attention regulation.

Berman, Jonides, and Kaplan (2008) found that guided meditation when viewing pictures of nature as well as walking in nature indicated improved outcomes on the backward Digit Span tasks and the Attention Network Task in college undergraduates. Tang and Posner (2009) showed that undergraduates who took three hours of Integrative Body-Mind Training (IMBT) experienced increased activity in their anterior cingulate cortices, the part of the brain linked to improvements in attention-regulation. In a follow-up study, Tang, Oilin, Geng, Stein, Yang & Posner (2010) evaluated the outcomes associated with 11 hours of IMBT. In comparison to a control group, intervention

participants demonstrated improved conflict scores on the Attention Network Test and reported decreases in anxiety, depression, anger, and fatigue on self-report ratings.

Play, Learn, and Enjoy (PLE) Curriculum Overview

PLE is a game-based regulation and socio-emotional learning curriculum for elementary school children that connects attention and self-regulation skills with socio-emotional competencies (Savina et al., 2018). The curriculum consists of fifteen one-hour lessons. The design of the curriculum is a thematic format in which children, together with story characters, go on imaginary adventures into the wilderness. Students "travel" to mountains, a desert, a rainforest, and the Arctic; they take a riverboat trip and go ocean sailing and snorkeling. The curriculum activities are contextual, meaningful, imaginative, experiential, and collaborative. The curriculum trains children in a broad range of self-regulation competencies, including neurocognitive functions (voluntary attention, working memory, and inhibition), strategic skills (time-management, planning, and organization), self-reflection and self-monitoring, and emotion regulation. *PLE* activities also promote social competencies, including listening, communication, and collaboration skills.

The present study was aimed at understanding the impact of the curriculum on attention and inhibition skills in elementary school children.

CHAPTER III: METHODOLOGY

Purpose of the Study

This study was an examination of the outcomes of a small group intervention, *Play, Learn, and Enjoy*, designed to train children's self-regulation skills (Savina et al., 2018). Specifically, the lead researcher facilitated intervention groups using the *PLE* curriculum to second-grade children. At the outset of the pilot study, the expected outcomes were as follows:

- Participants would increase on-task behavior and decrease off-task behavior in the classroom.
- Participants would improve their performance on direct measures of attention and inhibition control.

Recruitment Procedures, Participants, and Setting

Six children participated in the study, recruited through a convenience sample from a second-grade classroom at a K-to-5 elementary school in a small city in Western Virginia. Of the school's student population, 84.6% of children were eligible for free or reduced lunch. The student body was ethnically and racially diverse, comprised of 58.7% Latino students, 30.5% White students, 7.5% Black students (African American, Caribbean American, and African), 2.6% multiracial students, and 0.7% Asian students. Over 11% of the student body received special education services, and all students primarily received instruction in general or inclusion classrooms rather than a self-contained environment. The classroom teacher referred children for participation in the study. Referred students displayed attentional and behavioral difficulties (e.g., impulsivity) as informally assessed by the classroom teacher.

Upon identifying a student for participation, the teacher contacted the student's parents or guardians to let them know the researcher was available to answer any questions. Each guardian received an informed consent to sign (see Appendix B). The lead researcher was available for individual meetings with parents before, during, and after the study to discuss aggregate results; however, no parents requested additional informational meetings. No parent or child requested exclusion from data collection. In addition to the parental informed consent, participating students received a child-friendly assent form (see Appendix C).

The *PLE* intervention took place in the second-grade classroom because a separate group meeting space was not available. Fortunately, research has suggested that observations conducted in a naturalistic setting tend to diminish competing variables, as the students are all familiar with the learning hierarchies and rules (Carroll et al., 2006). The children are also familiar with the other members of the intervention group. All of these parameters are considered conducive when conducting naturalistic intervention research (Carroll et al., 2006).

Table 1 presents participant demographics and attendance. Below that, is detailed information about each participant.

Table 1

Participant Demographics and Attendance

Pseudonym	Sex	Age at baseline	Age at maintenance	ELL services	Race/ ethnicity	Observation absences	Intervention session absences
Hank	M	07-04	07-08	None	White	0	0
Samuel	M	07-11	08-04	None	White	1	0
Maria	F	06-10	07-02	Consultation	African/Black	4	1
Chris	M	07-02	07-07	Monitor	Latino/Hispanic	6	5
Ivan	M	07-02	07-07	Consultation	Latino/Hispanic	9	3
Xavier	M	07-04	–	None	Multiracial	13	6

Hank

Hank, a seven-year-old White male, had attended this elementary school since kindergarten and had consistent attendance throughout the school year, including during the intervention study. The classroom teacher reported being concerned with his impulsivity, especially his lack of verbal inhibition. The teacher said these difficulties had impacted his class participation, his social relationships, and his attention to detail on classwork.

Samuel

Samuel is a Caucasian boy who was seven-years-old at the time of referral. He had been at this current elementary school since kindergarten with consistent attendance throughout the school year, including during the intervention study. Samuel's classroom teacher reported being most concerned with his passive off-task behavior and carelessness, as well as his impulsivity—specifically, his lack of motor inhibition. She reported that these difficulties had impacted his class participation and his attention to detail on classwork.

Maria

At the time of referral, Maria was a six-year-old second-grader who turned seven during the intervention study. Maria, who is of West African descent, had been at this current elementary school since kindergarten with consistent attendance throughout the school year, including during the intervention study. Although her family speaks the language of their country of origin, Maria only understands simple sentence structure in her parents' language. The family speaks English with the children; accordingly, the language assessment conducted by the school (i.e., WIDA) indicated that she is proficient

in English, requiring only consultative services for English language learners. Maria's classroom teacher was most concerned with Maria's difficulties with sustained attention and her lack of attention to details on classwork and the speed with which she completed classwork.

Chris

At the time of referral, Chris was a seven-year-old second-grader. He had been at this current elementary school since the beginning of this school year, having moved with his family from a U.S. territory after a natural disaster left them without reliable housing and schooling. The family is Latino and was living with extended family. Although Chris's mother and grandmother speak Spanish, the family uses English more often, especially when conversing with Chris and his siblings. Language assessments conducted by the school (i.e., WIDA) indicated that Chris is proficient in English, requiring only monitoring services for English language learners.

Ivan

At the time of referral, Ivan was a seven-year-old second-grader. He is Latino and has been at this elementary school since first grade. Although Ivan's parents speak Spanish, Ivan uses English with his siblings. Language assessments conducted by the school (i.e., WIDA) indicated that he was nearly proficient in English, requiring consultative services for English language learners. During this study, Ivan first moved to another classroom after two baseline observations and then returned to his original classroom. Both moves were due to census changes at the school. Although Ivan participated in the intervention and post-intervention observations, he was not present for the baseline observation beyond the initial week. In addition, Ivan's attendance was lower

due to illness, including twice coming down with influenza. His school absences resulted in missed intervention lessons (November 9, Lesson 2; January 28, Lesson 10; and March 1, Lesson 15) as well as missed classroom observations. Ivan's referring classroom teacher was most concerned with his sustained attention and verbal inhibition difficulties, which she said impacted his class participation and his ability to engage in sustained work.

Xavier

At the time of referral, Xavier was a seven-year-old second-grader. He is multi-racial, having enrolled at this elementary school at the beginning of this school year and moving to another school toward the end of the intervention phase of the study. His attendance at school was inconsistent. Therefore, in addition to moving before the completion of the study, Xavier was not present for some observations and intervention lessons: Lesson 7 (December 14), Lesson 9 (January 25), Lesson 11 (February 4), Lesson 13 (February 19), Lesson 14 (February 25), and the final session and wrap up (March 1). The reason for Xavier's extremely poor attendance is unknown. Xavier's classroom teacher referred him for the intervention study, reporting being most concerned with his difficulties with sustained attention as well as verbal and motor inhibition. She indicated that these difficulties impacted his class participation and his ability to engage in sustained work.

Research Design

Procedures

A single-subject, A-B-A^1, concurrent baseline across participants design was utilized. In addition, pre- and post-intervention measures of attention and inhibition were

administered. Single-case design is one of the preferred methods of assessing the effectiveness of interventions for children (Schottelkorb & Ray, 2009; Silverman & Hinshaw, 2008). Moreover, several researchers recommend using single-case designs when evaluating the effectiveness of counseling or therapy interventions for individuals, including examining and explaining individual behavior change (Kaminski & Claussen, 2017; Morgan & Morgan, 2003; Sharpley, 2007).

Baseline (A) Phase

Three weeks prior to the *PLE* group intervention, trained research assistants conducted timed naturalistic observations using the Behavior Observation of Students in Schools (BOSS) method. The initial phase, the baseline (A) phase entailed collecting a minimum of seven observations per child for all but one participant using the BOSS method. This student, Ivan, was observed only twice. Each observation lasted ten minutes and was broken into fifteen-second intervals. Therefore, there were 40 intervals for each observation. Research assistants made observations during math and language arts instruction.

The BOSS observational system was used to designate on-task and off-task behaviors. Using a paper-and-pencil method and a timer, the trained research assistants noted at the beginning of each interval if a student was on-task. On-task behaviors were noted using a momentary time sampling strategy. A partial interval method to note off-task behaviors was used during the remainder of the fifteen-second interval.

All six participants also completed pre-intervention testing using the NEPSY-II. The lead researcher administered participants the Inhibition and the Auditory Attention and Response Set subtests to measure inhibition, selective attention, and sustained

attention. All components of the subtests were administered to five of the six participants. One participant, Maria, did not complete the baseline administration of the Response Set task due to her age (< seven-years-old at baseline). Error analyses were completed for all participants, including how frequently students self-corrected their errors.

Intervention Phase (B)

***Play, Learn, and Enjoy* curriculum**. The intervention phase consisted of delivering *Play, Learn and Enjoy* curriculum. The lead researcher served as the group leader and held *PLE* intervention sessions twice per week during the traditional school day, barring holidays, teacher workdays, and inclement weather closures. The intervention consisted of the 15 group lessons from the *PLE* curriculum, which were delivered across 23 total group meetings.

The group facilitator implemented *PLE* curriculum with fidelity to the model with some additions. Based on the needs of the students in the intervention group, the group leader provided additional scaffolding for self-regulation in the early sessions. For example, some students struggled with staying seated. The group facilitator implemented the directions for attention used by the teacher in the classroom. Specifically, students received prompts to check their eyes, ears, hands, and feet for location and position. The group facilitator added to these cues "This means I am paying attention because it is important" at the end of each call-and-response sequence. The group facilitator also clearly discussed and modeled the relationship between these prompts and behavior in the beginning stages of the intervention. Students received explicit teaching to ensure they understood what attending and inhibition behaviors looked like. For all sessions, the group facilitator provided positive-labeled praise to students who demonstrated the

aforementioned attending behaviors and recognized successive approximations at the beginning of the intervention. Additionally, due to university and school district breaks, students experienced interruption of intervention groups during the months of December and January, as indicated in the reporting of results.

Implementation procedures. The intervention group stayed in the general education classroom during remediation time. During the intervention, nonparticipating students stayed at one end of the classroom, with intervention group members at a table on the opposite side of the classroom. The nonparticipating students either worked independently on enrichment activities or collaborated with their classroom teacher or other specialists on remediation activities. During the intervention phase, research assistants used the BOSS protocol to conduct twice-weekly systematic observations for each participant during mathematics and/or language arts instruction.

Maintenance Assessment (A^1)

Following the intervention phase, research assistants collected maintenance data. For four participants, research assistants made a minimum of eight maintenance observations, with the other two participants receiving limited maintenance observations due to absences of one and a move for the other. Five of the six participants also completed post-intervention testing using the NEPSY-II. The lead researcher administered participants the Inhibition and the Auditory Attention and Response Set subtests to measure inhibition, selective attention, and sustained attention. As with the baseline assessments, error analyses completed included how frequently students self-corrected their errors. Researchers did not collect post-intervention NEPSY-II data for the sixth student NAME due to his move. In addition to the aforementioned assessments,

qualitatively, at the conclusion of the intervention group, the children's teacher provided feedback on what, if anything, she had noted for each participant. She also shared information from those students' parents who participated in a parent-teacher conferences.

Dependent Variable Measures

Behavior Observation of Students in Schools (BOSS)

The BOSS (Shapiro, 2013) is a time-sampling observation procedure used to assess students' on- and off-task behaviors. The research assistants conducted BOSS observations in the classroom. Naturalistic settings such as the classroom are considered the best practice in assessing classroom behavior (Hintze, Volpe, & Shapiro, 2002). The BOSS is characterized by a high level of inter-rater reliability and less time-intensive fidelity training than other comprehensive protocols (Hintze et al., 2002; Volpe et al., 2005). Researchers conducted observations using a paper-and-pencil method of recording. Both research assistants received approximately 15 hours of training, including supervision for practice and administrations.

The behaviors observed with the BOSS were on-task and off-task behaviors. The BOSS defines on-task behaviors as active engaged time (AET) and passive engaged time (PET). Off-task behaviors include motor behaviors not associated with the task at hand (e.g., fidgeting, leaving one's seat, playing with nonessential materials in another's workspace), verbal behaviors (e.g., humming, talking to a peer, talking out when a response was not expected or requested), and passive off-task behaviors (e.g., looking around the room, looking out of the window, staring).

While the off-task behaviors tracked by the BOSS are straightforward, there are important distinctions between the on-task behaviors of AET and PET. Students with AET are actively engaged in a specific response (e.g., answering questions aloud, leading a group discussion, demonstrating a task). It is important to note that while the BOSS defines AET as a subtype of on-task behavior, on-task behavior is one of the variables that require for active engagement. While it is necessary for children to be attending to instruction or the tasks at hand, it is also necessary that the opportunity for an active response be provided. Therefore, in order for a child to engaged in AET, there are a number of factors that must be present. The lesson must be designed in such a way as to elicit an active response; and, even if the child attends and raises their hand, they must also be called upon. Therefore, low frequency of AET may not necessarily reflect a lack of attention, but also be a result of low opportunity for students to actively respond. In contrast to AET, PET does not require that a response be specifically elicited by the teacher or group members. Students who exhibit PET attend to instruction or a task (e.g., reading to self, attending to the teacher when engaged in lecture, attending to written material on a whiteboard). This study will be most concerned with evaluating PET, as well as the off-task behaviors noted.

BOSS Inter-Observer Agreement

The research assistants received training to utilize the Behavior Observation of Students in Schools (BOSS) observation method with fidelity. As a part of formal training, the research assistants engaged in practice coding with one another and with the lead researcher until they reached at least 90% inter-observer agreement (IOA). After

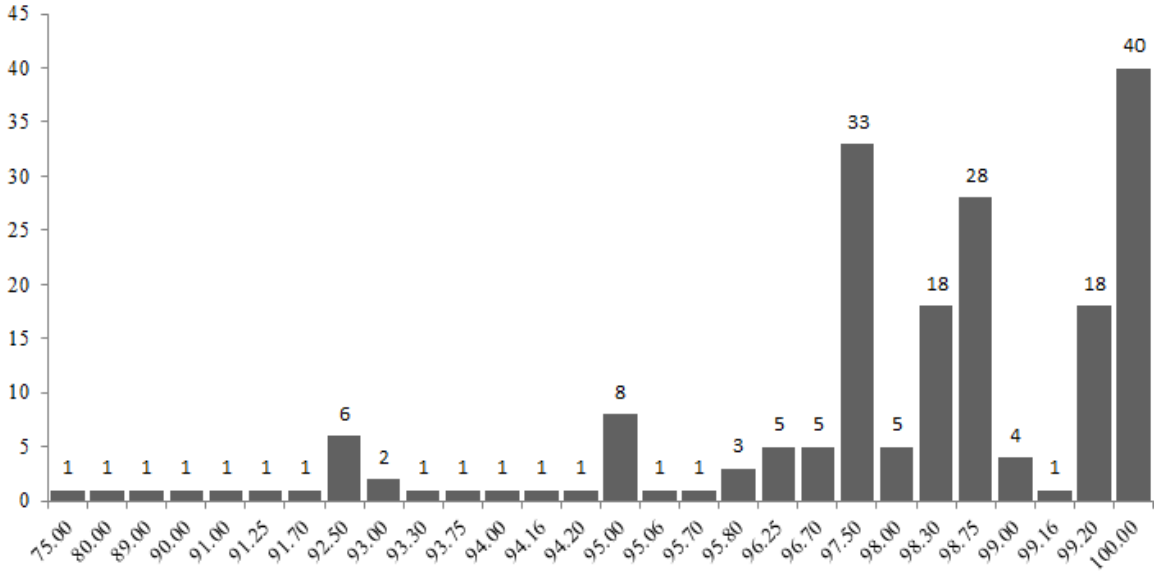
reaching 90% agreement during training, the research assistants were then cleared to complete study-related observations.

In order to obtain IOA, both research assistants observed the same participant at the same time. Tracking and review of inter-observer agreement occurred at weekly research meetings. The minimum aim for IOA was at least 70% agreement for all observations. Inter-observer Agreement (IOA) involves comparing simultaneous but independent observations (Johnston & Pennypacker, 2009).

Figure 1 reflects Total Agreement IOA frequencies. Total Agreement IOA is a procedure in which the total count of observational notations is summed; and, then, the smaller total is divided by the larger total in order to obtain the percentage of agreement for an individual's observation. For this study, the minimum agreement target was at least 70% total agreement for all recorded observations. As Figure 1 indicates, the Total Agreement IOA was 75% or higher for all observations, with agreement ranging from 75% to 100%. The mean Total Agreement IOA was 97.62% and the mode was 100%.

Figure 1

Observation Integrity: Frequency Count of Total Agreement IOA

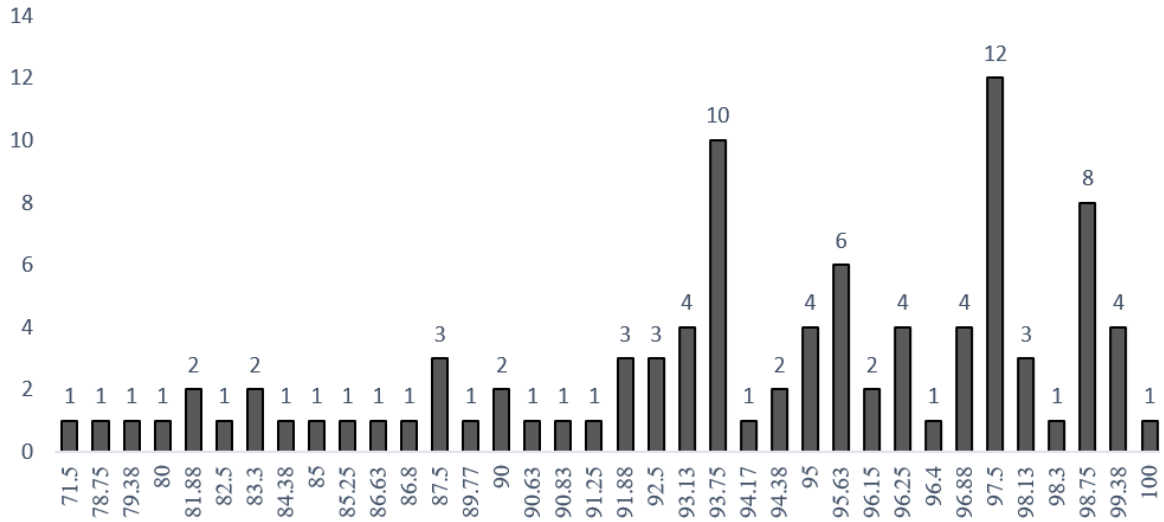


When calculating IOA for formal observations, it is recommended that when agreement is low or high that a more conservative IOA procedure also be used. For this study, prior to data collection, it was decided that in cases where the Total Agreement IOA was less than 30% or greater than 70% agreement that Occurrence versus Nonoccurrence IOA be calculated. Occurrence versus Nonoccurrence IOA is a more conservative approach for interval recording procedures, such as the BOSS. This procedure involves calculating the percentage of inter-observer agreement for both occurrences (scored intervals) and nonoccurrences (unscored intervals) (Johnston & Pennypacker, 2009).

