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Teacher-Led Active Classroom Breaks to Improve Student On-Task Behavior: A Dose-Response Study

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Teacher-Led Active Classroom Breaks to Improve Student On-Task Behavior:

A Dose-Response Study

By

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A Dissertation Submitted in Partial Fulfillment of the

Requirements for the Degree of

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In

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Dedication

To my family and friends who have continued to support me through this journey of following my dreams. Thank you for always being there for me, near or far, and offering your unwavering support, love, and encouragement. I am grateful for your patience, understanding, and sacrifices, which have allowed me to pursue my doctoral degree.

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Active Breaks (AB) are a classroom management strategy to increase student on-task behavior in elementary-aged general education populations. ABs are defined as short bouts of physical activity that take place between academic instructional periods. Research has focused on breaks with a dosage ranging from 4- to 15-min, with demonstrated positive effects. The current study aimed to address several gaps in the literature related to teacher implementation of breaks, dosage of breaks, and assessment of teacher and student acceptability and perceptions of ABs. The impact of teacher-led ABs on student on-task behavior was examined across two 3rd grade general education classrooms through the implementation of a within-subject ABC research design, with each classroom exposed to each of the three conditions. Results of this study demonstrated that 4-min and 8-min breaks were both found to have a positive impact on student on-task behavior when compared to baseline. Additionally, each of the participating classrooms exhibited differences in the dosage required to produce positive effects, indicating that the appropriate dosage may vary by classroom. Furthermore, participating teachers rated student on-task behavior similarly when comparing DBR data to direct observation data gathered by external observers, supporting the idea that teachers can produce accurate ratings of student on-task behavior. Lastly, both teachers and students rated the AB intervention as acceptable, feasible, and enjoyable through the IRP-15 and KIP. While these findings are promising, additional research is required to further the evidence regarding AB dosage requirements and accuracy of teacher DBRs.

Chapter 1

Introduction

Classroom management is a skill that educators must have to teach effectively and respond appropriately to disruptive behaviors exhibited by students in the classroom (Korpershoek et al., 2016). Research on classroom management supports utilizing preventative strategies (e.g., setting classroom rules, promoting positive student-teacher relationships) rather than reactive strategies (e.g., punishing disruptive students; Korpershoek et al., 2016). Effective classroom management involves implementing classwide procedures that are focused on creating an appropriate academic and social-emotional learning environment for all students (Korpershoek et al., 2016; Long et al., 2018). However, creating an environment that is conducive to learning is one of the most difficult challenges teachers face, especially when having to meet the diverse needs of students. Difficulty managing their classroom can result in an increase in teacher stress, dissatisfaction with their job, and burnout that could ultimately lead to increased attrition rates (Long et al., 2018). Along with negatively influencing teachers, disruptive and off-task student behaviors often interrupt instructional time and the entire class. These interruptions can result in several negative outcomes for students such as decreased instructional time and lower academic achievement (Long et al., 2018).

Though the main priority of schools is to provide students with tools to be successful academically and increased academic instruction is thought to lead to higher test scores, prolonged periods of instruction may also lead to an increase in undesirable student behaviors such as disruptive behaviors, inattention, and anxiety (Dinkel et al.,

2017). With problem behaviors increasing in classrooms, teachers need effective strategies to address undesirable student behaviors. In fact, for teachers to successfully manage their classroom, there are several goals they must focus on, including: (1) promoting student self-regulation and (2) using appropriate interventions to decrease student problem behavior in classrooms. Both goals signify the importance of addressing student behavior and self-regulation in the classroom (Korpershoek et al., 2016). There have been several classroom management strategies discussed previously in the literature that focus on addressing student behavior. A few strategies discussed in a meta-analysis conducted by Korpershoek and colleagues (2016) include establishing classroom rules, implementing group contingencies, and utilizing reward-based interventions such as the good behavior game. In addition, another classroom management strategy that has been discussed in the literature is the implementation of classroom breaks (Dinkel et al., 2017; Goh et al., 2016; Howie et al., 2014, 2015; Klatt et al., 2013; Ma et al., 2014, 2015; Mahar et al., 2006; McMullen et al., 2014; Schmidt et al., 2016).

Benefits of Classroom Based Physical Activity

Children and adolescents spend much of their time in school, averaging six or more hours per day, for 180 days a year (Dinkel et al., 2017). The amount of time that students spend in school can provide an opportunity for teachers to incorporate physical activities to get children moving throughout the day. In addition, students are recommended to engage in at least 60-min of age-appropriate physical activity per day, to help stay healthy both physically and mentally (Klatt et al., 2013; McMullen et al., 2014). There are many reasons students may benefit from taking breaks during the school day.

In fact, some research suggests that children display fewer problem behaviors, are more engaged, and perform better academically when they participate in physical activities throughout the school day (Klatt et al., 2013; Mahar et al., 2006; McMullen et al., 2014; Schmidt et al., 2016).

Classroom-based physical activity breaks are defined as physical activities that occur inside or outside of the classroom (e.g., hallway, playground) during regular class hours (Watson et al., 2017). These breaks are separate from recess and can take three different forms: active breaks, physically active lessons, and curriculum-focused active breaks (Watson et al., 2017). These strategies are commonly implemented classwide, allowing for all students in the classroom to take a brief break from academic instruction during the school day. In addition, classroom breaks provide teachers with a preventative behavioral classroom management strategy for all students with minimal interruption of academic instruction. That is, classroom activity breaks allow for students to release energy during the break, reducing the potential for disruptive behavior to occur during academic instruction. Research has suggested that more time in academic instruction can lead to increased maladaptive student behaviors such as inattention, fidgety behavior, and difficulty concentrating (Dinkel et al., 2017). In fact, long periods of academic instruction may reduce student academic productivity and performance (Mahar et al., 2006). Another benefit of classroom breaks is that they are relatively easy for teachers to implement. That is, breaks can be implemented effectively and efficiently with few materials required. Furthermore, classroom breaks have been widely researched across many grades and abilities, ranging from preschool to high school students (Semple et al., 2017;

Watson et al., 2017). Previous literature suggested that it might be easier to incorporate effective breaks with younger students (Dinkel et al., 2017). Most of the literature has focused on implementation of classwide breaks in general education classrooms with elementary-aged students. For example, Goh et al. (2016) implemented active breaks in nine classrooms of 3rd to 5th grade students. Another study, conducted by Howie et al. (2014), implemented exercise breaks in several 4th and 5th grade classrooms. The focus on the elementary school population could be because teachers struggle more with keeping younger students attentive and on-task in comparison to older students. For example, research suggests that children's sustained attention to tasks improves with age, therefore, younger children likely require more breaks during the school day to promote on-task behavior (Godwin et al., 2016). In addition, younger students may participate in classroom breaks at higher rates because they find the activities fun and look forward to engaging in them. Lastly, research suggests that the use of classroom breaks can lead to several positive academic and behavioral outcomes for students, such as improving overall academic achievement as measured through standardized assessments, grades, and quizzes and reducing student problem behaviors in the classroom, such as inattention and lack of effort (Carlson et al., 2015; Howie et al., 2015; Watson et al., 2017)

Overall, providing students with breaks throughout the school day can enhance their ability to focus and learn while decreasing their undesirable behaviors. Much of the literature reviewed in published meta-analyses has focused on the use of a specific type of break, which are active breaks. This topic has especially been popular focusing on

students in elementary schools (Dinkel et al., 2017; Semple et al., 2017; Watson et al., 2017).

<div align="center">**Active Breaks**</div>

Active breaks are a type of classroom break that allows for students to move around to release some energy so they can focus better on educational tasks. Examples of active breaks are dancing, arm and leg movements, or moving around the classroom (Watson et al., 2017). In previous literature, there have been several definitions of active breaks. However, active breaks are commonly defined as short bouts of physical activity that take place between academic instructional periods (Schmidt et al., 2016; Turner & Chaloupka, 2017; Watson et al., 2017). These breaks may occur while transitioning from one academic subject to the next or they could take place in the middle of an academic lesson. An example of an active break is having students engage in a 5 to 10-min movement activity, such as dancing or stretching, before the teacher introduces a new subject. There are many different programs available to teachers to help implement active breaks in their classroom.

Active Break Programs

A review of the literature suggested that active breaks have many resources that are easily and readily accessible for teachers and schools (Daly-Smith et al., 2018; Goh et al., 2016; Mahar et al., 2006; Semple et al., 2017). In fact, over 17 programs have been mentioned in the published literature as being used for implementing classroom-based physical activity. The most commonly cited programs include Energizers, Take10!, FUNtervals, GoNoodle, Encouraging Activity to Stimulate Young Minds (EASY Minds),

and BrainBITES. (Dinkel et al., 2017; Howie et al., 2014; Kibbe et al., 2011; Mahar et al., 2006; Turner & Chaloupka, 2017; Watson et al., 2017). Most of these programs are accessible online and are free for teachers to use. The FUNtervals manual is available online for free. To access GoNoodle, teachers are required to sign up to gain access to the free materials. The TAKE10! Program costs around $100 for teachers to gain access to the materials. Resources for BrainBITES, Energizers, and EASY minds interventions were not found online. Overall, the programs were commonly implemented classwide with primary grade students and included a variety of physical activities (Watson et al., 2017). Additionally, most programs required minimal set-up (e.g., aerobic movements such as jumping jacks), while implementation of others required the use of additional equipment and a location outside of the classroom (e.g., playground, sports field, technology; Watson et al., 2017).

Dosage of Active Breaks

In addition to the selection and design of activities, the ideal active break length is an important consideration given that they generally require time away from instruction. Previous literature on active breaks focused on ones that were no longer than 15 min (Carlson et al., 2015; Goh et al., 2016; Mahar et al., 2006; Schmidt et al., 2016). Additionally, at least one previous study found that breaks as brief as 4 min can improve student behavioral outcomes (Ma et al., 2014). The required dosage, or length of break time, to promote positive student outcomes has not been thoroughly researched. However, one study compared different dosages of active classroom breaks with students from eight classrooms in 4th and 5th grade (Howie et al., 2014). Participating classrooms

were exposed to randomized doses of 5-, 10-, and 15-min breaks, two times per week for a 4-week period. Findings suggested that breaks that lasted 10-min were the most effective for increasing student-on task behavior. However, 10-min breaks may not be feasible for all teachers due to their busy schedules. Therefore, classroom breaks that can be implemented in a short amount of time are more likely to be accepted by teachers due to the minimal interference with instructional time. This is important to note since time constraints are identified as one of the biggest barriers that teachers face when determining whether to use breaks in their daily instructional routine (McMullen et al., 2014).