Because the Total Agreement IOA was greater than 70%, the Occurrence versus Nonoccurrence IOA procedure was utilized. As Figure 2 indicates, Occurrence versus Nonoccurrence IOA was at least 71.5% for all observations, with a range from 71.5% to 100%. The mean IOA was 92.49% and the mode for IOA was 97.5%. Even when considering the more stringent occurrence versus nonoccurrence procedures, these data are considered reliable across raters.

Figure 2

Observation Integrity: Frequency Count of Occurrence versus Nonoccurrence Agreement IOA



Visual Analysis Strategies for BOSS Data

Visual analyses of graphed data utilize a four-step process (Kratochwill et al., 2010; Kratochwill & Levin, 2014). First, the baseline data underwent analysis for stability. Generally, baseline data are considered stable if the trend remains constant or is opposite of the direction from what the researcher expects for behavior change due to intervention. Next, the intervention phase data underwent analysis for patterns, with the intervention observational data next compared to the baseline data to determine noted changes in on-task and off-task behavior. Finally, post-intervention data underwent analysis and comparison with the trends noted among the baseline and intervention phases. Visual examination of the aforementioned analyses was a means to identify the following trends: level (i.e., mean for each phase), trend (i.e., slope), variability (i.e., the range of data and deviations from the trend), the immediacy of the intervention effect, overlap of data, and the consistency of data patterns within and across subjects for each

phase (Kratochwill et al., 2010). Ideally, there would be consistent patterns and limited variability among the data points for the baseline data collection. When there are fewer inconsistencies and immediate effects, these patterns are considered more desirable during the analysis of treatment effect (Kratochwill et al., 2010).

A Developmental Neuropsychological Assessment – Second Edition (NEPSY-II)

The NEPSY-II was used to measure baseline and post-intervention sustained and selective attention skills as well as inhibition control for each group participant. Specifically, the Auditory Attention and Response Set subtest, as well as the Inhibition subtest, served as pre- and post-intervention measures. These subtests measure selective and sustained attention, as well as inhibition skills. Error analyses completed on the NEPSY-II included how frequently students self-corrected errors. The reliability for each of the subtests used for this study is adequate to strong (Korman, Kirk, & Kemp, 2007).

CHAPTER IV: RESULTS

The goal of the present pilot study was to determine the outcomes of the small group, *Play, Learn, and Enjoy* curriculum intervention, which among other skills, is designed to train children in attention regulation skills. In the first section, the overall group results will be presented. Following those summaries are the means for total on- and total off-task behaviors for the group. These results are then followed by the means for detailed on- and off-task behaviors. Next, the NEPSY-II pre- and post-measure results are summarized for the group. Finally, detailed results for each of the aforementioned areas are presented and discussed for each participant.

Group Results

Behavior Observation of Students in School (BOSS) Results

Table 2 presents the means of total on- and off-task behavior for all participants. These data are reflected for all phases of the study.

Table 2

Means of Total On- and Off-Task Behavior for All Participant

Participant	*On*-task baseline	*On*-task intervention	*On*-task maintenance	*Off*-task baseline	*Off*-task intervention	*Off*-task maintenance
Hank	70.94	86.10	84.00	69.31	65.39	28.81
Samuel	60.23	82.89	90.94	72.95	77.50	35.93
Maria	67.69	83.39	87.76	73.06	76.40	27.81
Chris	79.13	84.34	81.39	72.21	61.65	32.18
Ivan	–	86.11	71.88#	–	81.61	37.50#
Xavier	75.01	80.71	–	79.86	73.21	–

Note. – = no data available; # = fewer than six data points.

Overall, the results suggest increases in on-task and decreases in off-task behavior. The increases in on-task behavior are most notable among students who had regular attendance and participation in the intervention (Hank, Samuel, and Maria).

Unfortunately, for two participants, Ivan and Xavier, insufficient data were gathered to make comparisons across all three phases of the study. Ivan was not present for the collection of baseline observational data, and Xavier moved prior to the completion of the intervention phase. Ivan also missed three intervention sessions due to illness, and Xavier missed six intervention sessions for excused and unexcused reasons. In addition to Ivan and Xavier, Chris, while sufficiently present for pre- and post-intervention observations, had sporadic attendance during the intervention phase of the study (six intervention session absences for both excused and unexcused reasons).

Detailed Data for On-Task Behaviors

As a reminder, on-task behaviors are defined as Active Engaged Time (AET) and Passive Engaged Time (PET). AET does require the opportunity to engage in a response. PET is characterized by attending to instructions or a task (e.g., reading to self, attending to the teacher when engaged in lecture, attending to written material on a whiteboard).

Table 3 presents the mean Active Engaged Time (AET) and Passive Engaged Time (PET) for all participants.

Table 3

Mean Active Engaged Time (AET) and Passive Engaged Time (PET)

Participant	*AET* baseline	*AET* intervention	*AET* maintenance	*PET* baseline	*PET* intervention	*PET* maintenance
Hank	6.99	3.63	3.75	63.96	82.49	84.00
Samuel	2.05	1.45	5.63	58.18	81.18	85.31
Maria	3.02	0.60	3.13	69.06	81.18	84.64
Chris	8.69	1.28	16.67	70.44	83.06	64.72
Ivan	–	3.87	12.50#	–	83.49	56.50#
Xavier	0.71	0.83	–	74.37	81.53	–

Note. – = no data available; # = fewer than six data points.

The results for Active Engaged Time are mixed and variable. Chris demonstrated increases in his active on-task behavior at maintenance, after declines during the

intervention phase. To a lesser degree, Samuel demonstrated a similar pattern of results. Hank's AET demonstrated a decline from baseline. As discussed previously, it is important that AET is also understood in terms of the opportunities a child has to engage in an active response. The results showed that for the students who had consistent attendance, their Passive Engaged Time increased. These increases were noted for Hank, Samuel, and Maria. Chris demonstrated slight increases in on-task behavior during the intervention, but these increases did not continue during the maintenance phase. Data for all three phases was insufficient for Ivan and Xavier.

Detailed Data for Off-Task Behaviors

As a reminder, the off-task behaviors include tracked motor, verbal, and passive off-task behaviors (Shapiro, 2004). Motor off-task behaviors are those not associated with the task at hand (e.g., fidgeting, leaving one's seat, playing with nonessential materials in another's workspace), off-task verbal behaviors are unrelated to the task (e.g., humming, talking to a peer, talking out when a response was not expected or requested), and passive off-task behaviors (e.g., engaging behaviors such as looking around the room, looking out the window, and staring). The results for each participant are summarized in Tables 4-6.

Table 4

Mean Motor Off-Task Behavior (BOSS)

Participant	Motor off-task baseline	Motor off-task intervention	Motor off-task maintenance
Hank	38.40	49.31	11.88
Samuel	56.88	63.06	26.25
Maria	27.92	58.12	16.45
Chris	43.45	36.44	10.83
Ivan	–	60.56	15.63#
Xavier	48.09	57.83	–

Note. – = no data available; # = fewer than six data points.

Table 5

Mean Verbal Off-Task Behavior (BOSS)

Participant	Verbal off-task baseline	Verbal off-task intervention	Verbal off-task maintenance
Hank	31.61	16.77	14.38
Samuel	16.67	17.5	4.06
Maria	24.58	20.91	3.17
Chris	15.36	24.77	8.06
Ivan	–	20.41	5.63#
Xavier	44.66	23.07	–

Note. – = no data available; # = fewer than six data points.

Table 6

Mean Passive Off-Task Behavior (BOSS)

Participant	Passive off-task baseline	Passive off-task intervention	Passive off-task maintenance
Hank	34.39	26.75	14.69
Samuel	31.25	30.00	17.81
Maria	42.60	43.96	12.98
Chris	37.42	32.37	19.44
Ivan	---	34.47	23.12#
Xavier	38.07	39.17	---

Note. – = no data available; # = fewer than six data points.

Declines in off-task motor behavior were apparent for all participants who completed the study. Five of the six participants showed an increase in mean motor behavior during the intervention phase, followed by fairly dramatic declines during the maintenance assessment phase. For verbal off-task behavior, declines were apparent for the five participants who completed the study. Four students exhibited notable declines during the maintenance assessment phase, as well, with similar trends noted for passive off-task behaviors.

NEPSY-II Pre- and Post-Intervention Assessment Results

The NEPSY-II was used a means to measure baseline and post-intervention sustained and selective attention skills, as well as inhibition, for each group participant. Specifically, the Auditory Attention and Response Set, and Inhibition subtests were

administered. The error analyses completed for the NEPSY-II included how frequently students self-corrected errors. The Auditory Attention and Response Set subtests measures selective and sustained attention; the inhibition of motor impulses is also necessary for successful performance. Five subjects participated in the pre- and post-intervention administration of the Auditory Attention subtest. Xavier moved before the intervention was complete.

Table 7

NEPSY-II Auditory Attention and Response Set Scores

	AA total correct		AA combined		RS total correct		RS combined	
Participant	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
Hank	5	**8***	3	**8***	3	**14***	2	**12***
Samuel	4	7	3	5	2	**11***	2	**13***
Maria	8	9	7	9	N/A	14	N/A	14
Chris	2	**12***	1	**12***	2	**15***	1	**12***
Ivan	1	**7***	2	**6***	1	**10***	4	**12***
Xavier	4	---	4	---	2	---	2	---

Note. NEPSY-II average scaled scores range from 8–12. Scaled scores have a mean of 10 and a standard deviation (*SD*) of 3. **(* = significant improvement**; N/A = less than 7 years old; – = attrition).

Three of the five participants demonstrated significant improvements in their total correct responses, and in their combined Auditory Attention results. The combined measure merges a participant's response time with their accuracy. Specifically, results for Hank, Chris and Ivan indicated between one and three standard deviation improvements in their performance. Samuel and Maria demonstrated improvements, but their results were not significant. For Response Set, four participants engaged in the pre- and post-intervention assessment. Maria was unable to participate in the pre-intervention assessment due to her age. All four of those for whom complete data are available demonstrated significant improvements in their total correct and combined Response Set performance. Three to four standard deviation improvements were noted for all participants. The Inhibition subtest is comprised of three components: the Inhibition-

Naming, Inhibition-Inhibition, and Inhibition-Switching tasks. The Inhibition-Naming subtest is most closely associated with selective and sustained attention.

Table 8

NEPSY-II Inhibition Errors and Inhibition – Naming Scores

	Inhibition total errors		Inhibition naming time		Inhibition naming combined	
Participant	Pre-	Post-	Pre-	Post-	Pre-	Post-
Hank	10	10	6	8	7	**12***
Samuel	5	1	8	8	6	**12***
Maria	9	10	10	11	9	9
Chris	8	10	1	**7***	7	6
Ivan	8	**12***	5	**8***	6	**10***
Xavier	5	---	8	---	12	---

Note. NEPSY-II average scaled scores range from 8–12. Scaled scores have a mean of 10 and a standard deviation (*SD*) of 3. **(* = significant improvement**; N/A = less than 7 years old; – = attrition).

Not unlike the results for Auditory Attention, three participants (Hank, Samuel, and Ivan) demonstrated significant improvements when their performance speed and accuracy are considered. One to two standard deviations improvement is noted for each participant. The Inhibition-Inhibition and the Inhibition-Switching tasks measure motor and verbal inhibition, as well as selective and sustained attention are necessary for successful completion of the associated tasks.

Table 9

NEPSY-II Inhibition – Inhibition and Inhibition-Switching

	Inhibition-Inhibition Time		Inhibition-Inhibition.Comb.		Inhibition-Switching Time		Inhibition-Switching Comb.	
Participant	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
Hank	6	8	7	8	8	8	8	8
Samuel	9	9	5	**10***	19	**7**	10	3
Maria	9	11	9	10	N/A	9	N/A	10
Chris	6	**11***	6	**10***	7	8	8	10
Ivan	7	9	6	**12***	7	8	8	**12***
Xavier	7	---	6	---	10	---	6	---

Note. NEPSY-II average scaled scores range from 8–12. Scaled scores have a mean of 10 and a standard deviation (*SD*) of 3. **(* = significant improvement**; N/A = less than 7 years old; – = attrition).

Samuel, Chris, and Ivan also showed one to two standard deviations improvement on the Inhibition-Inhibition subtest, a measure of inhibition and selective and sustained attention. On the most complex subtest, only one student demonstrated significant improvement (Ivan).

When error analyses for each participant were conducted, while improvements in scaled scores were inconsistent, the results suggest that four participants improved in their ability to self-monitor their responses. Specifically, the following students showed improvements in their self-correction rates on the most complex of the Inhibition subtests, Inhibition-Switching: Hank (16% to 96%), Samuel (60% to 82%), Chris (21% to 100%), and Ivan (23%-100%). It is important to note that for the other two participants, incomplete data impacted the analyses. Maria was not old enough to participate in these analyses due to incomplete data due to her age. Xavier did not complete post-intervention assessments.

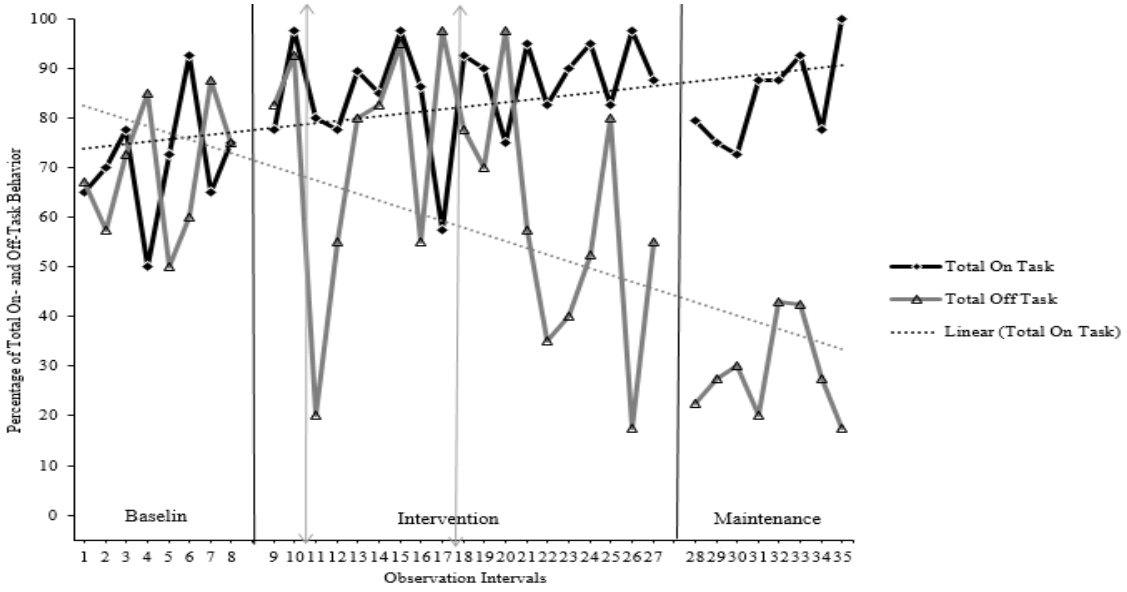
Results for Each Participant

Hank

Hank is a seven-year-old White male. He had consistent attendance throughout the school year, including during the intervention study. Hank's classroom teacher reported being concerned with his impulsivity, especially his lack of verbal inhibition.

Figure 3

BOSS Total On- and Off-task Behavior



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

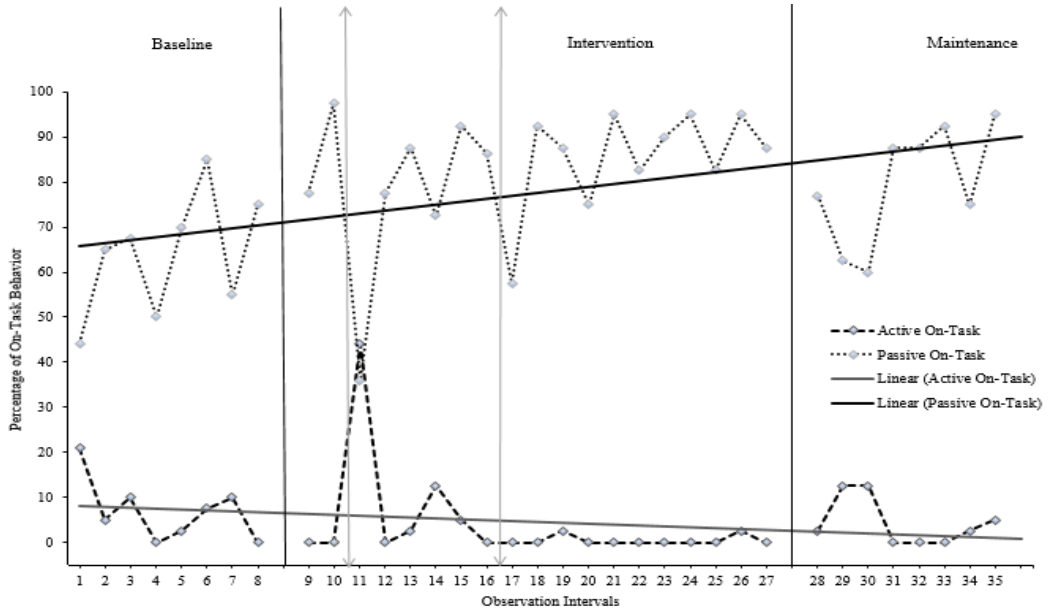
Behavioral observations indicated increases in Hank's on-task behavior and declines in his off-task behavior. Specifically, at baseline, Hank was on-task for an average of 70.94% of the 10-minute observation period. During the intervention phase, he improved his average on-task percentage to 86.1% and slightly decreased during the maintenance assessment phase (84.0%). Hank displayed off-task behaviors at baseline for an average 69.31% of the 10-minute observation period. Hank exhibited considerable variability during the intervention phase, but his average off-task behavior declined slightly (65.39%).

For Hank, there were the fluctuations that occurred immediately preceding a break and the improvements noted after resuming the intervention. For example, before the Thanksgiving break (Interval 10), Hank's off-task behaviors occurred for 82.5% and 92.5% for the observations intervals. After returning from break, his off-task behavior

declined to 20% and 50%. It is important to note that he had only engaged in two group sessions prior to Thanksgiving break. A more extended spike appeared before and after winter break. It is also important to note that there the winter break in the intervention lasted for four weeks. Before the break (intervals15-17), Hank's off-task behavior was at 82.5%, 95%, and 55%; after the resumption of group interventions, his off-task behavior remained between 70% and 97.5% during the subsequent four observation intervals that occurred during January. There was a decline for both intervals, 21 and 22, beginning in February (57.5% and 35%). It is also important to consider the data trends in light the variability across all observations, which is consistent with students who have or are at risk for ADHD, who demonstrate more inconsistencies with attention to task (Rapport, Kofler, Alderson, Timko, & DuPaul, 2009). For Hank, his mean off-task behavior declined to 28.8% during the maintenance phase.