Teacher Training Requirements

Another topic that is discussed throughout the literature is the need for teacher training before implementing active breaks in their classroom. Across several studies, teachers wishing to implement active breaks completed a training session that lasted between 30 min to an hour, with some studies not specifying the length of the training session (Carlson et al., 2015; Goh et al., 2016; Mahar et al., 2006; Schmidt et al., 2016). The training sessions typically involved an overview of why active classroom breaks should be implemented as well as hands-on experience and practice with the implementation materials (Goh et al., 2016; Mahar et al., 2006). The length of these training sessions may explain why active classroom break studies have been primarily implemented by researchers. Whereas having researchers implement classroom breaks may be convenient for teachers, it is not realistic or practical in school settings.

Student Outcomes Examined in Previous Active Break Research

It is important to review the magnitude of effects on various outcomes within the existing active classroom breaks research to help determine if they are a beneficial and acceptable intervention for the classroom. Previous research measured the effects of active breaks on student outcomes related to behavior regulation, productivity on various tasks, and success in the classroom.

Student On-Task Behavior

Student on-task behavior is one of the most measured outcomes in active classroom break research. The popularity of this variable could be because teachers are continuously looking for ways to improve students' on-task behavior. A study by Mahar et al. (2006) assessed the effectiveness of Energizers, a physical activity program, on kindergarten through 4th grade students' physical activity levels and on-task behavior. On-task behavior of 62 3rd and 4th grade students was observed, and mean percentages of time spent on-task were recorded weekly for each class. Findings were promising in those classrooms that participated in the Energizers program as student on-task behavior increased by a mean of 8% from pre- to post-intervention. In a similar study, Goh et al. (2016) measured the effectiveness of the active break intervention TAKE 10! on 3rd grade students' on-task behavior across nine classrooms. Observed student on-task behavior increased 8% after the intervention was implemented suggesting that TAKE 10! may be an effective intervention for increasing student on-task behavior. Furthermore, a meta-analysis conducted by Watson et al. (2017) assessed the influence of physical activity in elementary school classrooms on three academic-related outcomes, one of which was

classroom behavior. Of the studies reviewed, 12 focused specifically on student on-task behavior outcomes. Ten of the 12 studies observed that participation in classroom-based physical activity increased short-term student on-task behavior. However, long-term effects of classroom physical activity on on-task behavior were not assessed. Lastly, Daly-Smith et al. (2018) discussed the findings from two studies that implemented active breaks. Both studies suggested that active breaks as brief as 4 min had the potential to increase students' on-task behavior. Empirical support is emerging from these studies that active breaks can improve student on-task behavior.

Student Academic Performance

Student academic performance is one outcome that has been measured after implementing active breaks during instructional periods. For example, Howie et al. (2014) conducted a movement break study with 96 students in 4th and 5th grade across five classrooms. Each classroom was randomized to implement a 5-min, 10-min, 20-min exercise break or a 10-min lesson given by the researchers. Results suggested that classroom active breaks led to increased correct answers on mathematics problems after 10- and 20-min breaks. In addition, after implementing classroom-based physical activity, the impact of active breaks on student achievement outcomes were assessed in several studies included in the Watson et al. (2017) meta-analysis. Throughout these studies, academic achievement was assessed using several measures such as progress monitoring tools, standardized tests, grades, and quizzes. Effects that classroom-based physical activity had on academic achievement differed by the length and type of measure used. Seven of eight studies that used a progress monitoring tool observed

improvement in student academic achievement. However, four of seven studies that used

standardized tests as outcome measures showed no improvement in academic

achievement. Academic achievement outcomes using grades and quizzes were

inconsistent within the literature, with some reporting improvement in grades and quiz

scores and others reporting no difference. Overall, findings have been varied related to

the impacts that active breaks have on student academic performance. Many of the

studies that looked at student academic achievement included active breaks that were

over 10-min in length, which, as discussed previously, may not be feasible for all

teachers. Future research should focus on whether shorter active breaks have the capacity

to increase student academic performance on various tasks.

Classroom Behavior

Classroom behavior outcomes were measured by one study after implementing

active classroom breaks across six elementary school districts. Carlson et al. (2015)

investigated how physical activity breaks in the classroom affected classroom behavior as

well as student physical activity levels. Teachers assessed classroom behavior by

completing a 10-question survey adapted from the Classroom Behavior and Assets Scale

to determine whether classroom behavior improved after active breaks were

implemented. The survey consisted of items regarding positive student behaviors,

problem behaviors, and included questions related to "attention problems, social

withdrawal, antisocial behavior, and low motivation" (Carlson et al., 2015, p. 68).

Researchers found that teachers who implemented active breaks in their classrooms

identified fewer students with problem behaviors such as inattention and lack of effort, in comparison to teachers that did not implement these breaks.

Cognition

Cognition is another outcome variable that has been examined with active breaks. Cognitive processes assessed across these studies included variables such as reaction time, working memory, and processing speed (Daly-Smith et al., 2018; Watson et al., 2017). In a meta-analysis conducted by Watson et al. (2017) regarding active break use in classrooms, 12 studies assessed aspects of student cognitive function. However, results from all studies included in the meta-analysis indicated that classroom-based physical activity had no effect on cognitive function. Similarly, in a more recent meta-analysis, Daly-Smith et al. (2018) identified six studies that measured student cognition outcomes. In line with previous findings, minimal to no changes in cognition were found after active breaks were implemented in the classroom.

In summary, the active break literature has supported the implementation of breaks to improve student classroom behavior, had mixed results regarding the improvement of student academic achievement outcomes, and did not support improving student cognitive processes. Overall, teachers that are interested in improving classroom behavior may consider implementing active breaks as previous literature shows promising outcomes. On the other hand, further research is required to determine if active breaks can produce successful outcomes for improving student cognitive processes and academic achievement.

Barriers to Implementation of Active Breaks in the Classroom

Though it is important to discuss the beneficial outcomes within the literature, it is equally important to discuss barriers of implementing active classroom breaks. Published research has identified several barriers regarding active breaks, including a lack of classroom space, the time required to implement a break, the time needed for training, and the unknown effectiveness of breaks across students (Carsley et al., 2015; Cothran et al., 2010; Dinkel et al., 2017; Mahar et al., 2006).

Teachers may choose not to implement classroom breaks because of a lack of space in the classroom, lack of resources, and lack of time required for training (Dinkel et al., 2017). In 2019, the Organization for Economic Co-operation and Development reported that primary and secondary classrooms in the United States have 20.8 and 25.7 students on average, respectively. Classrooms with more students likely have more desks and less space for movement, which can be a concern when implementing active classroom breaks. In addition, materials that are accessible online can be difficult for teachers that lack access to web-based programs. Another limitation of web-based resources is the cost associated with subscriptions to some of these programs. Gaining administrative support can be difficult due to the cost and teachers having trouble accessing materials (Dinkel et al., 2017). A couple of studies mentioned that administrator attitudes and perceptions towards implementing classroom breaks could influence teacher perceptions about the usefulness of the breaks (Dinkel et al., 2017; Mahar et al., 2006).

Another barrier that teachers are concerned with is the time required to implement breaks. Almost half of the teachers interviewed in the Dinkel et al. (2017) study stated that their biggest barrier to implementing classroom breaks was time. Teachers are worried these breaks will take time away from delivering the required curriculum. A teacher's main goal is to ensure that students learn throughout each school day. Nearly the entire school day is scheduled with content they must complete to stay on track with the required curriculum. Many teachers are fearful that classroom breaks could cut into their instructional time and prevent them from completing their lessons each day (Cothran et al., 2010).

Furthermore, previous research on active breaks discussed the training requirement for teachers to implement classroom breaks. Teacher training for active break programs can last anywhere from 30 min to a full day of training. The time commitment required of teachers to attend these training sessions can discourage them from implementing these breaks in their classrooms. Teachers are already busy, and many do not have spare time to participate in training activities. Therefore, classroom breaks that require minimal preparation and training time may be more acceptable to teachers.

Lastly, some studies have mentioned student resistance to participate in classroom breaks and difficulty getting the class back on track after the break as potential barriers to implementing them (Carsley et al., 2015; Dinkel et al., 2017). If teachers experience these difficulties, their motivation for implementing breaks could be negatively impacted (Dinkel et al., 2017). As with all activities that are utilized in classrooms, it is important

for teachers to assess what is developmentally appropriate for their students. Teachers should be aware that some students may not respond to classroom breaks as well as others and finding a balance between what breaks are successful in their classroom is a learning process (Carsley et al., 2015; Dinkel et al., 2017).

Overall, there are several barriers that teachers should consider before choosing to implement breaks in their classroom. Teachers with smaller classrooms, a lack of resources, and a lack of time may be less likely to implement classroom breaks. Additionally, if students are resistant to participate or struggle to get back on task after the break concludes, teachers may be less motivated to use breaks in their classrooms. Even though several barriers have been discussed throughout the literature, there has been considerable support from both teachers and students in the use of classroom breaks.

Teacher and Student Perceptions and Acceptability of Active Classroom Breaks

This section discusses the published studies that have examined the variables of teacher and student perceptions and acceptability of classroom breaks. Understanding these topics are important as this information can be used to promote classroom breaks to all teachers, especially those who are not currently using them (Dinkel et al., 2017). It is also important to assess student social validity to understand what students like and dislike about classroom breaks. Teacher and student social validity on the use of classroom breaks in schools have been investigated, but there is not a commonly used tool for assessing it. However, some researchers have conducted semi-structured interviews with teachers and students to assess their perceptions and acceptability prior to and/or after implementing breaks in their classroom.