Figure 4

BOSS Detailed On-task Behavior Observations – Hank



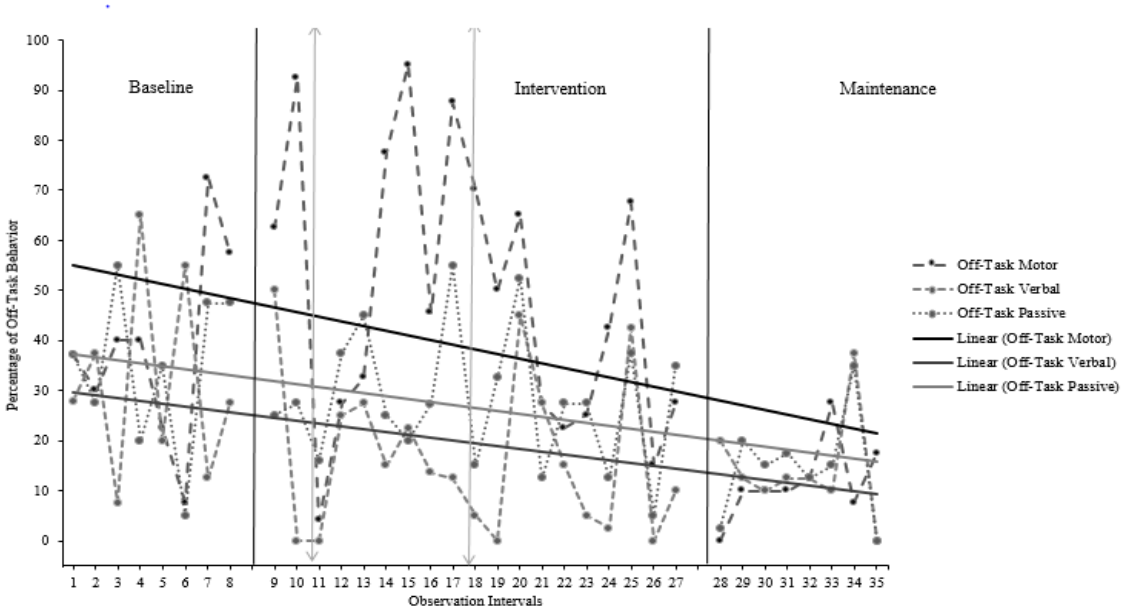
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The most notable increases were regarding Hank's passive on-task behavior. Specifically, Hank's baseline, on average, was 63.96%; across the intervention phase, his passive engagement increased to 82.49%. Post-intervention, during the maintenance assessment phase, his passive engagement increased further to 84%.

Hank's active on-task data are suggestive of slight decline over time. At baseline, Hank's average active engagement was 6.99%. During the intervention and maintenance assessment phases, his mean active engagement was 3.63% and 3.75%, respectively. Prior to Thanksgiving break, which occurred between sessions 10 and 11, Hank's passive on-task behavior was at its highest noted point (97.5%), but it drastically declined to 36% immediately upon return from Thanksgiving. His active engagement shows an inverse decline and a spike. Specifically, he was at 0% active engagement before the break and increased to 44% active engagement immediately following, which was his highest level of active engagement over the study. This level may be due to the class activities that day; unfortunately, the research assistants did not note the nature of the activities observed. The second break was winter break (sessions 16 and 17). For the observations immediately preceding winter break, Hank's active engagement was low (0%), and upon resumption of observations and intervention, his performance remained unchanged at 0%.

Figure 5

Detailed Off-task Behavior Observations – Hank



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The results indicated declines in each of Hanks's off-task behaviors. Specifically, at baseline, Hank's motor off-task behavior averaged 38.4%, increasing to 49.31% during the intervention phase. His mean off-task motor behavior then declined dramatically during the maintenance assessment phase (11.88%). The research assistants commented during research meetings that Hank's off-task motor behavior appeared differently across the study timeline. Specifically, his out-of-seat behavior declined (as it did for most students); however, they noted that for Hank (and other students), that he was standing and shifting in the seats while remaining passively engaged in tasks became more common as time passed. There were noted declines with each phase for verbal and passive off-task behaviors. Specifically, for verbal off-task behaviors at baseline, Hank's mean was at 31.61%. During the intervention phase, this declined to 16.77% on average; however, the research assistants noted considerable variability. During the maintenance

assessment phase, his off-task percentage declined slightly (14.38%). For Hank's off-task passive behavior, the declines were more gradual in the beginning and more drastic during the post-intervention phase. His mean percentages for passive off-task behavior were 34.39% (baseline), 26.75% (intervention), and 14.69% (maintenance).

Fluctuations also emerged with breaks. Prior to the Thanksgiving break (Interval 10), Hank exhibited very elevated motor off-task behavior (92.5%), with a steep decline immediately following break (20%). These fluctuations, however, are not likely to be related to the intervention, as he had only participated in two groups prior to the November break. An additional spike in his motor activity occurred during the second week of December, but then gradually declined after returning in January. His verbal off-task behavior remained low before and after Thanksgiving break, whereas heightened verbal off-task behavior occurred variably across all intervention months. For passive off-task behaviors, there were declines immediately following both Thanksgiving and winter breaks, but these declines did not remain stable. Again, it is important to keep in mind that fluctuations also occurred that were unrelated to breaks.

NEPSY-II results. On the Auditory Attention and Response Set subtest, Hank demonstrated improvement across all subtests. Specifically, Hank's pre-intervention performance on the Auditory Attention portion, a measure of selective and sustained attention, fell in the Below Expected Level (ScS = 5) for his accuracy prior to the intervention. Post-intervention, his accuracy performance improved to the Average range (ScS = 8). When considering accuracy and inhibition errors, Hank also demonstrated positive skill acquisition. Specifically, before the intervention, his performance was in the Well Below Expected range (ScS = 3); this improved to the At Expected Level post-

intervention (ScS = 8). Post-intervention, Hank improved in his ability to respond selectively while sustaining attention, as indicated by fewer omission errors. Moreover, his inhibition skills aided in resisting commission and inhibitory errors.

The Response Set portion of the subtest measures children's ability to shift their attention while inhibiting previously learned responses. Hank's accuracy improved dramatically, from the Well Below Expected Level (ScS=3) pre-intervention to a scaled score of in the Above Expected Level (ScS=14), post-intervention. With accuracy and inhibition-related errors combined (Response Set Combined), his performance also improved dramatically; pre-intervention, his score was in the Well Below Expected Level (ScS = 2) and post-intervention, his performance improved to the upper limits of the Expected Level (ScS = 12).

Although the subtests require inhibition for the successful completion of the tasks, the second subtest, Inhibition, is a timed measure designed specifically to evaluate a child's ability to inhibit automatic verbal and motor responses. There was more variability in Hank's performance across the phases of this subtest. For the Inhibition-Naming portion of the test, a measure of sustained and switching attention, Hank's performance remained consistent but his efficiency improved. For task completion time, his performance remained the same (ScS = 8 for pre- and post-intervention). He became more efficient, however, making no errors post-intervention (ScS = 6 pre-intervention; ScS = 12 post-intervention) and improving his time somewhat, from 75 seconds to 68 seconds.

For the Inhibition-Inhibition portion, a task that requires inhibiting an automatic verbal response while engaging in sustained attention, Hank's time remained consistent

again (ScS = 9 for pre- and post-intervention). His efficiency improved and he made fewer errors post-intervention (ScS = 5 pre-intervention, ScS = 10 post-intervention). Pre-intervention, he self-corrected 21% of his errors (3/14); post-intervention, he self-corrected all of the errors he made (4/4). The results indicate that in addition to efficiency, Hank also improved in his ability to monitor his task performance in real-time.

The most complex aspect of the Inhibition subtest, Inhibition-Switching, requires multiple executive functions, including sustained, selective and switching attention, verbal inhibition, and working memory. Specifically, children taking this subtest use working memory to remember the color-dictated rules regarding whether to name a stimulus or inhibit the automatic response. Unfortunately, Hank's skills for this portion of the subtest declined post-intervention. Because Hank's speed slowed for the post-intervention assessment and he made more errors, his overall scaled scores declined (ScS = 19 to ScS = 7 for Inhibition-Switching time; and ScS = 10 to ScS = 3 for Inhibition-Switching Combined). Qualitatively, however, his self-corrections improved for the post-intervention assessment. Before the intervention, he made 19 errors, only 16% of which he self-corrected (3/19); post-intervention, he made 53 errors but self-corrected 96% of them (51/53).

Qualitative observations. Throughout the group, Hank reported identifying with the *PLE* character Jamal, a leader who easily becomes impatient with others when they do not agree with his ideas. During the initial sessions of group, Hank appeared most concerned with finishing first. He would also become irritated, sometimes shutting down briefly, when not immediately praised for his efforts. Especially in the early phases of the

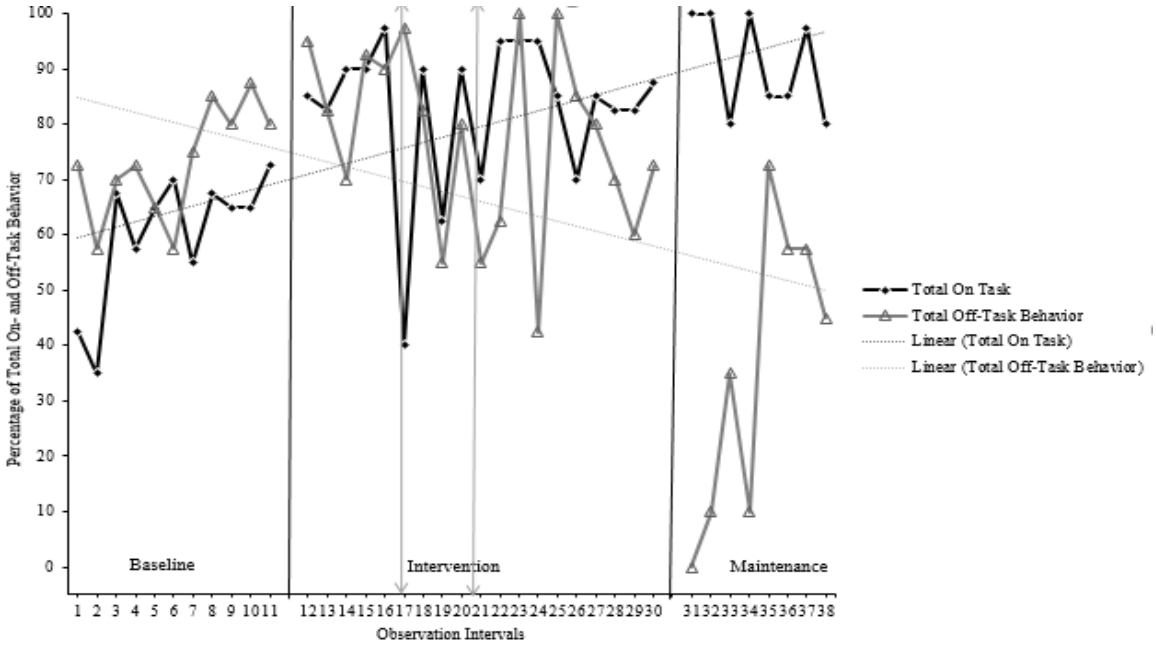
group intervention, Hank received coaching, which he eventually verbalized, including self-reminders (e.g., “It is more important to be correct than to be fast” or “Look at [my] body; am [I] calm and are [my] muscles helping me to focus?”). Hank also responded well to utilizing the same strategies that Jamal used in the stories to help him remain more patient with others and himself in completing tasks, especially those that required group planning and execution. For example, during the third session, when asked to fix the leak in a boat, Hank repeated the directions that Jamal provided: “We need to stay calm. How can we solve the problem?” In this initial session, while he attempted to repeat the directions modeled, he did not wait to hear what suggestions his other group members had without coaching from the facilitator. In later sessions, although he continued to provide his suggestions first, Hank improved in his ability to hear others’ ideas and vote on the best solution to a problem. For example, during session 10 (Artic Excursion – Day 1), Hank was among the first to offer solutions for how to land the helicopter safely, but he also listened to the other possible solutions offered by his group members. All students, including Hank, agreed to vote on the best solution after processing the pros and cons of each suggested plan. Qualitatively, his teacher reported observing him to repeat the coaching statements he had learned during the group intervention (e.g., “It is more important to be correct than to be fast;” or, “Look at [my body], am I calm and are my muscles helping me to focus?”). These external verbalizations appeared to help him with his sustained attention and remaining in his seat for seat work. During the third quarter conference, she further indicated that Hank’s parents reported seeing him engage in similar self-talk and to improve in his availability to consider other’s ideas when planning family activities.

Samuel

Samuel is a Caucasian boy who was seven-years-old at the time of referral. He had consistent attendance during the intervention study. Samuel's classroom teacher referred him, reporting being most concerned with his passive off-task behavior and carelessness as well as his impulsivity. She specifically, reported that Samuel frequently experienced difficulties with motor inhibition, including a high activity level.

Figure 6

BOSS Total On- and Off-task Behavior Observations – Samuel



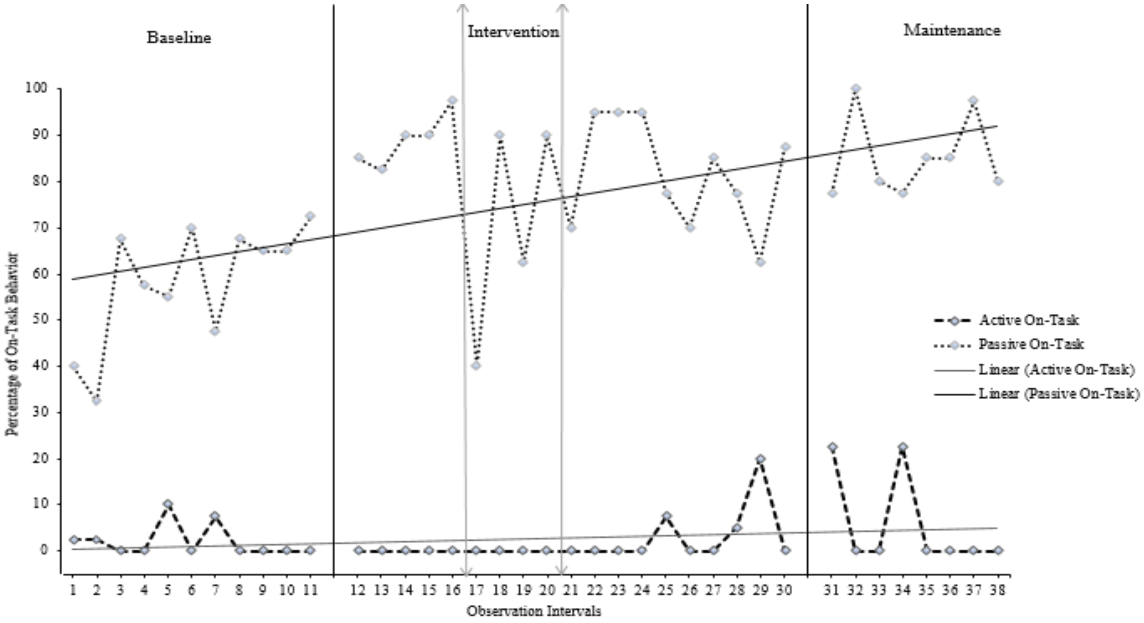
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The results indicated increases in Samuel's on-task behavior and declines in his off-task behavior. Specifically, at baseline, Samuel was on-task for an average of 60.23% of the observation periods. During the intervention phase, he improved his average on-task behavior to 82.89%. At baseline, Samuel displayed off-task behaviors for an average 72.95% of the 10-minute observation period. He exhibited considerable variability during the intervention phase but his average off-task percentage increased slightly (77.5%).

There are no notable impacts of the Thanksgiving and winter breaks; however, he, like others, displays fluctuations across observations. This is not unexpected, given fluctuations that are common with children who experience attention dysregulation (Rapport, Kofler, Alderson, Timko, & DuPaul, 2009).

Figure 7

BOSS Detailed On-task Behavior Observations – Samuel



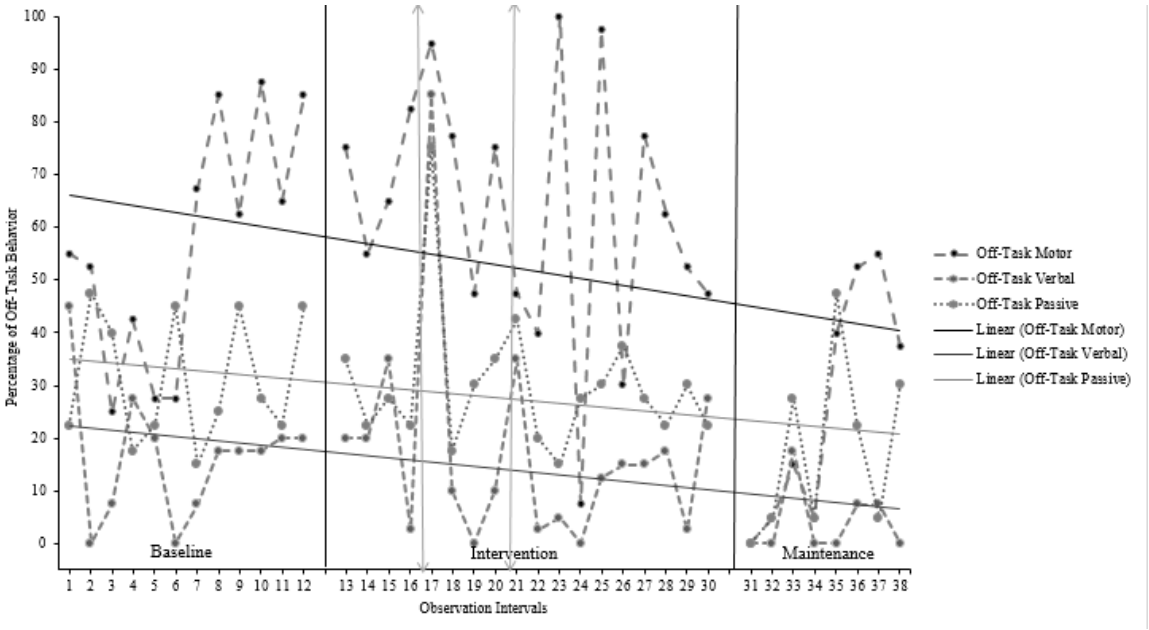
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The most notable increases were observed in Samuel's on-task skills appeared in his passive on-task behavior. Specifically, his baseline, on average, was 58.18%. Across the intervention phase, his passive on-task behavior increased to 81.18%, with further increase during the post-intervention maintenance assessment phase to 85.31%. Samuel's active on-task behaviors slightly increased from the baseline phase to the post-intervention phase. At baseline, Samuel's active on-task was at 2.05%, on average, a number that declined to 1.45% during the intervention phase. With the maintenance assessment phase, his mean active engagement increased to 5.63%.

Prior to Thanksgiving break, Samuel's passive on-task behavior was at its highest point (97.5%) but drastically declined to 40% immediately upon return. His active on-task showed no change across any of the intervals, remaining at 0%. For the observations immediately preceding winter break (sessions 20 and 21), Samuel's active on-task behavior was low (0%), remaining unchanged upon the resumption of observations and intervention. There was more variability across observations of his passive on-task behavior. His pre–winter break passive on-task behavior of 90% declined to 70% upon the resumption of observations and intervention groups. His trends for passive engagement continued to improve thereafter, but with variability.