Teacher Perceptions and Acceptability

Some researchers have discussed teacher perceptions and acceptability of active classroom breaks. For example, Cothran et al. (2010) surveyed teachers about their perceptions of active classroom breaks before and after implementing them. They found that teachers were more likely to adopt classroom breaks if they correlated with the teacher's own personal wellness priorities and if teachers had a high level of care regarding student health. Similarly, Dinkel et al. (2017) found that many teachers believed they could make time to incorporate more physical activity breaks into their classroom even though there were several barriers in implementing them. The same study noted that a motivating factor for teachers was the beneficial effect to students. In addition, many teachers reported wanting to learn more about how to effectively implement breaks into their classrooms. Furthermore, a study conducted by McMullen et al. (2014) found that most teachers were more supportive of classroom breaks that allowed them to incorporate academic lessons into the exercise. Teachers also noted that breaks were beneficial only if they had a positive effect on student academic success.

Overall, teachers were more likely to implement physical activity breaks for students if the activities were "simple to adopt, compatible with their teaching skills and philosophies, possible to yield observable outcomes and beneficial to make teachers innovative in their educational practices" (McMullen et al., 2014, p. 513). In summary, the literature suggests that teachers perceive breaks as beneficial when they align with their teaching strategies, are easy to implement, involve academic content, and observably benefit their students.

Classroom breaks appear to be acceptable and perceived well by teachers based on interview or survey data. This indirect information is promising and a motivating factor for teachers who are considering implementing these breaks in their classroom. However, obtaining direct information from teachers would add more evidence of the effectiveness of active breaks. One way in which this direct data can be collected is through having teachers use direct behavior ratings (DBR). DBRs combine aspects of both behavior rating scales and systematic direct observation to capture overall effectiveness of interventions (Chafouleas et al., 2009; Riley-Tillman et al., 2009). This allows for data to be repeatedly recorded by someone who has direct exposure to the target behavior, in close temporal proximity to the observational period, while using standardized methods (Chafouleas et al., 2009; Riley-Tillman et al., 2009). In previous research, DBR ratings completed by teachers were found to converge with the direct observational data collected by external observers (Chafouleas et al., 2005; Christ et al., 2011; Riley-Tillman et al., 2008). These findings provide evidence that DBR data reported by teachers can produce accurate ratings of observed student behaviors. DBRs can be used across response to intervention (RTI) tiers, including at the classroom level (Riley-Tillman et al., 2009). Overall, the use of DBRs would provide additional evidence to identify the overall acceptability and the effectiveness of classroom breaks from the teacher's point of view.

Student Perceptions and Acceptability

Just as it is important for teachers to rate classroom breaks as acceptable and effective, it is equally important that students find them beneficial as well. In the

published research, researchers have obtained most information indirectly about student perceptions and acceptability of classroom breaks. That is, researchers have asked teachers to provide their perspectives about students in forms of interviews, reflective journaling, or rating scales of student behavior like the Conner's Teacher Rating Scale-Revised (Cothran et al., 2010; Dinkel et al., 2017; Klatt et al., 2013). Though most studies have used indirect forms of student acceptability, one study directly interviewed elementary-aged students about their perceptions and acceptability of classroom break interventions.

In Howie et al. (2014), an active break intervention called Brain BITES was implemented across four classrooms of 4th grade and four classrooms of 5th grade students. The study included five focus groups of 12 to 26 students that were held one week after the classroom break intervention was completed. These focus groups assessed student acceptability and reactions to the intervention. Students commented on the intervention's benefits related to physical activity, effects on learning and academic tests after breaks, and how much they enjoyed the breaks. Many students reported the classroom breaks as a fun way of exercising and a good workout. Students also stated that they felt more awake and able to focus after completing the exercise than before, which helped them to do better on tests and assignments. Additionally, many students reported that the 5-min breaks were too short, and several preferred the 10- or 20-min breaks. Overall, students reported enjoying the active classroom break if they were 10- to 20-min in length and stated that they helped them focus and stay awake.

In summary, current literature suggests that students perceive active breaks to be acceptable. Elementary students reported that active breaks were a fun way of exercising that helped them to focus on schoolwork better after completion of the break. Students also preferred longer 10- to 20-min breaks. With the few studies that included student perspectives, their positive perceptions and acceptability regarding the use of classroom breaks provides promising evidence that they find active breaks to be enjoyable and beneficial in several domains. Knowing that students find these breaks beneficial is a motivating factor for teachers to implement classroom breaks, which can increase teacher acceptability. However, future studies should utilize more direct measures of student acceptability to support this claim.

Purpose of the Current Study

The purpose of the current study was to address several gaps in the published literature related to dosage of breaks, teacher implementation, and assessment of teacher and student acceptability and perceptions of active classroom breaks. First, although a review of the published literature indicated that several studies have mentioned the dosage of breaks used within the classroom, only one published study investigated dosage effects on active classroom breaks. Howie et al. (2014) was the first study within active break literature to consider the use of different dosages of active breaks in classrooms and their impacts on student on-task behavior. Though there were many useful aspects of the Howie et al. (2014) study, there were several limitations and areas to expand upon, which the current study addresses. For example, active breaks were implemented by researchers twice per week. It would be nearly impossible to have

researchers come in every day to guide students through a brief activity break. To help increase teacher buy-in, teachers should be the ones implementing active breaks in the classroom.