Figure 8

Detailed Off-task Behavior Observations – Samuel



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

In general, the results showed declines in Samuel's off-task behavior, which averaged 56.88% at baseline and 49.31% during the intervention phase. As was the case with other observational data, his mean off-task motor behavior declined dramatically

during the maintenance assessment phase (26.25%). It is important to note the qualitative differences with his motor off-task behaviors. Specifically, although his out-of-seat behavior declined, Samuel engaged in more standing and shifting in his seat while remaining passively engaged in tasks. For verbal off-task behaviors, Samuel's mean percentage at baseline was 16.67%; during the intervention phase, this increased slightly to 17.5% on average, yet with considerable variability. During the maintenance assessment phase, his off-task percentage declined precipitously to 4.06%. There was a negligible decline between the baseline and intervention phases; however, his average passive off-task behaviors noticeably declined during the maintenance phase. His mean percentages for passive off-task behavior were 31.25% (baseline), 30% (intervention), and 17.81% (maintenance).

NEPSY-II results. Across the Auditory Attention and Response Set subtest, Samuel demonstrated improvement on both portions of the subtest. Samuel's performance on the Auditory Attention task, a measure of selective and sustained attention, fell in the Below Expected Level (ScS = 4) for his accuracy prior to the intervention. Post-intervention, his accuracy performance improved but remained somewhat below average (ScS = 7). When considering accuracy and inhibition errors, Samuel also demonstrated positive skill acquisition. Specifically, before the intervention, his performance was in the Well Below Expected range (ScS = 3); this improved but remained in the Below Expected Level range (ScS = 5). Post-intervention, Samuel improved in his ability to selectively respond while sustaining his attention, as indicated by fewer omission errors. Moreover, his inhibition skills aided in resisting commission

and inhibitory errors. Unfortunately, these skills did not improve to average levels when compared to same-age peer norms.

Samuel's Response Set performance, a subtest that requires shifting attention while inhibiting previously learned responses, improved post-intervention. Specifically, Samuel's accuracy improved dramatically, from the Well Below Expected Level (ScS=3), pre-intervention to the Expected Level (ScS=11), post-intervention. With accuracy and inhibition-related errors combined (Response Set Combined), his performance also improved dramatically: Pre-intervention, his score was in the Well Below Expected Level (ScS = 2) and post-intervention his performance improved to the upper limits of the Above Expected Level (ScS = 13). Post-intervention, Samuel improved in his ability to selectively respond while sustaining his attention, as indicated by fewer omission errors. Moreover, his inhibition skills aided in resisting commission and inhibitory errors, with his total correct responses increasing from 15 to 31. Samuel's Omission errors (sustained attention) decreased from 21 to 5, Commission errors decreased from 15 to 1, and Inhibitory errors decreased from 7 to 1.

Inhibition is a timed measure designed to evaluate a child's ability to inhibit automatic verbal and motor responses. Across all associated measures, Samuel's performance improved to varying degrees, but less dramatically than on the previous measures. For the Inhibition-Naming portion of the test, a measure of sustained and switching attention, Samuel's performance improved significantly (ScS = 7 pre-intervention to ScS = 12 post-intervention). For task completion time, he improved his performance speed by 13 seconds, scoring ScS = 6 pre-intervention and ScS = 8 post-intervention. He also became more efficient, making no errors post-intervention for

Inhibition-Naming. In the Inhibition-Inhibition portion, a task that requires inhibiting an automatic verbal response while engaging in sustained attention, his time improved slightly (ScS = 6 pre-intervention and ScS = 8 post-intervention). His efficiency remained consistent (ScS = 8 for both pre- and post-intervention) and his self-correction rate improved from 83% to 100%. Finally, the most complex aspect of the Inhibition subtest, Inhibition-Switching, requires multiple simultaneous executive functions including sustained, selective and switching attention, verbal inhibition, and working memory. Specifically, children use working memory to remember the color-dictated rules regarding whether to name a stimulus or inhibit the automatic response. Here, Samuel's skills remained consistent (ScS = 8 pre- and post-intervention). Qualitatively, however, his self-corrections improved in the post-intervention assessment, from 60% to 82%.

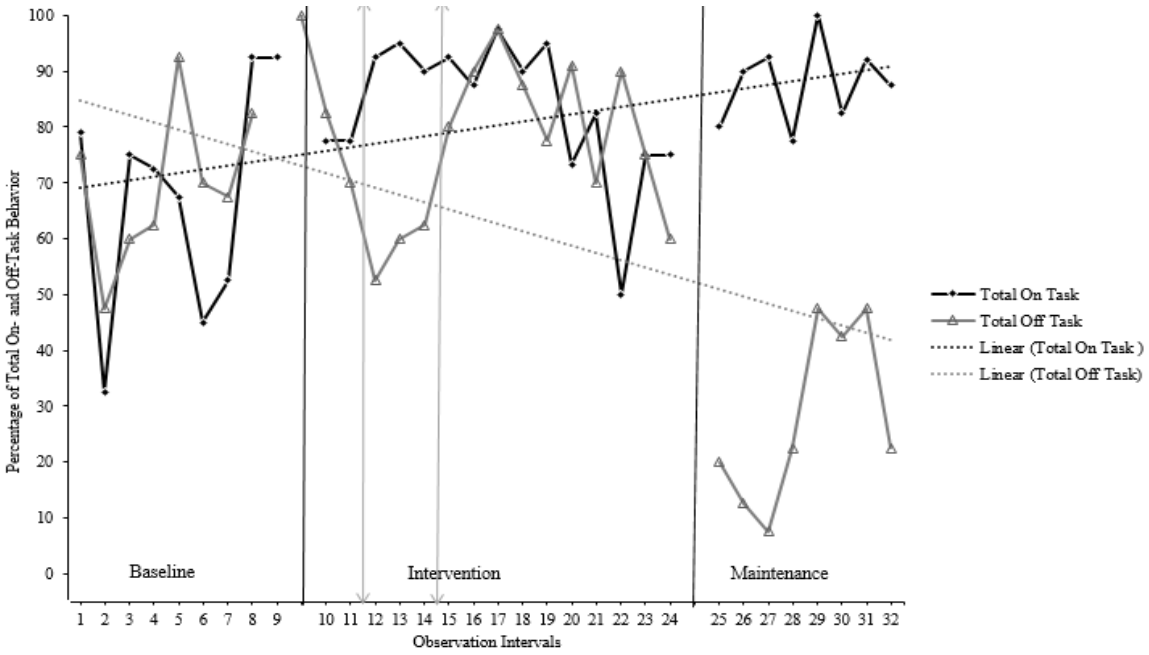
Qualitative observations. During the initial sessions of group, Samuel appeared most concerned with finishing quickly and was often out of his seat (e.g., standing, "flossing," and other out-of-seat behavior). Samuel responded well to positive verbal praise and coaching and immediately began to use verbal coaching strategies. As with others, his verbalizations included self-reminders (e.g., "It is more important to be correct than to be fast" or "Look at [my body]; am I calm and are my muscles helping me to focus?"). Like Hank, Samuel's parents and teacher also reported having observed him to repeat the coaching statements and reminders used during the intervention group. During the third quarter conference, Samuel's parents shared with the teacher that homework time had been less contentious. They had also observed seeing Samuel engage in similar self-talk, which seemed to help with his persistence, and he required less coaching or intervention from his parents.

Maria

At the time of referral, Maria was a six-year-old second-grader who turned seven during the intervention study. Maria, of West African descent. She had consistent attendance throughout the school year, including during the intervention study. Maria's classroom teacher referred her to the intervention, being most concerned with Maria's passive off-task behavior.

Figure 9

BOSS Total On- and Off-task Behavior Observations – Maria



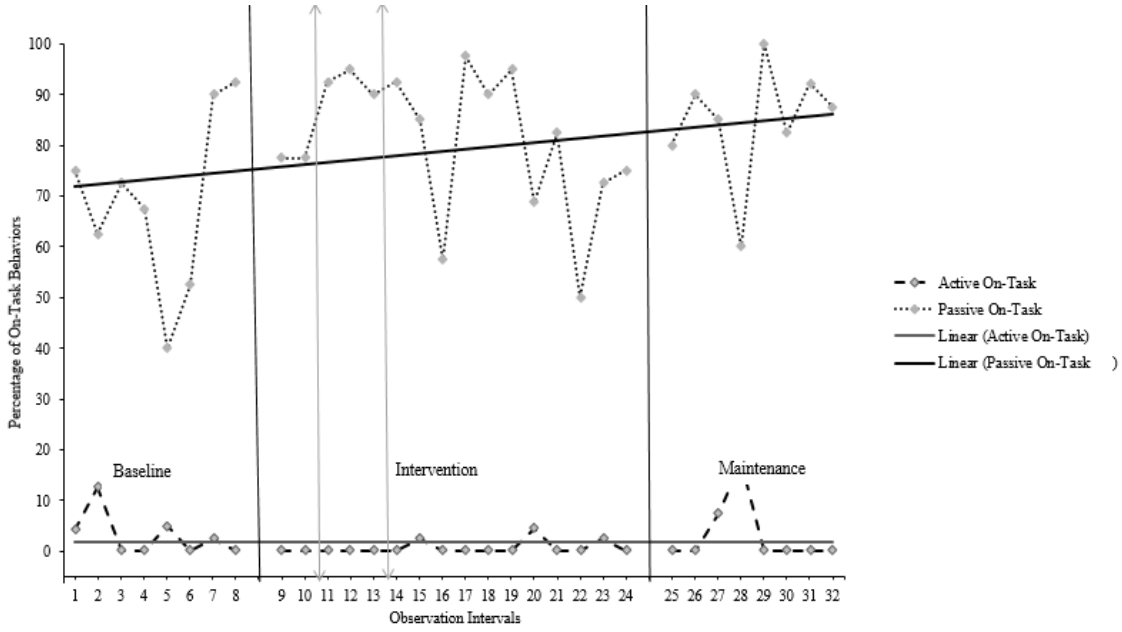
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The results indicated overall increases in Maria's on-task behavior and declines in her off-task behavior. At baseline, Maria was on-task for an average of 67.69% of the observation periods. During the intervention phase, she improved her average on-task percentage to 83.39%. At baseline, Maria displayed off-task behaviors for an average of 73.06% of the 10-minute observation period. During the intervention phase, she showed considerable variability, but her average off-task percentage increased slightly (76.4%).

Notable were some of the fluctuations that occurred for her, as well. Before and after the Thanksgiving break, Maria's off-task behavior continued to decline, with her on-task behavior simultaneously improving. Her on-task behavior continued to improve, even before and after the winter break. In contrast, her off-task behavior increased after winter break. For example, she increased to 87.5% to 97.5% for off-task behavior for intervals 17-19, with declining trends before these dates. There were fluctuations after February 4, with her task-related observations becoming stable toward the end of the intervention period. Maria's mean off-task behavior declined to 27.81% during the maintenance phase.

Figure 10

BOSS Detailed On-task Behavior Observations – Maria



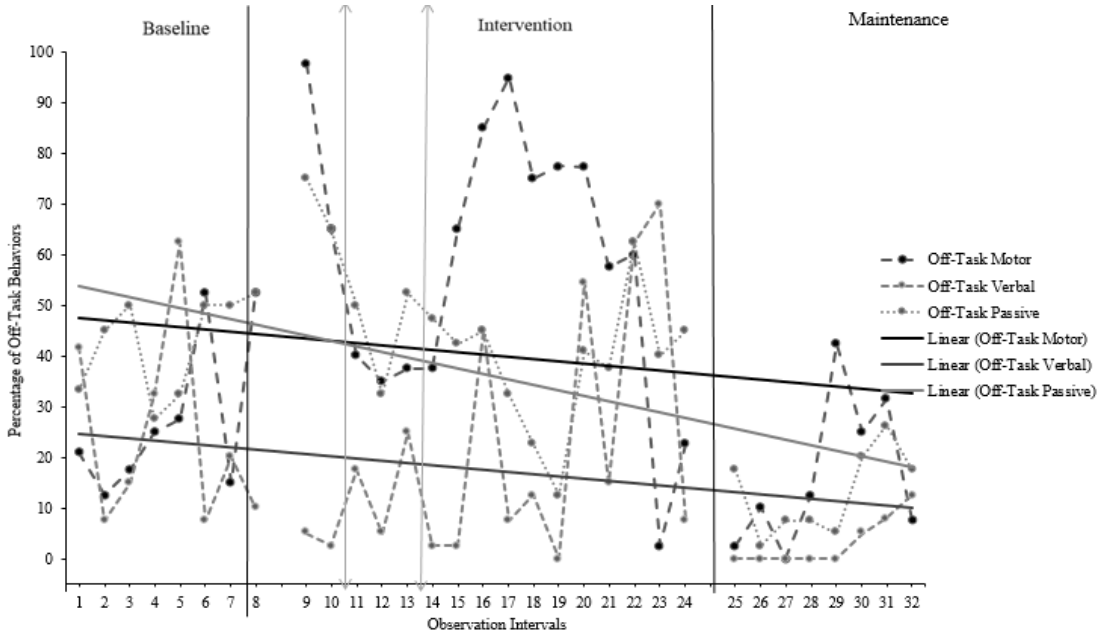
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

Maria's on-task behavior at a baseline, on average, was 69.06%. Across the intervention phase, her passive on-task behavior increased to 81.18%; post-intervention,

during the maintenance assessment phase, it increased further to 84.64%. Maria's active on-task behaviors remained static overall, with slight variability when analyzed closely. At baseline, Maria's active on-task behavior was at 3.02% on average; however, during the intervention phase, it declined to 0.60%. With the maintenance assessment phase, her mean active on-task behavior returned to baseline levels (3.13%). Overall, there were no notable changes in Maria's on-task performance prior to or following breaks. Her on-task behavior around intervention breaks, declined in on Interval 16 (Christmas break), Interval 22, and Interval 28. Heightened active on-task behavior emerged particularly for Interval 28, which may be more reflective of the activity type the class was engaged. Unfortunately, the research assistants did not record the nature of the classroom activity.

Figure 11

Detailed Off-Task Behavior Observations – Maria



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

At baseline, Maria's motor off-task behavior averaged 27.92% and increased to 58.12% during the intervention phase. As had been the case with other observational data, her mean off-task motor behavior declined dramatically during the maintenance assessment phase (16.45%). For verbal off-task behaviors, Maria's mean baseline was 24.58% and primarily consisted of checking with others about how to approach a task or verbalizing her insecurities. During the intervention phase, this score decreased slightly to 20.91% on average, with further decline of her of-task percentage (4.06%) during the maintenance assessment phase. For her off-task passive behavior, the declines persisted across the phases. There was a negligible decline between baseline (24.58%) and intervention (20.91%), but her average passive off-task behaviors further declined during the maintenance phase (3.17%). Maria demonstrated variability across the intervention phase as a whole.

NEPSY-II results. Across all measures, Maria's skills did not significantly change; however, it is important to consider the extent to which she may have been experiencing more anxiety-related off-task behavior. On the Auditory Attention and Response Set subtest, Maria's performance for accuracy (Auditory Attention Total Correct) fell within the Expected Level for both the pre- and post-intervention assessment. There were negligible improvements (ScS = 8 pre-intervention and ScS = 9 post-intervention). When considering accuracy and inhibition errors, Maria also demonstrated slight positive skill acquisition. Specifically, before the intervention, her performance was in the borderline range (ScS = 7); post-intervention, her performance fell in the Expected Level range (ScS = 9).

Qualitatively, Maria's error rates improved. Post-intervention, Maria improved in her ability to selectively respond while sustaining her attention, as indicated by fewer omission errors (from 8 pre-intervention to 3 post-intervention). Moreover, her inhibition skills aided in resisting commission and inhibitory errors (from 10 errors to 3 errors). Maria was not old enough to participate in the baseline measure for Response Set, so only post-intervention results are available. Response Set requires shifting attention while inhibiting previously learned responses, which improved post-intervention, as Maria's accuracy was Above Expected Levels (ScS = 14). When accuracy and inhibition-related errors are combined (Response Set Combined), her performance was also strong (ScS = 14).

Inhibition is a timed measure designed to evaluate a child's ability to inhibit automatic verbal and motor responses. Across all associated measures, Maria's performance did not change significantly. For the Inhibition-Naming portion of the test, more a measure of sustained and switching attention, Maria's performance remained stable and within age expectancies (ScS = 9 for pre- and post-intervention). For task completion time, her performance speed improved by 8 seconds, which resulted in scores of ScS = 10 pre-intervention and ScS = 11 post-intervention. Her error rate also remained minimal but consistent, as did self-corrections (67%). The Inhibition-Inhibition task required inhibiting an automatic verbal response while engaging in sustained attention. Here, her time improved slightly (ScS = 9 pre-intervention and ScS = 11 post-intervention). Remaining consistent was her efficiency (ScS = 9 for both pre- and post-intervention) and self-correction rate (100%). Finally, the most complex aspect of the Inhibition subtest, Inhibition-Switching, requires multiple simultaneous executive

functions including sustained, selective, and switching attention, verbal inhibition, and working memory. Specifically, the children used working memory to remember the color-dictated rules regarding whether to name a stimulus or inhibit the automatic response. Again, Maria was not old enough to participate in the pre-intervention assessment; her post-intervention performance was average across all domains (Completion Time ScS = 10; Combined ScS = 9).

Qualitative observations. Maria was rather reserved in group initially. She was hesitant to offer her thoughts, even when encouraged to do so. She frequently looked to others' work before initiating activities as well. As group progressed, while she remained concerned about comparing her performance to others, she initiated tasks independently. With modeling, she was also able to reframe her focus on comparing her early task performance to the improvements she made with later activities. Maria's teacher also reported noting improvements in Maria's willingness to take chances on her learning, as well as better sustained attention to her work. In fact, Maria was made a peer coach, one of six in her class. Specifically, after discussions with the teacher about Maria's performance anxiety, she requested that Maria help others when they are filling "stuck or discouraged." Maria shared her delight in this appointment with the facilitator when this appointment was made in mid-February.

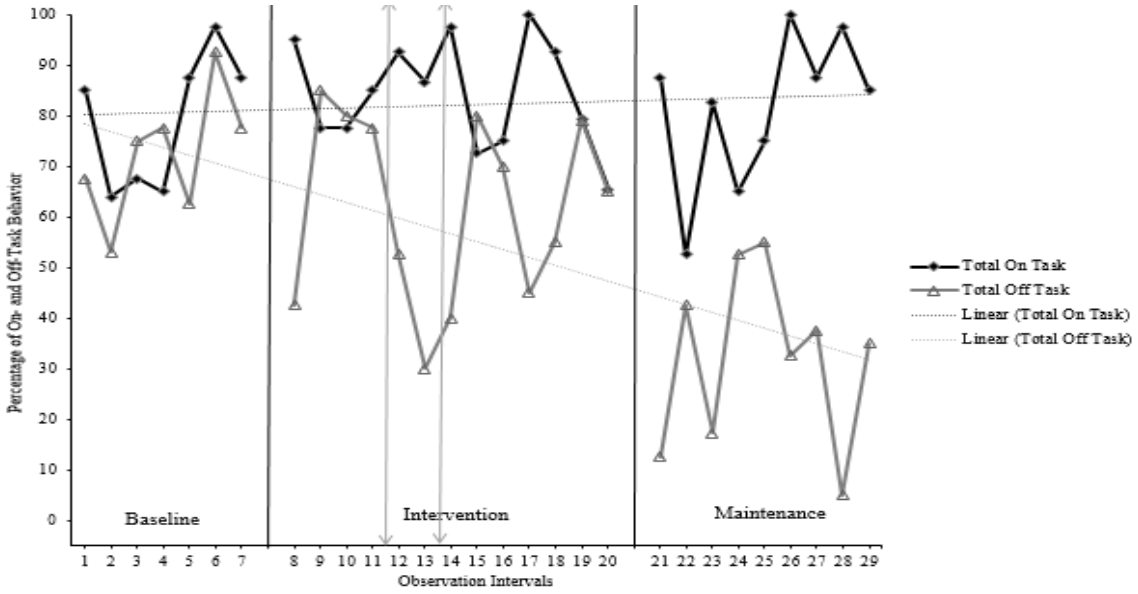
Chris

At the time of referral, Chris was a seven-year-old second-grader. He was new to the elementary school that participated in this pilot study, having moved with his family from a U.S. territory after a natural disaster left them without reliable housing and

schooling. The family is Latino and was living with extended family. His teacher was concerned with his passive on-task behavior and motor inhibition.

Figure 12

BOSS Total On- and Off-task Behavior Observations– Chris



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

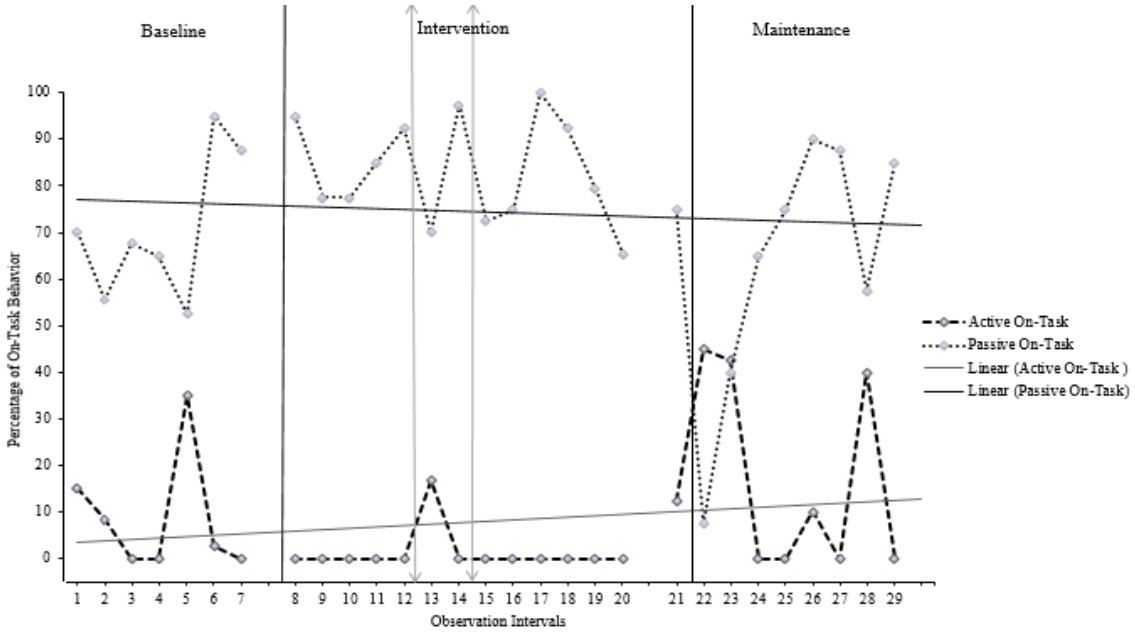
The results indicated slight increases in Chris's on-task behavior and dramatic declines in his off-task behavior. The declines in his off-task behavior are especially interesting, as his attendance was sporadic during the intervention phase. At baseline, Chris was on-task for an average 79.13% of the 10-minute observation period. During the intervention phase, he improved his average on-task percentage to 84.34%. Compared to his baseline performance, there was a slight increase in his overall on-task behavior during the maintenance phase (81.39%); however, this was a slight decline compared to the intervention phase of the study.

At baseline, Chris displayed off-task behaviors for an average 72.21% of the 10-minute observation period. During the intervention phase, Chris exhibited considerable

variability, especially with off-task behaviors; however, his average off-task percentage declined (61.65%). There were also fluctuations during the intervention phase. Chris tended to increase his off-task behavior following a break. Also, of note is that most of Chris's absences occurred between observation Intervals 13 to 16, a period during which he was more off-task and less on-task behavior. As observed in other children, Chris's off-task behavior during the maintenance phase declined considerably (32.18%).

Figure 13

BOSS Detailed On-task Behavior Observations– Chris



Note: Thanksgiving and winter breaks are demarcated by gray arrows.

At baseline, on average, Chris demonstrated passive on-task behavior 70.44% of the time. Across the intervention phase, his passive on-task behavior increased to an average of 83.06%. Again, however, he missed five intervention sessions. During the post-intervention maintenance assessment phase, his passive on-task behavior decreased to below baseline observations (64.72%). Chris's active on-task slightly increased over

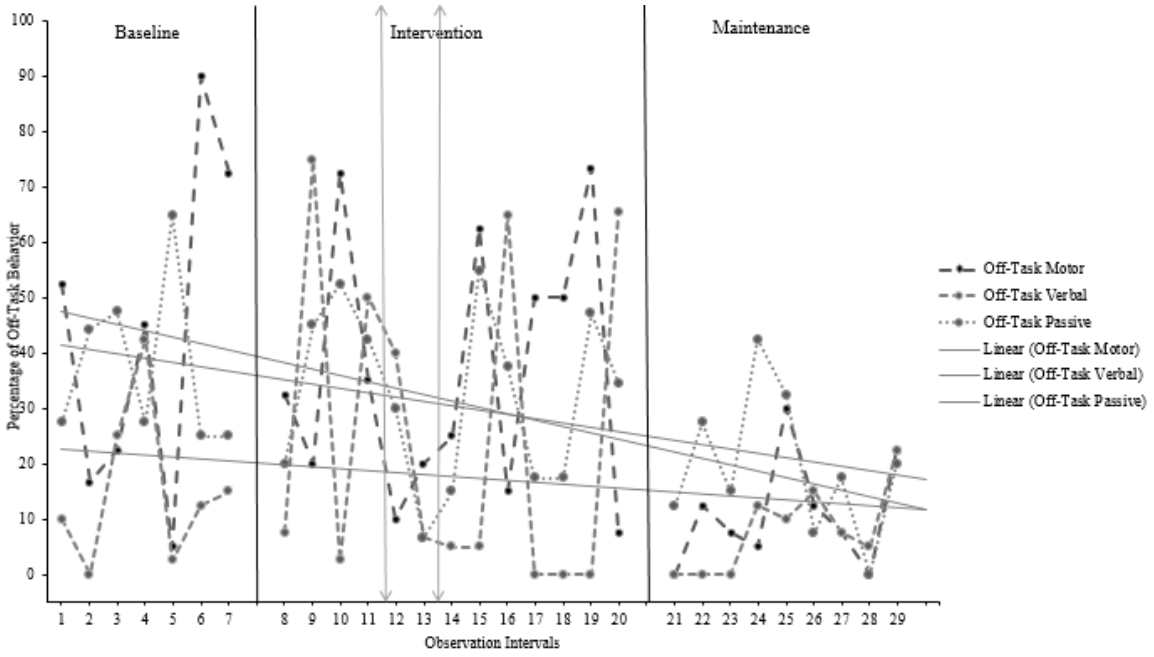
time; however, given his intervention absences, the results are rather surprising. At baseline, Chris's active on-task behavior was at 8.69% on average, declining to a mean of 1.28% during the intervention phase. An increase emerged in the maintenance assessment phase (16.67%).

Beyond the school breaks, it is necessary to consider Chris's intervention session absences. Of the 15 *PLE* lessons conducted across 23 sessions, Chris missed five, or 22% of the provided sessions. The missed lessons—Lesson 6 (December 10), Lesson 7 (December 14), Lesson 8 (January 18), Lesson 10 (January 28), and Lesson 15 (March 1)—indicate that Chris failed to attend a considerable number of intervention sessions before and after winter break. He also missed the last lesson in which students reviewed and reflected on their self-assessments from the group.

Prior to Thanksgiving break, which occurred between Intervals 12 and 13, Chris's passive on-task behavior was competitively high (92.5%), and then it declined to 70% immediately upon return. Interestingly, the observation interval immediately following Thanksgiving break also ended up being his only observation for two months due to absences from intervention group, BOSS observations, or both. There was no notable change following winter break, with the variability not drastically different from his overall variability across BOSS observations. Chris's active engagement was low, as all but one interval was 0%. For Interval 12 (November 26, 2018), his active engagement was 16.67% with a matching decline in passive engagement to 70%, suggesting that the classroom activity or other variables were more influential than school breaks. Unfortunately, there are no notes regarding the nature of the class activity on this day.

Figure 14

Detailed Off-task Behavior Observations– Chris



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

At baseline, Chris's motor off-task behavior averaged 43.45% and then decreased to 36.44% during the intervention phase. As had been the case with other observational data, his mean off-task motor behavior then declined dramatically during the maintenance assessment phase (10.83%). For verbal off-task behaviors, Chris's mean baseline was 15.36%, with him often talking with others at his table about nonrelated tasks. During the intervention phase, his verbal off-task behavior increased to 24.77% on average, with that number declining beyond baseline levels to 8.06% during the maintenance assessment phase. Declines in Chris's off-task passive behavior persisted across all phases of the study. There was a negligible decline between baseline (37.42%) and intervention (32.37%); however, his average passive off-task behaviors further declined during the

maintenance phase (19.17%). What is promising is that despite Chris's absences, he still displayed fewer off-task behaviors post-intervention than he had at baseline.

Before Thanksgiving break, Chris had elevations in motor, verbal, and passive off-task behaviors (35%, 50%, and 42.5%, respectively); upon return, his off-task behavior was lower (10%, 40%, 30%, respectively). Concerning winter break, it is important to note that Chris was not present for any observations in December and resumed attendance on observation days on January 25, 2019. Because of these absences, it is necessary to interpret the data with caution. Specifically, in comparison to observations at the end of November, his January motor and passive off-task behaviors were slightly elevated but were less than the off-task behavior exhibited before Thanksgiving break. His verbal off-task behavior declined very slightly after winter break. His observations results are as follows: motor off-task behavior: 20% to 25%; verbal off-task behavior: 6.67% to 5%; and passive off-task behavior: 6.67% to 15%. Again, Chris's considerable absences likely impacted his results here, as well.

NEPSY-II results. Despite his absences, Chris demonstrated significant improvements across all associated tasks on the Auditory Attention and Response Set subtest. His performance on the Auditory Attention task, a measure of selective and sustained attention, fell in the Well Below Expected Level (ScS = 2) for his accuracy before the intervention; post-intervention, his score improved to the upper limits of the Expected Level range (ScS = 12). Considering accuracy and inhibition errors, Chris also demonstrated impressive skills acquisition. Specifically, prior to the intervention, his performance was in the Well Below Expected range (ScS = 1); this score improved more than three standard deviations to the upper limits of the Expected Level range (ScS = 12).

Post-intervention, Chris improved in his ability to selectively respond while sustaining his attention, as indicated by fewer omission errors. Moreover, his inhibition skills aided in resisting commission and inhibitory errors across both phases of the subtest.

Response Set performance is a subtest that requires shifting attention. Because Chris inhibited previously learned responses on the post-intervention administration of the NEPSY-II, he improved his skills post-intervention. Specifically, Chris's accuracy improved dramatically, from a ScS of 2 (Well Below Expected Level) pre-intervention to a ScS of 15 (Above Expected Level) post-intervention. When accuracy and inhibition-related errors are combined (Response Set Combined), his performance also showed dramatic improvement from a pre-intervention score in the Well Below Expected Level (ScS = 1) to a post-intervention performance in the upper limits of the Expected Level (ScS = 12). Post-intervention, Chris improved in his ability to selectively respond while sustaining his attention, as indicated by fewer omission errors, dropping from 20, pre-intervention, to 1, post-intervention. Moreover, his inhibition skills aided in resisting commission errors (17 to 3) and inhibitory errors (7 to 3) and his total correct responses increased from 15 to 35.

Inhibition is a timed measure designed to evaluate a child's ability to inhibit automatic verbal and motor responses. In this measure, Chris's performance varied. For the Inhibition-Naming portion of the test, more a measure of sustained and switching attention, Chris showed a decline (ScS = 7 pre-intervention to ScS = 6 post-intervention). Although his time improved, he made slightly more errors post-intervention. In the Inhibition-Inhibition portion, a task requiring inhibiting an automatic verbal response while engaging in sustained attention, Chris's time improved (ScS = 6 for pre-

intervention and ScS = 9 post-intervention) as did his efficiency (ScS = 6 for pre-intervention and ScS = 9 post-intervention). His self-correction rate improved dramatically from 30% to 100%. The most complex aspect of the Inhibition subtest, Inhibition-Switching, requires multiple simultaneous executive functions, including sustained, selective, and switching attention, verbal inhibition, and working memory. In this intervention, working memory is how children remember the color-dictated rules regarding whether to name a stimulus or inhibit the automatic response. Here, Chris's skills improved slightly (ScS = 8 pre-intervention and ScS = 10 post-intervention). Qualitatively, his self-corrections improved for the post-intervention assessment, going from 21% to 100%.

Qualitative observations. Chris was physically active during the initial stages of group, frequently leaving his seat, interrupting others, and grabbing materials before they were offered. As the sessions progressed, while he continued to require prompting and modeling to attend to his body and inhibit his impulses, he was redirectable. He reported especially enjoying the auditory attention activities that also involved movement and/or motor inhibition skills. When Chris was present for group, he actively participated. His absences hindered his ability to immediately engage in activities after he had missed a session. For Chris, some qualitative improvements were noted. His teacher reported that he appeared more amenable to feedback or redirection on raising his hand and waiting for instructions; as well as decreases in out-of-seat behavior. These observations also parallel what was observed during the intervention groups. While Chris often preferred standing during group, he was invested in following instructions and responded well to positive verbal feedback. On occasion, he was observed engaging in self-talk, using the coaching

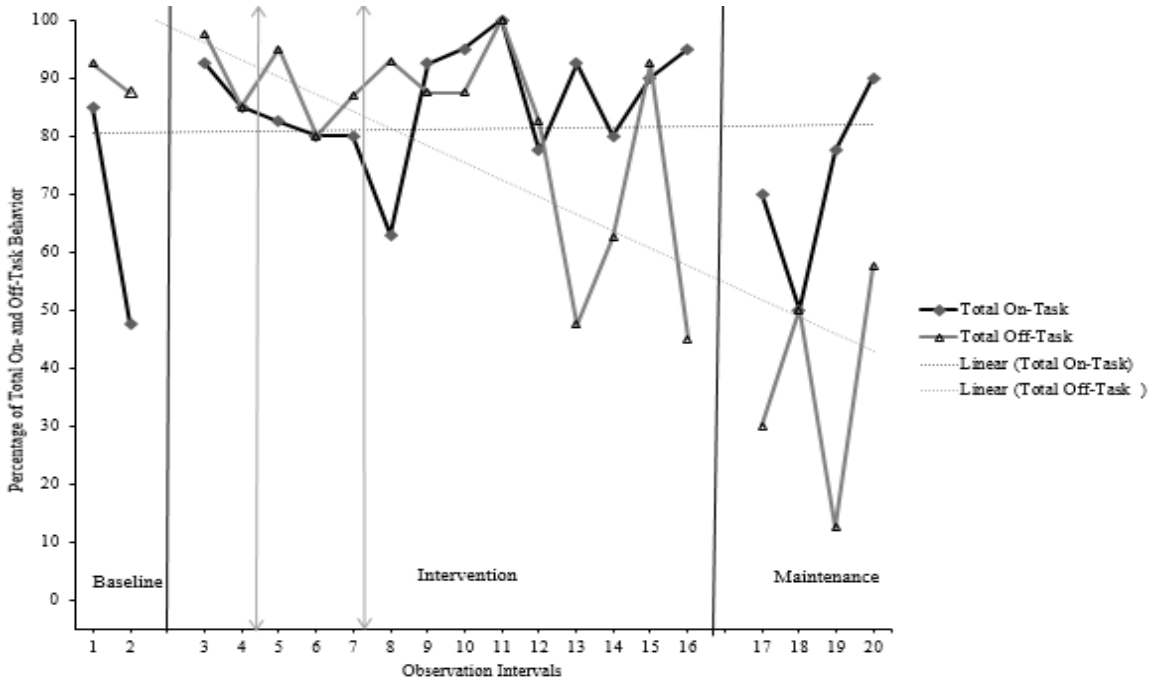
strategies reviewed during the intervention group. He was especially attentive to the ideas that group members had for Jose, the character in *PLE* with whom Chris most identified.

Ivan

At the time of referral, Ivan was a seven-year-old second-grader. He is Latino and has been at this elementary school since first grade. Although Ivan participated in the intervention and post-intervention observations, he was not present for the baseline observation beyond the initial week. In addition, Ivan's attendance was lower due to illness, including twice coming down with influenza. Ivan's referring classroom teacher was most concerned with his sustained attention and verbal inhibition difficulties, which she said impacted his class participation and his ability to engage in sustained work.

Figure 15

BOSS Total On- and Off-task Behavior Observations – Ivan

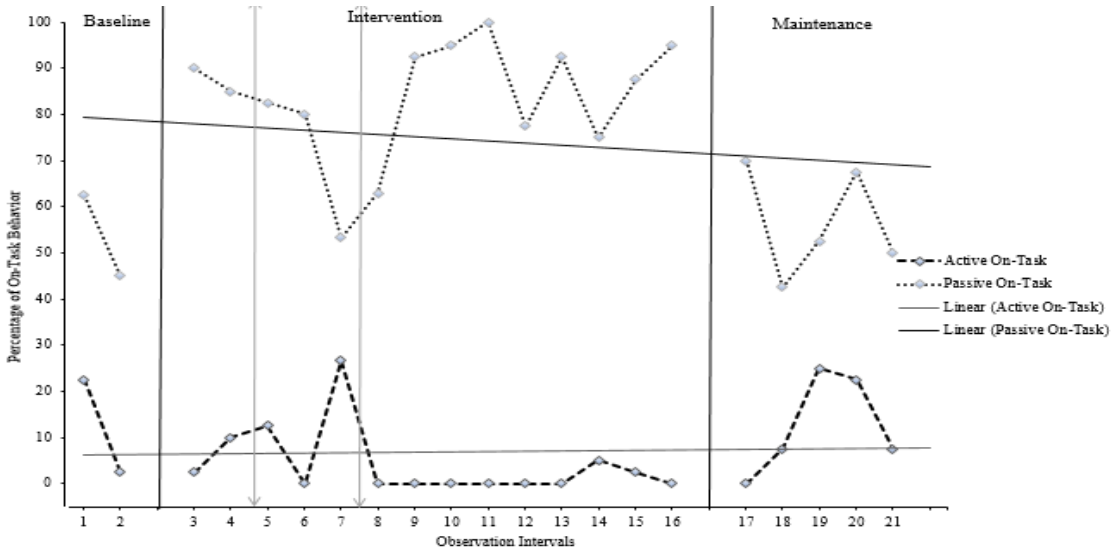


Note: Thanksgiving and winter breaks are demarcated with gray arrows.