An additional expansion of the Howie et al. (2014) study is the frequency of active breaks per week. In fact, the frequency of breaks per week has not thoroughly been addressed in the literature as a potential factor in increasing student on-task behavior. It could be hypothesized that breaks are more effective at increasing student on-task behavior when used every day of the week, maintaining a consistent routine for both students and the classroom teacher.

Furthermore, one of the biggest barriers of implementing active breaks in classrooms is the time they may take away from academic instruction. Howie et al. (2014) implemented breaks that were up to 15-min in length, which teachers may find to be unattainable. Teachers are more likely to implement active breaks in classrooms if they require minimal time and are easily embedded into their daily schedule to reduce interruptions to academic instruction. Lastly, the published research discussed teacher and student perceptions and acceptability of active classroom breaks. However, most of the published research studies have asked for teacher input of researcher-led breaks rather than teacher-led breaks and student acceptability has been measured indirectly. Direct measures of teacher acceptability of breaks would require the use of DBRs, which are nonexistent in the active break literature, and therefore adds an important element to the research.

The current study focused on implementation of active breaks in elementary school classrooms for two reasons. First, most of the published research has focused on implementing breaks in elementary school classrooms. Second, elementary school teachers are more likely to struggle with keeping their students on-task. Additionally, four research questions were used to guide the study and develop hypotheses. The first research question was to what extent does increasing the dosage of active classroom breaks affect student on-task behavior? It was hypothesized that as the dosage of active breaks increases, so will student on-task behavior. The second research question, as tracked by DBRs, was do teachers endorse more student on-task behavior during active break days in comparison to baseline? It was hypothesized that through the use of DBRs, teachers will endorse more on-task behavior during active break days in comparison to baseline. The third research question examined how acceptable do teachers find teacher-led, active breaks? The final research question asked do students enjoy active breaks as measured by a student acceptability scale? It was hypothesized that both teachers and students will rate active breaks as acceptable and enjoyable as measured by a teacher and a student acceptability scale at the conclusion of the study.

Chapter 2

Method

Participants and Setting

The current study was conducted in a public elementary school in the rural Midwest. Institutional Review Board (IRB) approval was obtained before the site was recruited. After obtaining IRB approval, the principal from the prospective site was contacted by the researcher to obtain permission to recruit teacher participants in their school. After permission was granted, the Principal Investigator recruited general education teachers to participate in the study on a voluntary basis. Participants included two 3rd grade general education classroom teachers who were willing to have active breaks utilized in their classrooms.

Active classroom breaks took place within the general education classroom and during an instructional period that was agreed upon by both the teachers and the primary researcher. Each classroom consisted of a total of 18 third grade students and one teacher. The teacher was asked to choose a break time that occurs after at least 20 min of normal classroom instruction, to control for potential carryover effects of other activities (e.g., lunch or recess; Ma et al., 2014). After choosing the break time, the teacher was asked to keep the start time of the active break consistent for the entirety of the study. The active classroom break took place within the classroom setting, requiring some space within the classroom for students to engage in movements of their bodies during the activity.

Materials

Consent Forms

The researcher emailed teachers the purpose of the research study, their role in participating, and distributed consent forms for the teacher to review. In addition, consent forms were given to all students in the classroom to bring home for their parent/guardian to review and sign. Signed parental consent forms were required for the students to complete the acceptability scale at the conclusion of the study. The general education teachers also provided consent to participate in the study. In addition, student participants provided verbal assent to engage in the active breaks prior to the beginning of data collection.

Active Classroom Break Program

Active classroom break sessions were conducted across a period of eight weeks. The active breaks were teacher-led and held at approximately the same time every day. To promote teacher acceptability and feasibility of active breaks within their classroom, the researcher utilized a program called GoNoodle, which was free for teachers to join and use. To access GoNoodle, both teachers had an internet-enabled device with broadcasting capabilities, such as a laptop that was projected onto a larger screen within the classroom. Additionally, the teachers created an account for free, through the GoNoodle website (GoNoodle, n.d.).

GoNoodle provided access to several different categories such as curricular activities, social-emotional learning and mindfulness activities, sensory and motor skills activities, school life activities, and movement activities (GoNoodle, n.d.). The

movement activities category was used for this study. Specifically, the sub-categories of Guided Dance and Workout were chosen because they involve active movements such as dancing and various exercise movements. Each of the chosen subcategories had more than 50 different activities, consisting of different durations, allowing for diverse activities to keep students engaged and entertained each day (GoNoodle, n.d.). The teachers were instructed by the researcher of what dosage of break to use each week and the researcher provided the teachers with a list of pre-selected videos and links to those videos to be used each day of the week. Teachers were asked to use a timer to ensure the proper dosage of active break was delivered. Activities engaged in during each break were similar across the study conditions, with only dosage of break varying each week.

Data Collection Forms

Observation Forms. Observational data forms were provided to all researchers during each day of data collection. Observation data forms included intervals in which to record the occurrence of student on-task behavior, an operational definition of the target behavior, definitions of off-task behaviors to record, and space to write down the date of observation and the dosage of break used that day.