Ivan was present for only two baseline and four maintenance observations. He also had inconsistent attendance during the intervention phase, having been absent for nine observations and three intervention sessions; therefore, the results should be interpreted with extreme caution. Analysis of the trend lines for on- and off-task behaviors indicated that his on-task behavior remained fairly static, if not declined. For the intervention phase, his mean on-task performance was 86.11% most of the time, with a decline to 71.88% for the maintenance phase. Important to note, however, is that he was present for only four maintenance observations, despite multiple attempts to secure additional observations by the study's research assistants. Figure 15 shows declines for Ivan's off-task behavior; however, with limited data, it is not possible to truly analyze the outcomes (81.61% during the intervention phase and 37.5% during the maintenance phase) in a meaningful way. Notably, the declines in off-task behavior are similar to the other participants.

Figure 16

BOSS Detailed On-task Behavior Observations – Ivan



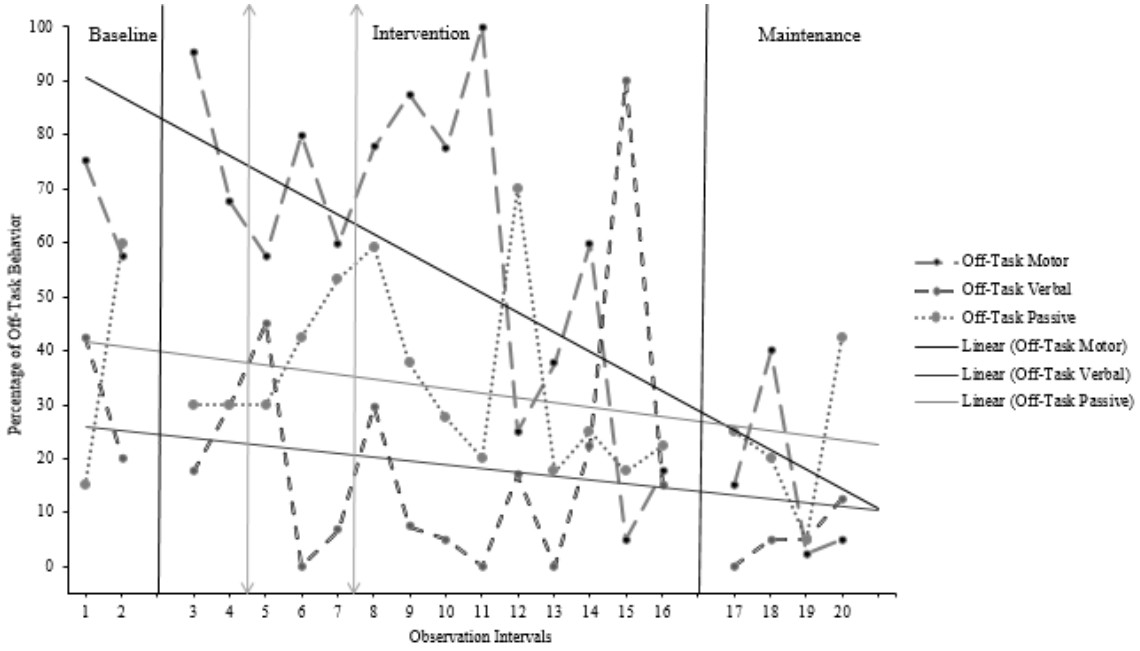
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

The research assistants completed only two baseline observations with Ivan. Unfortunately, in addition to a lack of baseline data, Ivan's attendance was problematic across the intervention and maintenance assessment phases, as well, with nine missed observation intervals and three missed intervention groups. Unfortunately, this excessive absence makes his results not fully interpretable. That said, there are some interesting trends. For active on-task behavior, Ivan's mean interval percentage was 3.87% throughout the intervention. For the maintenance phase, his mean increased to 12.5%; however, Ivan has fewer observation intervals than the other participants.

There was not a notable change in Ivan's passive engagement around the Thanksgiving break (85% pre-break and 82.5% post-break). His active on-task behavior followed the same trend (10% pre-break and 12.5% post-break). Before winter break, his passive on-task behavior was 53%, with his active engagement for that day measured at 26.67%. Following the break, his passive on-task behavior was 63% for the first interval in January, increasing to 92.5% and 95% for subsequent intervals a week later. For active engagement, his on-task behavior was at 0% for the six intervals after winter break. As on the other participants' graphs, gray arrows demarcate the Thanksgiving and winter breaks, which occurred between Intervals 4 and 5 (Thanksgiving) and Intervals 7 and 8 (winter).

Figure 17

Detailed Off-task Behavior Observations – Ivan



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

Ivan was one of two students for whom extensive absences affected the data; accordingly, there are not enough data points to reasonably evaluate the data. Although reported, his mean percentages for the intervention and maintenance assessment phases require extreme caution in interpretation. For each individual off-task behavior, declines were apparent between the intervention and the maintenance phases. This trend is commensurate with the findings for the four participants present for all phases of the study; however, without adequate baseline and maintenance observations, the true nature of Ivan's observation data patterns is less clear. For motor off-task behaviors, Ivan's mean percentage was quite high during the intervention (60.56%), declining to 15.63% on average for the maintenance phase. For verbal off-task behaviors, Ivan's intervention observations indicate that he was verbally off-task for 20.41% of the time; this percentage

declined to 5.63% during the maintenance assessment phase. For passive off-task behaviors, Ivan demonstrated that 34.47% of the time, he was passively off-task. Maintenance durability declined to 23.12% on average.

Thanksgiving break occurred between observation Intervals 4 and 5. Data showed no specific trends related to the first break. Ivan's motor off-task behavior declined but was still high (67.5% to 57.5%), his verbal off-task behavior increased (30% to 45%) and his passive off-task behavior remained the same (30%). Winter break occurred between Intervals 7 and 8 for Ivan, who demonstrated increases in all off-task behaviors after winter break and the break in session continuity. Moreover, Ivan was out sick for much of December, with the resultant increases as follows: motor off-task (60% to 77.78%), verbal off-task (6.67% to 29.63%), and passive off-task (53.33% to 59.26%). There are declining trends beginning in February, with continued spikes and declines across the entirety of the intervention phase. Ivan's post-intervention maintenance assessment indicates visual declines in his motor off-task behavior.

NEPSY-II results. Despite his absences, Ivan demonstrated improvements across all areas, between pre-intervention and post-intervention assessments. Ivan's performance on the Auditory Attention task, a measure of selective and sustained attention, fell in the Well Below Expected Level (ScS = 1) for his accuracy before the intervention; post-intervention, his accuracy performance improved but remained below the expected range (ScS = 7). With accuracy and inhibition errors taken into consideration, Ivan also demonstrated an improvement in his skills, from a pre-intervention performance in the Well Below Expected range (ScS = 2) to an improvement of more than a standard deviation but still below expectations (ScS = 6). Post-intervention, Ivan improved in his

ability to selectively respond while sustaining his attention, as indicated by fewer omission errors (from 19 to 5). Unfortunately, his commission and inhibitory errors across both phases of the subtest remained constant.

Ivan's Response Set performance on a subtest that requires shifting attention while inhibiting previously learned responses improved three standard deviations post-intervention, from a ScS of 1 (Well Below Expected Level) pre-intervention to a ScS of 10 (Expected Level) post-intervention. When accuracy and inhibition-related errors are combined (Response Set Combined), his performance also improved dramatically. Pre-intervention, his score was in the Below Expected Level (ScS = 4) and post-intervention, his performance improved to the upper limits of the Expected Level (ScS = 12). Post-intervention, Ivan improved in his ability to selectively respond while sustaining his attention, as indicated by fewer omission errors: 29 pre-intervention versus 6 post-intervention. Moreover, his inhibition skills aided in resisting commission (9 to 2) and inhibitory errors (5 to 0) and his total correct responses increased from 7 to 30.

Inhibition is a timed measure designed to evaluate a child's ability to inhibit automatic verbal and motor responses. Ivan's performance improved across each sub-component. For the Inhibition-Naming portion of the test, more a measure of sustained and switching attention, Ivan's performance improved (ScS = 6 pre-intervention to ScS = 10 post-intervention). His completion time also improved but was not significant (ScS = 6 to ScS = 8). For the Inhibition-Inhibition portion, a task that requires inhibiting an automatic verbal response while engaging in sustained attention, Ivan's time also improved (ScS = 6 pre-intervention and ScS = 9 post-intervention) and his efficiency improved by two standard deviations (ScS = 6 for pre-intervention and ScS = 12 post-

intervention). His self-correction rate also improved, from 87.5% to 100%. Finally, the most complex aspect of the Inhibition subtest, Inhibition-Switching, requires multiple simultaneous executive functions including sustained, selective, and switching attention, verbal inhibition, and working memory. Specifically working memory is how children remembered the color-dictated rules regarding whether to name a stimulus or inhibit the automatic response. Here, Ivan's skills improved (ScS = 8 pre-intervention and ScS = 12 post-intervention). Qualitatively, his self-corrections improved for the post-intervention assessment, increasing from 23% to 100%.

Qualitative observations. When Ivan was present, he actively participated in group. He reported enjoying reflecting on his skills and seeing his improvements on cancellation-related tasks. Ivan responded well to positive verbal praise and coaching, especially when he experienced difficulties with shifting or sustained attention. He frequently volunteered for leadership roles during discussions and activities but was also very amendable to others taking the lead. Illnesses and school-initiated classroom moves impacted his participation and attendance. Even with his absences, Ivan's teacher reported noting some improvements in his behavior. Specifically, his teacher reported appeared more amenable to feedback or redirection on raising his hand, waiting for instructions, and decreases in out of seat behavior. Needless to say, she was also concerned with his absences.

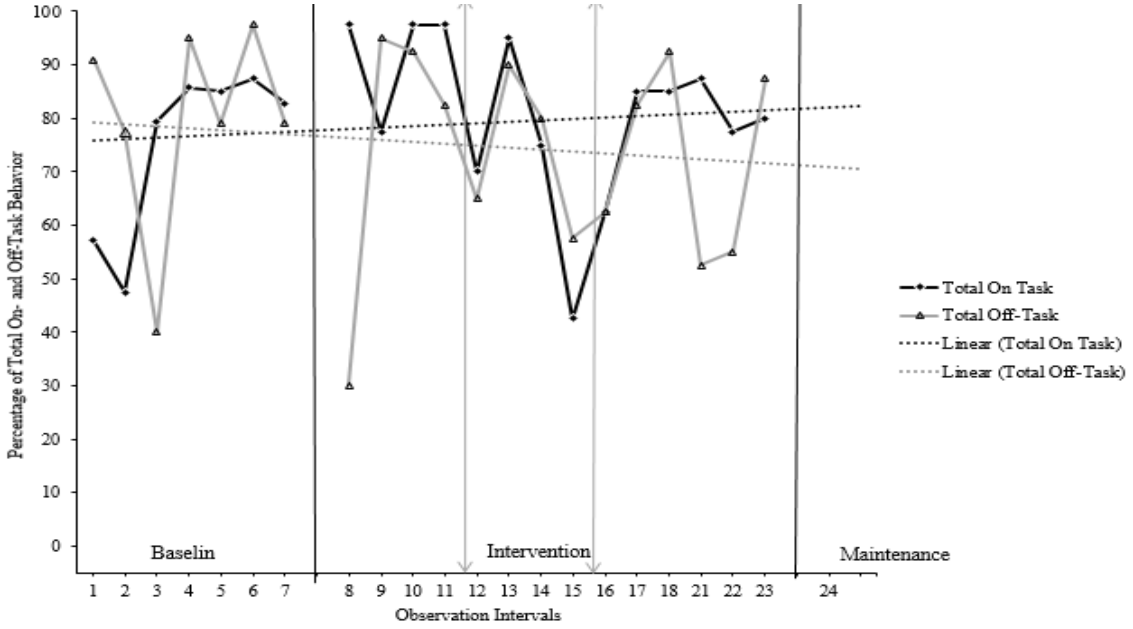
Xavier

At the time of referral, Xavier was a seven-year-old second-grader. He is multi-racial, having enrolled at this elementary school at the beginning of this school year and moving to another school toward the end of the intervention phase of the study. His

attendance at school was also inconsistent. Xavier's classroom teacher referred him for the intervention study, reporting being most concerned with his difficulties with sustained attention as well as verbal and motor inhibition. She indicated that these difficulties impacted his class participation and his ability to engage in sustained work.

Figure 18

BOSS Total On-and Off-task Behavior Observations – Xavier

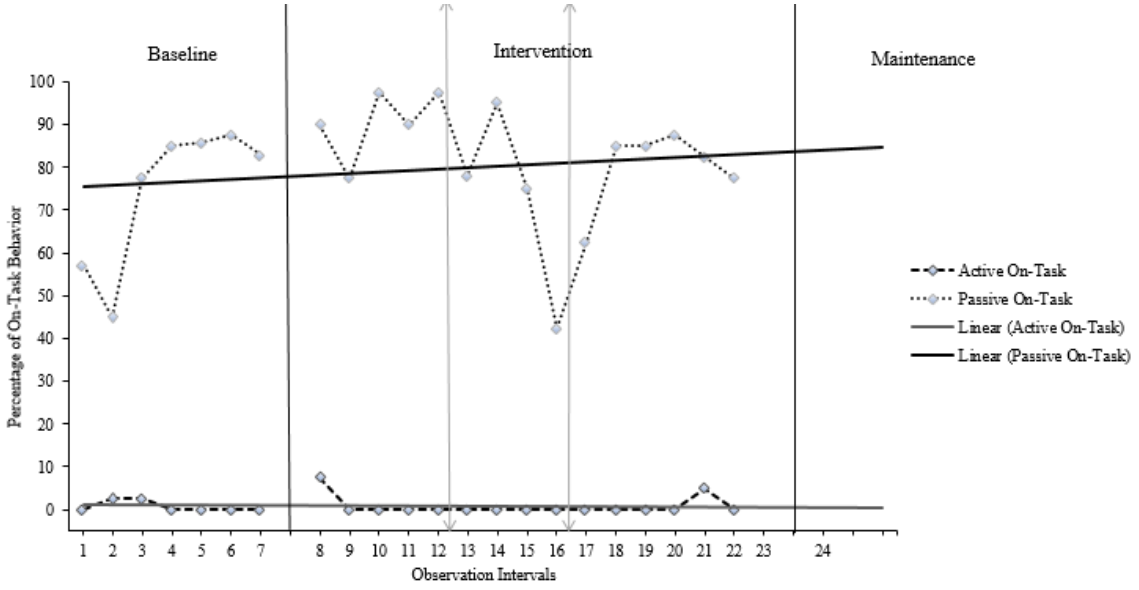


Note: Thanksgiving and winter breaks are demarcated with gray arrows.

Because Xavier moved before the completion of the study and had inconsistent attendance during the intervention phase, interpreting the results should be with extreme caution. He missed 13 observation intervals and six intervention sessions. Among the observational data collected, Xavier demonstrated an increase in on-task behavior from the baseline to the intervention phase (75.01% to 80.71%). For overall off-task behavior, his behaviors declined slightly (from 79.86% to 73.21%). It would have been interesting to see if significant declines occurred during the maintenance phase as it did with the other participants.

Figure 19

BOSS Detailed On-task Behavior Observations – Xavier



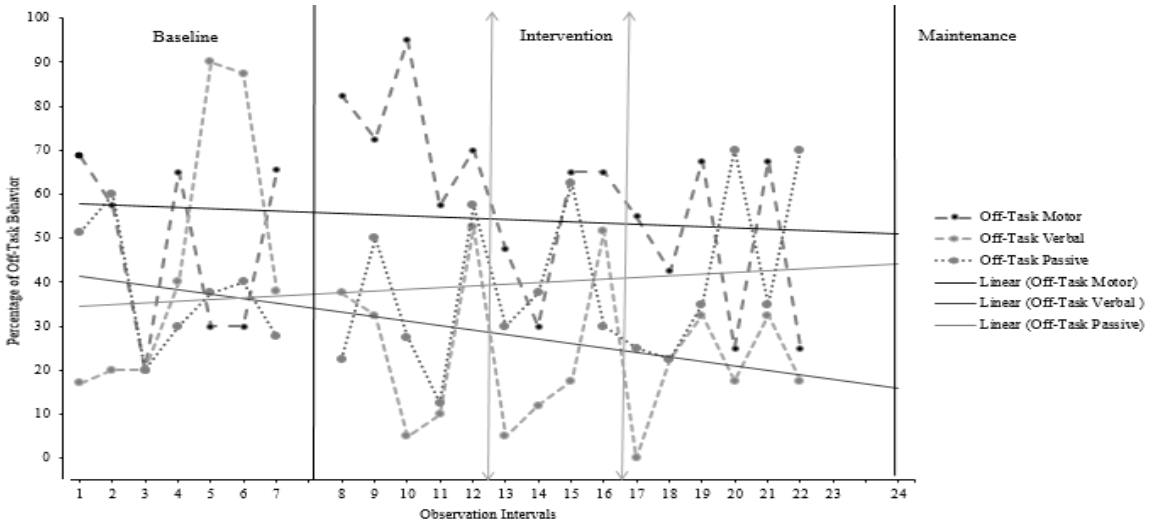
Note: Thanksgiving and winter breaks are demarcated with gray arrows.

At baseline, on average, Xavier demonstrated passive on-task behavior 74.37% of the time. Across the intervention phase, his passive engagement, on average, slightly increased to 81.53%. He moved before the maintenance phase began, so no data are available for post-intervention outcomes. His active engagement remained relatively flat, averaging 0.71% at baseline and 0.83% during the intervention. Beyond the school breaks and a move, it is important to consider Xavier's intervention session absences. Of 15 *PLE* lessons across 23 sessions, Xavier missed six intervention lessons and 26% of the provided sessions. The missed *PLE* lessons included Lesson 6 (December 10), Lesson 7 (December 14), Lesson 8 (January 18), Lesson 10 (January 28), and Lesson 15 (March 1). Xavier missed a considerable number of intervention sessions before and after winter break. He also failed to attend the last session in which students reviewed and reflected on their self-assessments from the group.

Prior to Thanksgiving break, which occurred between Intervals 12 and 13, Xavier's passive on-task behavior was high (97.5%). After Thanksgiving, passive engagement declined for reading (78%) but remained at 95% for math. Before winter break, Xavier's passive on task performance was at 42.5%, among the lowest recorded. He rebounded to 62.5% after the break and improved in February. Xavier's active engagement was low, with all but two intervals falling at 0%.

Figure 20

Detailed Off-task Behavior Observations – Xavier



Note: Thanksgiving and winter breaks are demarcated with gray arrows.

Although reported, Xavier's mean percentages for the baseline and intervention phases require interpretation with extreme caution due to his absences as well as his attrition. There is variability for each individual off-task behavior; however, the patterns of declines and increases appear consistent with the trends noted among the other participants. For motor off-task behaviors, Xavier's mean percentage was 48.09% at baseline, increasing to 57.83% for the intervention phase. Xavier's verbal off-task behaviors declined between the baseline and intervention observational phases (44.66%

to 23.07%). At baseline, he demonstrated passive off-task behavior 38.07% of the time, a percentage that increased slightly to 39.17% for the intervention phase.