DBR and Fidelity Forms. A Direct Behavior Rating (DBR) form and Intervention Fidelity form were provided to teachers to complete daily during the implementation of the intervention. Teachers were asked to fill out the DBR form each day of data collection for the duration of the study. These forms provided the researcher with additional data on the effectiveness of active breaks from the classroom teacher.

These forms were designed efficiently, taking less than a few minutes for teachers to complete each day. These forms are discussed in more depth in a later section.

Treatment Acceptability Forms. Treatment acceptability forms were completed by teachers and students who were involved in the research at the conclusion of the study to measure both teacher and student acceptability and perceptions of each dosage of active classroom breaks. Teachers completed the Intervention Rating Profile (IRP-15), a shortened version of the Intervention Rating Profile (IRP), which measures teacher acceptability and perceptions of interventions (Martens et al., 1985). Student participants completed the Kids Intervention Profile (KIP) which has been used to measure student acceptability and perceptions of academic interventions (Eckert et al., 2017). These forms were handed out to all teacher and student participants on the last day of data collection. Participants were asked to fill out the forms truthfully and no identifying information was collected.

Preliminary Procedures

Teacher Training

Prior to the start of the current study, a few preliminary procedures were completed. First, teachers were familiarized with the active break program. The researcher scheduled a time to meet with the teachers to help them create a GoNoodle account, discussed the sub-categories to be used for the current study, and showed them how to broadcast the online activities to a larger screen within their classroom. During this training session, the teachers and researcher collaboratively determined what time the active break would take place each day. The time chosen for the active break remained

consistent throughout the study, to ensure reliability within data collection. In collaboration with the teachers from each classroom, it was determined that Classroom A would take a break in the mid-morning, followed by silent reading. Classroom B took a break in the afternoon, followed by their Phonics lesson. Additionally, the researcher introduced the DBR and fidelity checklist to the teacher(s) and instructed them how to complete each form on a daily basis. This training session lasted a total of 25 min during one day after regular school hours.

Operational Definition of Target Behavior

Furthermore, the target behavior for the current study was operationally defined to ensure accurate data collection between raters. For this study, student on-task behavior was chosen because it has been studied extensively in the classroom break literature and is a prominent behavior to increase to help teachers manage classroom behavior. For the current study, on-task behavior was defined as "verbal or motor behavior that follows classroom rules and is appropriate for the task at-hand" (Goh et al., 2016, p. 713; Mahar et al., 2006, p. 2088). This definition has been used in other active break studies that have measured student on-task behavior. An example of on-task behavior would be a student attending to the teacher with their body and eyes and using the required materials during academic instruction. A non-example of student on-task behavior would be a student playing with writing utensils at their desk, talking to a peer when not instructed to do so, or getting out of their seat during inappropriate times. How on-task behavior was measured during the study is discussed in the following section.

Measures

Systematic Direct Observation

To measure student on-task behavior, systematic direct observations were conducted in the classroom. Specifically, momentary time sampling was utilized. Observations were conducted for 20-min after the active break concluded. The 20-min observation was divided into 15-s intervals, with a new target student identified at each interval. An interval of 15-s was chosen for consistency with previous literature (see Appendix A; Howie et al., 2014). The researcher started a stopwatch on their Smartphone or handheld device to track each 15-s interval. At the end of each 15-s interval, the researcher observed the target student and recorded whether they were displaying on- or off-task behaviors on their data sheet. These same procedures continued for the remainder of the 20-min observation, rotating between students in a pre-determined order in the classroom.

Direct Behavior Rating

Teachers were expected to complete Direct Behavior Rating forms daily for the duration of the study. However, due to scheduling conflicts, DBRs were not collected by the teacher in Classroom A on five occasions and on two occasions by the teacher in Classroom B. DBRs provided a comparison of teacher-rated effectiveness between the dosage of active breaks utilized. Daily recordings of student on-task behavior also provided additional data to support intervention effectiveness. The DBR form was adapted from previous versions, and included dosage of break used that day, the date, and a scale from 0% (never) to 100% (always) for teachers to indicate class on-task behavior

during the instructional period directly after the active break (see Appendix B;

Chafouleas et al., 2009).

Intervention Fidelity

Furthermore, teachers were asked to collect intervention fidelity data. The

Intervention Fidelity form was located on the same form as the DBR and included a brief

4 to 6-item checklist for teachers to complete each day of the intervention with items

related to beginning the break, correct dosage used, and correct GoNoodle video used

(see Appendix B). Both teachers indicated 100% intervention fidelity as indicated

through the daily fidelity forms. The primary researcher collected fidelity data on

approximately 20% of the observation sessions to determine the inter-rater reliability of

intervention fidelity. There was 100% agreement between the teachers' ratings and the

primary researchers, suggesting that the intervention was implemented as intended.