For Xavier, Thanksgiving break occurred between observation Intervals 12 and 13. Across all three off-task behaviors, declines were apparent after the break. His motor off-task behavior declined (70% to 47.5%), as did his verbal and passive off-task behaviors, with noticeable decreases for his verbal off-task skills (verbal off-task behaviors -52.5% to 5%, passive off-task behaviors 57.5% to 30%). Winter break occurred between Intervals 16 and 17; however, Xavier missed two intervention sessions prior to the break. Decreases in all off-task behavior appeared to varying degrees after winter break, as follows: motor off-task (65% to 55%), verbal off-task (51.5% to 0%), and passive off-task (30% to 25%). Following the break, Xavier continued to show fluctuations in each of the off-task areas. Because he was not present for the maintenance assessment phase, it is unknown if he, like other participants, would have exhibited further declines in off-task behavior.

NEPSY-II results. Xavier moved before the completion of the intervention groups. Therefore, due to attrition, there are no data available for post-intervention psychological assessments.

Qualitative observations. When he was present, Xavier participated in group. Initially, he was active and had trouble remaining in location with the group. As the sessions progressed, he was open to modeling and cuing to attend to his body and demonstrated similar behaviors to the group leader. Xavier responded well to positive verbal praise and coaching, especially when he experienced difficulties with shifting or sustained attention. In addition to attendance and participation concerns, Xavier did

demonstrate some difficulties with frustration tolerance. He would sometimes passively refuse to participate in an activity if he felt he was performing less well than other participants. With encouragement from the group leader, he was generally able rejoin; however, this was sometimes limited to the specific activity in which he was engaged. A new activity would sometimes lead to more another bout of passive avoidance. Minimal qualitative feedback was provided for Xavier; however, his teacher did indicate that he was receptive to corrective feedback as the year progressed.

CHAPTER V: DISCUSSION

The present research was aimed at evaluating the effectiveness of the *Play, Learn, and Enjoy* curriculum (Savina, et. al., 2018) in improving students' on-task behavior and inhibition control in the classroom. Broadly, attention is the ability to selectively recognize and select some stimuli while ignoring other, irrelevant stimuli (Gazzaniga, Ivry, & Mangun, 2009). Off-task behavior has been linked to adverse academic outcomes and social performance (Multine et al., 2008; Rabiner, Carrig, & Dodge, 2016; Roberts, 2003). Among undiagnosed and at-risk students, school support personnel and teachers report that youth who display inattentiveness and engage in off-task behavior receive frequent referrals to school mental support staff for skills development and formal services (Barkley, DuPaul, & McMurray, 1990; Roberts, 2003) as well as individualized interventions in the classroom (Roberts, 2003). This study sought to evaluate the effectiveness of *Play, Learn, and Enjoy* curriculum on the reduction of off-task behavior in second grade students.

Research Question One

The first question of this study was, "Would the *Play, Learn, and Enjoy* curriculum intervention lead to increased on-task and decreased off-task behavior among identified second-graders?" The overall results suggest that increases in on-task behavior were most notable among students who had regular attendance and participation in the intervention. For the participants with consistent attendance, their mean baseline on-task performance ranged from 60%-70%, which increased during the intervention phase to 83%-86% and further increase for the maintenance phase to 84%-91%. For some participants, whose attendance was a concern, there was a decline in their on-task

performance from the intervention to baseline phase and for others, there were insufficient data to make comparisons across all three phases of the study.

As reminder, there are two types of on-task behavior: Passive Engaged Time (PET) and Active Engaged Time (AET). Students practicing PET are passively attending to instructions or a task (e.g., reading to self, attending to a teacher's lecture, attending to written material). AET, in contrast, requires engagement in a specific response in relation to a task or instruction (e.g., answering questions aloud, leading a group discussion, demonstrating a task for the teacher). When subtypes of on-task behavior were evaluated in more detail, Passive Engaged Time (PET) and Active Engaged Time (AET), trends also emerged. The most notable increases in Passive Engaged Time were among those students who participated regularly in the intervention. The mean baseline PET for these students ranged from 58%-69% and increased to 81%-82.5% during intervention with further increase during the maintenance phase (range = 84%-85%). For the student who was present for the entirety of the study, but whose attendance was problematic, his PET increased from baseline to intervention (from 69% to 83%). Unfortunately, these increases did not maintain during the maintenance phase; his PET declined to 65% here. In summary, the results suggest that the intervention is associated with improvements in Passive Engaged Time, or passive on-task behavior for all participants; however, in order for the skills acquisition to generalize to the classroom beyond the intervention delivery, it would appear that attendance and participation in the intervention are crucial components.

The second subtype of on-task behavior is Active Engaged Time (AET). While the BOSS conceptualizes AET as a subtype of on-task behavior, this may be simplistic.

While it is necessary for children to be attending to instruction or the tasks at hand, it is also necessary that the opportunity for an active response be provided. The rates of these active engagement behaviors were low for the participants even prior to the intervention, as measured by the BOSS. Across the study phases, the results for Active Engaged Time demonstrate slight, but negligible declines across all of the phases for those participants who were present consistently. Again, these data are likely most reflective of opportunities for engagement, rather than active attention regulation. It might also be argued that because the participants were better able to control verbal and motor inhibition, their opportunities to be called upon may have declined. For one student whose participation was inconsistent, declines in AET are noted when the baseline and intervention phases are compared; increases were then noted in his AET during the maintenance phase. This finding is unusual. While there are no noted factors that might explain this phenomenon, it is possible that he remained active in volunteering information and therefore, had more opportunities to be called upon.

Off-task behaviors measured in this study were motor, verbal, and passive behaviors unrelated to task. When the level of overall off-task behavior are examined across all phases of the study, the results suggested declines in off-task behavior for all participants with regular attendance and for the student who participated in the intervention and maintenance phases. More specifically, the mean off-task performance at baseline ranged from 69%-73%, for the intervention phase, this ranged from 62%-78%, and declined further to 28%-36% at maintenance. Interestingly, two of the four students demonstrated increases in off-task behavior during the intervention, but then had dramatic declines by the maintenance phase. These increases seem to be influenced by

increases in motor off-task behavior that sometimes occurred in conjunction with on-task behavior. These findings are discussed in more detail below.

When the off-task behaviors were examined in more detail for motor, verbal, and passive off-task behavior, trends also emerged. Across the findings, declines from the baseline to the maintenance phases were noted for all of the participants for whom complete data are available. Even with overall declines, there was variability; this was especially the case with the intervention phase. As has been discussed previously, this finding is consistent with children who display attention and inhibition regulation difficulties, in that, such children tend to demonstrate more fluctuations in their attention to task than peers who do not experience attention dysregulation (Rapport et al., 2009).

For the children who participated regularly, increases were noted in motor off-task behavior from the baseline to intervention phases. The baseline motor off-task behavior spanned 28%-57% with increase to 49%-63% during intervention and significant decline during the maintenance phase to 12%-26%. When the percentage of off-task behaviors are compared for each participant from baseline to maintenance, motor off-task behaviors declined for all participants. These decreases spanned 11.47-32.62 %. For those participants who regularly attended group, and school in general, the declines spanned 26.52-32.62 %. Notes from the research assistants indicated that the types of motor off-task behavior were qualitatively different. Specifically, observations at baseline included more out-of-seat and out-of-location motor off-task behaviors. In contrast, during the intervention phase, off-task behaviors included more standing behaviors, or fidgeting behaviors that did not cause the participants to leave the task at hand. During the intervention phase, a number of on-task behaviors occur simultaneously with

movement. These less disruptive behaviors are coded as motor off-task behaviors with the BOSS. Another interpretation might be that students were acquiring controlled attentional skills, for which movement during tasks allowed them to more effectively engage in sustained attention. Because they were better able to remain engaged with tasks and not leave location during the intervention phase, the second interpretation might be more appropriate. A study by Fedewa & Erwin (2011) seems to support this interpretation. They found that students' attention and on-task behavior increased when they were allowed to sit on stability balls which allowed movement. With these results in mind, then we may not classify these simultaneous occurrences as off-task motor behaviors. This nuance in the results warrants additional study.

For verbal and passive off-task behaviors, there was a decline for all participants with regular attendance. More specifically, at baseline, verbal off-task observations ranged from 15%-32%. More variability was noted during the intervention phase. For three participants, verbal off-task behavior declined between 3.67-21.59 points. For two participants some increases in off-task behavior were noted (+0.83 and +9.41). Attendance and participation were not factors. At maintenance, the instances of verbal off-task behavior spanned 3%-14%, which represented declines for all participants. When the baseline and maintenance phases are compared, these declines ranged from 7.3-21.41%. These findings also warrant further study. It would appear that a consolidation of skills is further corroborated by the declines in verbal off-task behaviors for all participants at maintenance. It is also important to consider whether participants engaged in externalized self-talk that assisted with attention regulation. The content of

participants' verbalizations was not noted during this study, which should be a consideration for future studies.

For passive off-task behavior, baseline observations spanned 31%-43%. During the intervention phase, three participants demonstrated declines in their passive off-task behaviors (-1.25; -5.05; and -7.64). Two participants had negligible increases in passive off-task behavior (+1.09 and +1.1). At maintenance, the passive off-task percentages ranged from 13%-19%. For all participants, their passive off-task behaviors at maintenance represent a decline. When the baseline and maintenance phases are compared, these declines ranged from 13.44-29.62%. It would appear that a consolidation of skills is further corroborated by the declines in passive off-task behaviors for all participants.

The inspection of slope trends indicated that they were consistent with the observational mean data, across and within participants. Again, the trends suggest declines in off-task behavior across all participants. Improvements in on-task behavior are noted for those children who consistently attended and participated in the intervention. While the study suggests overall improvements in on-task and declines in off-task behavior, even the participants with consistent attendance exhibited fluctuations in their attention from day-to-day, over the course of the intervention and maintenance periods. Again, previous research indicates that children with and at risk for ADHD tend to demonstrate more inconsistencies with attention to task (Rapport, Kofler, Alderson, Timko, & DuPaul, 2009).

When subtypes of on-task behavior are evaluated, the results suggest that the intervention led to improvements in or passive on-task behavior, with students who had

consistent attendance demonstrating the most notable improvements. The *Play, Learn and Enjoy* curriculum specifically trains voluntary attention control necessary for staying on task and inhibiting distractions. The specific *PLE* activities that targeted the development of voluntary attention control are Comparing Pictures/Finding Differences, Embedded Pictures, Listening/Auditory Discrimination, Search Tasks, and Trail Making (see Appendix E). With each of these activities, the lead researcher directed children's auditory and visual attention to the selected material of interest. Once their attention was engaged, they were then oriented to relevant versus irrelevant material and coached on their response. Executive attention was then facilitated by the need to inhibit responses to irrelevant stimuli. The participants were provided feedback via positive-labeled praise initially. Later, the participants evaluated their skills and performance outcomes in order to guide their future response engagement. In other words, as confirmed by BOSS observations, improvements were noted in participants' abilities to increasingly engage successfully cognitive interference control (Posner & Rothbart, 2007) in order to be successful in carrying out goal directed behavior (Norman & Shallice, 1986; Ruff & Rothbart, 1996).

The promising results from this study suggest that students were able to retain and use their attention skills after the intervention. Furthermore, their off-task behaviors significantly diminished at the maintenance phase. Because the teacher did not change classroom-based interventions or responses; and, because this phenomenon occurred for all participants, it suggests that there was a consolidation of skills following the intervention.

Research Question Two

The second goal of this study was to investigate whether *Play, Learn, and Enjoy* interventions led to an improved performance on direct measures of executive functions including attention and inhibition control? Pre- and post- intervention measures of attention and inhibition from the NEPSY-II were administered to evaluate participants' selective and sustained attention, and inhibition of motor and verbal responses.

The results from the Auditory Attention subtest on the NEPSY-II indicated that three of the five participants demonstrated significant improvements in their total correct responses, and in their combined Auditory Attention results, which included response time coupled with their accuracy. For Response Set, the participants also demonstrated in improvements in their total correct and combined Response Set responses. Three to four standard deviation improvements were noted for all participants. Overall, the results suggest that improvements were noted with participants' selective and sustained attention. Moreover, they were able to inhibit automatic responses in order to engage in these tasks. What is promising is that two of the students with inconsistent attendance who did not demonstrate improvements in their on-task performance across BOSS observations were able to demonstrate skills acquisition on the post-intervention NEPSY-II measures.

On the Inhibition-Naming test, a subtest that more closely aligns with the measurement of selective and sustained attention, three participants demonstrated significant improvements (one to two standard deviations) when their performance speed and accuracy were considered. On the Inhibition-Switching test, only one student

demonstrated significant improvement. However, four participants showed improvements in their self-correction rates.

The results obtained in this research were similar to those in the previous studies that involved direct training attention skills through specially designed activities and computer-based training (Kerns et al., 1999; Rueda, et a, 2005; Tamm et al., 2016). These findings suggest that the *PLE* curriculum is compatible with other interventions specifically designed to train attention skills.

Implications for Practice

The importance of voluntary or controlled executive attention for school readiness, academic achievement, and social skills is cited by a several researchers (Vile Junod, DuPaul, Jitendra, Volpe, & Cleary, 2006; Mulrine, Prater, and Jenkins 2008). Existing research indicates that controlled, executive attention can be taught (Bedoin et al., 2019; Tamm et al., 2016; Jenson & Sprick, 2014; King et al., 2014; Blood et al., 2011; Tang & Posner, 2009; Carroll et al., 2006; Rueda et al., 2005; Barklay, 2000; Kerns et al., 1999; Semrud-Clikeman, et al., 1999; Ruff & Rothbart, 1996). Moreover, early elementary school is a critical period when children are very sensitive to environmental influences that foster or hinder the development of attention regulation and impulse inhibition skills (Posner & Rothbart, 2007; Ruff & Rothbart, 1996). It is an important time when children establish a pattern of learning-related behaviors they carry into consecutive years of education (DuPaul, 2007; DuPaul & Stoner, 2014; Fergusson & Horwood, 1992). IDEIA also mandates that educational professionals used evidence-based practices to guide their implementation of interventions (Schnoes, Reid, Wagner, & Marder, 2006).

With these rationales in mind, it is essential for teachers and school mental health professionals to implement interventions that teach children how to regulate their attention and impulses, as well as provide opportunities for practice those skills in the classroom. School psychologists, school counselors, and school social workers are well-positioned to provided Tier-II interventions that can help children develop attention and impulse control skills. The *Play, Learn, and Enjoy* curriculum is one of the interventions that can be used for that purpose.

For these particular participants, scaffolding beyond the curriculum was also necessary. Because a number of the children struggled with basic alerting attention, the group facilitator utilized a call and response routine with which the children were already familiar. These participants also received explicit teaching to ensure they understood what attending and inhibition behaviors looked like; and, for all sessions, the group facilitator provided positive-labeled praise to students who demonstrated the aforementioned attending behaviors and recognized successive approximations at the beginning of the intervention. These skills additions may be necessary for other children who also display weaknesses with alerting and orienting attention, skills that are necessary for the development of voluntary, executive attention.

A noteworthy finding from this study were the differences in on-task behavior skills acquisition among the participants. Even among those participants whose attendance was poor, improvements were noted in their off-task behaviors. In contrast, only those children who did not have attendance concerns showed improvements in on-task behaviors. It will be crucial that inter-professional collaboration and planning occur to help to eliminate these concerns, and/or that teacher outcome expectations be informed

by this trend. In addition to attendance considerations, some variability in participants' performance was noted across the study. Moreover, some students actually demonstrated declines in on-task behavior during the intervention or spikes in off-task behavior, which improved after the intervention. Therefore, as with the impact of attendance, it will be important that teachers understand that improvements associated with the intervention might not be fully visible until after the intervention has ended. Evaluating outcomes prematurely may not reflect accurate findings.

Limitations and Directions for Future Research

There are limitations with the present study. The primary limitation is single-case design; therefore, the obtained findings are not generalizable to a larger population. In addition, while the children participating represented diverse backgrounds with regard to race, ethnicity, and school-based services, all of the participants were from the same elementary school. These findings may not generalize to other grade levels, schools or geographical regions at this time. That said, the results are promising and suggest a larger study is needed.

Additional data were not gathered on the participants, which may have provided additional interpretable variables. For example, the referral for group was based on informal teacher assessments rather than parent and teacher rating scales that quantified symptoms associated with ADHD. That said, parent and teacher ratings of children's behavior can be subject to bias as well. It was also presumed that the participants' cognitive functioning within the average range, as this study did not formally control for IQ.

There were limitations of time parameters for the study. Because of time constraints, baseline stability was not established for participants. Ideally, prior to the intervention phase, baseline data should demonstrate a stable trend that remains constant or is opposite of the direction from what the researcher expects for behavior change due to intervention (Kratochwill, et al., 2010; Kratochwill & Levin, 2014). For this study, across all phases, there was variability. More pre-intervention baseline data collection time would have allowed for more stability. Ideally, there would be consistent patterns and limited variability among the data points for the baseline data collection. When there are fewer inconsistencies and immediate effects, these patterns are considered more desirable during the analysis of treatment effect (Kratochwill et al., 2010). At the same time, a lack of stability at the baseline, can also be explained by the fact that children with and at-risk for ADHD tend to demonstrate more inconsistencies with attention to task (Blood et al., 2011; Rapport, Kofler, Alderson, Timko, & DuPaul, 2009). This variability was observed across all phases of the study.

Time constraints were the most salient factor in the prescribed timeframe. Specifically, the time constraints for this study related to the classroom teacher's schedule. She was available only until Spring Break. Afterward, she was out on medical leave. Therefore, because the classroom teacher would not be available beyond spring break, baseline and maintenance data collection were impacted by a limited timeline. The lead researcher considered extending the data collection periods; however, it was decided that observation data collected when the teacher was out (with a substitute teacher present) was not ideal. Specifically, having a long-term substitute present would have added an additional variable that was deemed more problematic than a shortened data

collection time. A related limitation was due to breaks in the intervention and data collection due to the school closings for the students and the research assistants. These breaks are noted on the graphs of observational data; however, it is unknown if the intervention might have been more effective had extended breaks not been a factor in this study.

Finally, specific data were not collected related to the amount of labeled verbal praise. Previous research suggested that if a participant receives a reward, even that of positive labeled praise, for specific behaviors and then these contingency decreases, children may engage in target behaviors (e.g., off-task behaviors) to regain access to contingencies (Lerman & Iwata, 1995). It is possible that the variability observed across observations was also linked to extinction bursts beyond the variability that was expected among these students who displayed attention regulation difficulties.

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APPENDICES

APPENDIX A – Teacher Consent Form

Teacher Consent to Participate in Research

Identification of Investigators & Purpose of Study

You and select students in your class (with parental consent) are being asked to participate in a research study conducted by Virginia Larsen, CAGS, NCSP, ABSNP, a graduate student in the Clinical and School Psychology doctoral program at James Madison University (JMU). Virginia will be supervised by Elena Savina, Ph.D., a faculty member and clinical psychologist. The purpose of this study is to provide a small group intervention to elementary school students who exhibit off-task or attentional difficulty behaviors. You, the primary teacher, will serve as the referral source for the study. Prior to the first intervention group and after the conclusion of the intervention groups, you will be asked to provide feedback about students' on- and off-task behavior strengths and weaknesses. You will also have face-to-face interaction with the primary investigator, Virginia Larsen. For your students, after the initial assessment, the students you identify as having weaknesses with attention regulation have the opportunity to participate in a small group, which is aimed at improving students' self-regulation skills. Specifically, the group will utilize the *Play, Learn, and Enjoy* curriculum, which is authored by Dr. Elena Savina, Ms. Larsen, and other colleagues. *Play, Learn, & Enjoy* is a game-based regulation and socio-emotional learning curriculum for elementary school students that bridges attention and self-regulation skills with socio-emotional competencies. The focus of this study will be on the activities associated with attention regulation. This study will contribute to the researcher's completion of her Doctoral Dissertation.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction.

All of the research procedures will be conducted at Spotswood Elementary School. You, the primary teacher, will serve as the referral source for this study. You will be asked to identify students in your classroom who exhibit off-task behaviors or struggle with attention regulation. For these students, you will also be asked to send home a parent informed consent form, and will coordinate with the primary investigator, Virginia Larsen, regarding obtaining students' assent. Should parents or students have questions about the study, you will serve as a liaison between Ms. Larsen and the study participants. Ms. Larsen is happy to meet with students and/or their parents before, during and after the study to answer any questions. For those students for whom consent is obtained, you will participate in a face-to-face interview with Ms.

Larsen prior to the commencement, and at the conclusion of, the intervention groups. The interview will focus on your observations of each child's attention regulation strengths and weaknesses; as well as your use of whole group, small group, and individualized strategies to scaffold attentional skills. You, perhaps in consultation with the principal, will identify a consistent meeting space for the small group; and you will designate the time of day and days of the week the group will be held.

For your students, each child will first participate in an individual assessment of their attention, using the Test of Everyday Attention for Students – Second Edition (TEACh-2). Research assistants who are trained observers, will also observe each student in the classroom and note on- and off-task behaviors, using the BOSS (Behavior Observation of Students in Schools). The students participating in the group will not know these observers are there for them. The research assistants will not be interacting with you or the students. They will only require a place to sit that allows for the observations to take place. After these initial assessments, each student will participate 15 small group sessions using the *Play, Learn, and Enjoy* curriculum. The research assistants will continue to observe the students in the group and will collect data on their on- and off-task behavior during the intervention timeframe, as well as in the two weeks following the group. After the group sessions conclude, the students who participated in the group will again participate in an individual assessment of their attention, using the TEACh-2. Ms. Larsen will administer this assessment. All procedures will be implemented by or with the collaboration of Virginia Larsen, and supervised by Dr. Savina, a Virginia licensed clinical psychologist.

Time Required

Participation in this study will require pre- and post- intervention interviews that will last for at least 20 minutes, and longer if you wish to provide more feedback. For the identified students, an initial 30 minutes for the NEPSY-II assessment will also be required. The time of the assessment will be at your discretion. The small groups will occur twice per week, for 50 minutes. Barring student holidays or inclement weather, the groups will run for approximately 8-9 weeks. The groups will be held at a time and on days of the week that are convenient for you and during which your students will not miss core instruction. Observations will be unobtrusive and will occur during core language arts and math instruction. At the conclusion of the study, students will again participate in the NEPSY-II assessment, which will require 30 minutes. There are no costs for the intervention group, interviews, or the study in general.

Risks

The investigator does not perceive more than minimal risks from your involvement or the involvement of your students in this study. The *Play, Learn and Enjoy* curriculum is based upon well researched and documented developmental, neuropsychological and psychological research. In similar research on this topic, the Dr. Savina has found that students enjoy the small

group interaction and teachers are satisfied with the procedures as implemented. No adverse events have been noted or reported.

Benefits

Potential benefits from participation in this study include the development of improved on-task behavior in the classroom. Upon completion of the study, all information on individual participants (including interview data, observational records and group activity materials) will be destroyed. All records will be coded with non-identifiable numeric codes and dates only.

Confidentiality

In order to protect confidentiality, no names will appear on interview, assessment, observation data or materials. Each student will be identified only by numerical code; you will be identified as "teacher." No information that could identify you or each student will be included in any reports or discussions related to this research.

The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the observations and responses as a whole. All data will be stored in a secure location accessible only to the researcher. Data sheets will be secured in locked file cabinets and also stored on computers secured by passwords so that data and information coded only by number are accessible only to members of the research team.

The results of this research will be submitted for partial fulfillment of requirements for Virginia Larsen's Doctor of Psychology degree, presentation at professional meetings, and for publication and distribution for educational purposes. Confidential data obtained may also be reported without identification in grant applications. The results of the research will be coded in a way that participants' identities will never be revealed in any presentation or publication.

Participation & Withdrawal

Your participation is entirely voluntary. You and each student are free to choose not to participate. Should you and each student choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Virginia Gallup Larsen, Med, MA, CAGS, NCSP Doctoral Student

James Madison University

larsenvg@jmu.edu

(703) 447-7728

-or-

Elena Savina, Ph.D.

Clinical Psychologist

James Madison University

savinaea@jmu.edu

Questions about Your Rights as a Research Subject

Dr. Taimi Castle

Chair, Institutional Review Board

James Madison University

(540) 568-5929

castletl@jmu.edu

APPENDIX B – Parent Consent Form

Teacher Consent to Participate in Research

Identification of Investigators & Purpose of Study

You and select students in your class (with parental consent) are being asked to participate in a research study conducted by Virginia Larsen, CAGS, NCSP, ABSNP, a graduate student in the Clinical and School Psychology doctoral program at James Madison University (JMU). Virginia will be supervised by Elena Savina, Ph.D., a faculty member and clinical psychologist. The purpose of this study is to provide a small group intervention to elementary school students who exhibit off-task or attentional difficulty behaviors. You, the primary teacher, will serve as the referral source for the study. Prior to the first intervention group and after the conclusion of the intervention groups, you will be asked to provide feedback about students' on- and off-task behavior strengths and weaknesses. You will also have face-to-face interaction with the primary investigator, Virginia Larsen. For your students, after the initial assessment, the students you identify as having weaknesses with attention regulation have the opportunity to participate in a small group, which is aimed at improving students' self-regulation skills. Specifically, the group will utilize the *Play, Learn, and Enjoy* curriculum, which is authored by Dr. Elena Savina, Ms. Larsen, and other colleagues. *Play, Learn, & Enjoy* is a game-based regulation and socio-emotional learning curriculum for elementary school students that bridges attention and self-regulation skills with socio-emotional competencies. The focus of this study will be on the activities associated with attention regulation. This study will contribute to the researcher's completion of her Doctoral Dissertation.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction.

All of the research procedures will be conducted at Spotswood Elementary School. You, the primary teacher, will serve as the referral source for this study. You will be asked to identify students in your classroom who exhibit off-task behaviors or struggle with attention regulation. For these students, you will also be asked to send home a parent informed consent form, and will coordinate with the primary investigator, Virginia Larsen, regarding obtaining students' assent. Should parents or students have questions about the study, you will serve as a liaison between Ms. Larsen and the study participants. Ms. Larsen is happy to meet with students and/or their parents before, during and after the study to answer any questions. For those students for whom consent is obtained, you will participate in a face-to-face interview with Ms. Larsen prior to the commencement, and at the conclusion of, the intervention groups. The interview will focus on your observations of each child's attention regulation strengths and weaknesses; as well as your use of whole group, small group, and individualized strategies to scaffold attentional skills. You, perhaps in consultation with the principal, will identify a

consistent meeting space for the small group; and you will designate the time of day and days of the week the group will be held.

For your students, each child will first participate in an individual assessment of their attention, using the Developmental Neuropsychological Assessment – Second Edition (NEPSY-II). Research assistants who are trained observers, will also observe each student in the classroom and note on- and off-task behaviors, using the BOSS (Behavior Observation of Students in Schools). The students participating in the group will not know these observers are there for them. The research assistants will not be interacting with you or the students. They will only require a place to sit that allows for the observations to take place. After these initial assessments, each student will participate 15 small group sessions using the *Play, Learn, and Enjoy* curriculum. The research assistants will continue to observe the students in the group and will collect data on their on- and off-task behavior during the intervention timeframe, as well as in the two weeks following the group. After the group sessions conclude, the students who participated in the group will again participate in an individual assessment of their attention, using the NEPSY-II. Ms. Larsen will administer this assessment. All procedures will be implemented by or with the collaboration of Virginia Larsen, and supervised by Dr. Savina, a Virginia licensed clinical psychologist.

Time Required

Participation in this study will require pre- and post- intervention interviews that will last for at least 20 minutes, and longer if you wish to provide more feedback. For the identified students, an initial 30 minutes for the NEPSY-II assessment will also be required. The time of the assessment will be at your discretion. The small groups will occur twice per week, for 50 minutes. Barring student holidays or inclement weather, the groups will run for approximately 8-9 weeks. The groups will be held at a time and on days of the week that are convenient for you and during which your students will not miss core instruction. Observations will be unobtrusive and will occur during core language arts and math instruction. At the conclusion of the study, students will again participate in the NEPSY-II assessment, which will require 30 minutes. There are no costs for the intervention group, interviews, or the study in general.

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Benefits

Potential benefits from participation in this study include the development of improved on-task behavior in the classroom. Upon completion of the study, all information on individual participants (including interview data, observational records and group activity materials) will be destroyed. All records will be coded with non-identifiable numeric codes and dates only.

Confidentiality

In order to protect confidentiality, no names will appear on interview, assessment, observation data or materials. Each student will be identified only by numerical code; you will be identified

as “teacher.” No information that could identify you or each student will be included in any reports or discussions related to this research.

The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the observations and responses as a whole. All data will be stored in a secure location accessible only to the researcher. Data sheets will be secured in locked file cabinets and also stored on computers secured by passwords so that data and information coded only by number are accessible only to members of the research team.

The results of this research will be submitted for partial fulfillment of requirements for Virginia Larsen’s Doctor of Psychology degree, presentation at professional meetings, and for publication and distribution for educational purposes. Confidential data obtained may also be reported without identification in grant applications. The results of the research will be coded in a way that participants’ identities will never be revealed in any presentation or publication.

Participation & Withdrawal
Your participation is entirely voluntary. You and each student are free to choose not to participate. Should you and each student choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study
If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Virginia Gallup Larsen, Med, MA, CAGS, NCSP Doctoral Student
James Madison University
larsenvg@jmu.edu
(703) 447-7728
-or-
Elena Savina, Ph.D.
Clinical Psychologist
James Madison University
savinaea@jmu.edu

Questions about Your Rights as a Research Subject
Dr. Taimi Castle
Chair, Institutional Review Board
James Madison University
(540) 568-5929
castletl@jmu.edu

APPENDIX C – Child Assent Form

Child Assent to participate in Research.

My name is Ms. Virginia. I want to learn more about how children learn to pay attention in school.

Sometimes it can be hard to pay attention, listen, or sit still, which can make doing things at school hard.

I would like you and up to five of your friends in your class to be a part of my study because I want to help you and other students learn how to do their best in school.

With your friends, we will be playing games, reading stories and learning about adventures that will help us all to pay attention. I will ask you and your friends to have fun together as you learn how to solve problems.




I am doing this so I can help you to do your best in school.

I would also like to play some games that test your attention.

You do not have to participate if you don't want to. You can also stop participating at any time.

Talk to your parents about my study. If you would like to join me, please check the "yes" box. If you do not want to join me (this is okay!), please check the "no" box.

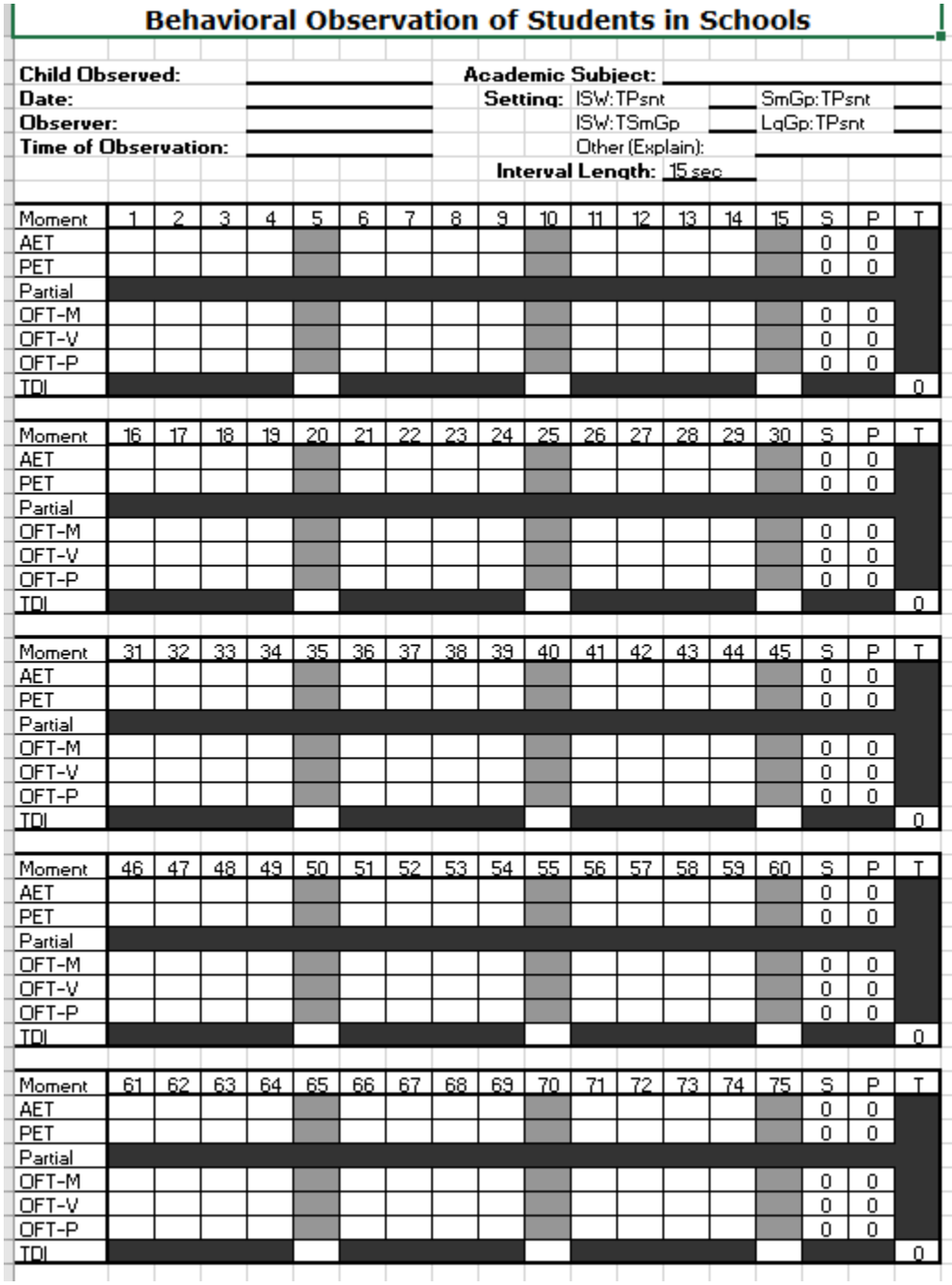
I want to participate in this study - YES ☐

Name

I do not want to participate in this study – NO ☐

Name

APPENDIX D – BOSS Recording Form



Behavioral Observation of Students in Schools

Child Observed: _____ **Academic Subject:** _____

Date: _____ **Setting:** ISW:TPsnt ___ SmGp:TPsnt ___

Observer: _____ ISW:TSmGp ___ LgGp:TPsnt ___

Time of Observation: _____ Other (Explain): _____

Interval Length: 15 sec

Moment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	S	P	T
AET																0	0	
PET																0	0	
Partial																		
OFT-M																0	0	
OFT-V																0	0	
OFT-P																0	0	
TDI																		0

Moment	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	S	P	T
AET																0	0	
PET																0	0	
Partial																		
OFT-M																0	0	
OFT-V																0	0	
OFT-P																0	0	
TDI																		0

Moment	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	S	P	T
AET																0	0	
PET																0	0	
Partial																		
OFT-M																0	0	
OFT-V																0	0	
OFT-P																0	0	
TDI																		0

Moment	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	S	P	T
AET																0	0	
PET																0	0	
Partial																		
OFT-M																0	0	
OFT-V																0	0	
OFT-P																0	0	
TDI																		0

Moment	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	S	P	T
AET																0	0	
PET																0	0	
Partial																		
OFT-M																0	0	
OFT-V																0	0	
OFT-P																0	0	
TDI																		0

APPENDIX E – Sample *PLE* Activities

Play, Learn, and Enjoy Thematic Activities

For this study, the independent variable was the *Play, Learn, and Enjoy* curriculum (Savina et al., 2018). Below is a sample of some of the activities that were utilized in addition to thematic overviews and collaborative planning activities:

- Comparing Pictures/Finding Differences: These activities require visual selective attention. Children are asked to compare two pictures and circle the differences between them. These activities were utilized for three lessons:
    - Find 5 Differences – Fish (Lesson #7)
    - Finding Differences – Desert (Lesson #13)
    - Find the Differences – Garden (Lesson #14)
- Embedded Pictures: The participants were presented with a worksheet containing overlaid pictures. This task requires for children to identify the single target items that are included in the more complex, embedded pictures. Selective Attention is the neurocognitive process utilized in these activities, which were utilized for three lessons:
    - Taking Pictures – Rainforest (Lesson #5)
    - Sea Animals (Lesson #9)
    - Find the Desert Animals (Lesson #12)
- Listening/Auditory Discrimination: Students are asked to identify a specific sound that is imbedded in background noise. Then, the children were requested to provide a

signal when they heard the requested sound(s). This activity taps into the following cognitive processes: auditory discrimination, selective auditory attention, and impulse inhibition. These activities were utilized for two lessons:

- Listening to Boat Horns (Lesson #8)
- Listen to Whales (Lesson #11)

- Search Tasks: For these activities, children are presented with worksheets and asked to circle or strike through a stimulus item of a particular shape, while ignoring similar distractor items. After they are finished, children are presented with a key and asked to check their work. The neurocognitive processes measured by search tasks include interference control, selective visual attention, and response inhibition. These activities were utilized for six lessons:
  - Looking for Berries (Lessons #4 and #5)
  - Counting Shells (Lesson #8)
  - Snow Flakes (Lessons #10 and #11)
  - Flowers in a Bouquet (Lesson #14)
- Trail Making: Trail-making tasks measure the neurocognitive processes of visual search speed, visual scanning, visual processing speed, and mental flexibility; as well as executive functioning, including visual attention, interference control and planning. These activities require students to quickly formulate a path or plan for separate trajectories, while maintaining accuracy. These activities were utilized for four of the lessons:

    - Trail Making with Birds (Lesson #2)
    - Trail Making with Frogs (Lesson #2)
    - Trail Making with Fishing Poles (Lesson #7)
    - Trail Making with Snakes (Lesson #12)

- Watch for the Signal: This activity is similar to the game, "Simon Says." The leader asks the children different questions. They may only provide an answer when a specific, practiced hand signal is given. The skills that are required for the successful completion of these tasks include visual attention and impulse inhibition. This skill is used most explicitly in Lesson #1.
- Yes and No Game: The leader asks different questions and the children must answer with complete sentences, rather than with just "Yes" or "No." The children were provided feedback and scaffolded assistance as needed. These tasks employ selective attention.
    - Yes and No – Rainforest (Lesson #4)
    - Yes and No – Going Fishing (Lesson #7)
    - Yes and No – Climb Kilimanjaro (Lesson #15)