Interobserver Agreement

Interobserver agreement (IOA) was completed for 33% of observations, which

met the standards within What Works Clearinghouse (2020). During IOA observations,

two observers concurrently collected direct observation data. IOA was calculated by

taking the number of intervals that both observers agreed on the occurrence or

nonoccurrence of the target behavior, divided by the number of total intervals observed,

then multiplying by 100 to obtain a final percentage of agreement. IOA was calculated

for observed student on-task behavior.

Prior to the start of data collection, researchers involved in the IOA data

collection process completed a 1-hr training session. Additional researchers included

undergraduate research assistants and graduate students from a school psychology

doctoral program. The primary researcher led the training session where the additional

researchers learned about the systematic direct observation implemented for this study

and the operational definition of student on-task behavior. The additional researchers

completed mock data collection sessions using a classroom observation video from

YouTube. To be approved to collect data, researchers had to attain at least 90%

interobserver agreement. Each researcher reached 100% agreement after the practice

session.

Treatment Acceptability

The last measures that were utilized for this study included both teacher and

student acceptability rating scales. The Intervention Rating Profile (IRP-15) and the Kid's

Intervention Profile (KIP) were used in the current study to assess teacher and student

acceptability at the conclusion of the study.

The IRP-15 consists of a total of 15 statements that address several aspects of

intervention acceptability. Teacher participants were instructed to rate each statement

from 1 (Strongly Disagree) to 6 (Strongly Agree), using a Likert scale style response (see

Appendix C). The IRP-15 produces a score that ranges from 15-90 and scores that are

above 52.5 are considered to indicate acceptability (Carter & Wheeler, 2019). The KIP

consists of a total of 8 questions that address several aspects of intervention acceptability

written at beginning 3rd grade level (Eckert et al., 2017). The questions are rated on a 5-

point scale from "Not at all" to "Very, very much" and included boxes that gradually

increased in size as a more developmentally appropriate indicator of acceptability for

students (see Appendix D). Two items (4 and 5) are reverse worded in comparison to the other questions asked and require recoding for analysis (Eckert et al., 2017). Scores on the KIP range from 8 to 50, with scores higher than 24 indicating acceptability (Carter & Wheeler, 2019; Eckert et al., 2017).

Research Design and Procedures

The current study utilized a within-subjects ABC design to examine student on-task behavior. Each classroom was exposed to each of three conditions: baseline or class as usual (A), 4-min active break (B), and 8-min active break (C). The order of the conditions were counterbalanced to control for order effects. That is, Classroom A was presented with an ABABCB design while Classroom B was presented with an ACACBC design. These doses were chosen because previous literature determined that active classroom breaks of as little as four minutes could improve student behavior class wide (Ma et al., 2015). Additionally, while previous literature has examined active classroom breaks anywhere from 5-, 10-, or 20-min, anything over 10 min had been noted by teachers as unreasonable and taking away too much time from academic instruction (Cothran et al., 2010; Dinkel et al., 2017). Therefore, it is important that literature focuses on the feasibility for teachers and effectiveness of shorter breaks. The researcher determined when to change phases based on the stability of the data. When there was a condition change, the researcher notified the teacher of the change via email so that the teacher knew what condition to implement for the next session.

Baseline (A)

The baseline phase consisted of class as usual, with no active break during the instructional period. This phase consisted of at least three data points, to ensure stability in data before moving onto the next phase.

4-Minute Break (B)

The 4-min break, or B phase, consisted of an active break that was no longer than four minutes in length, from start to finish. This phase consisted of at least three data points, to ensure data stability.

8-Minute Break (C)

The 8-min break, or C phase, consisted of an active break that was no longer than eight minutes in length, from start to finish. Similar to the B treatment, this condition included at least three data points to ensure data stability.

Data Analysis

Data on student on-task behavior were collected by researchers frequently throughout the duration of the study. That is, observers collected data 2-4 times per week in each of the two participating classrooms. These data were analyzed for each individual classroom using visual analysis procedures as cited in What Works Clearinghouse: Single Case Design Technical Documentation (Kratochwill et al., 2010). Within-group comparisons of the dosage of active break were determined through visual analysis for each classroom individually, as well. The average of student on-task behavior was graphed, in terms of the percentage of observed on-task behavior for each session observed across the three conditions. In addition, the percentage of non-overlapping data

points (PND) was calculated across each phase of the study for each classroom. PND is calculated by determining the number of data points in the intervention phase that do not overlap with the highest (or lowest, depending on the intended intervention effect) data point in the baseline phase, and then dividing that number by the total number of data points in the intervention phase. PND scores range from 0 to 100%. Scores between 50 to 70% indicate questionable intervention effectiveness, scores between 70 and 90% indicate adequate intervention effects, scores that exceed 90% demonstrate that the intervention was highly effective (Scruggs & Mastropieri, 1998). Furthermore, treatment acceptability was measured by obtaining total scores from both the IRP-15 and the KIP at the conclusion of the study. Acceptability scores provided by both teacher(s) and students was compared to determine the overall acceptability of the active breaks as well as compare the acceptability of the 4- and 8-min breaks from the student perspective.

Research Question #1

To answer the first research question, regarding the extent to which increasing the dosage of active classroom breaks affect student on-task behavior, student on-task behavior for each classroom were compared through visual analysis within and between groups to determine the level, trend, variability, immediacy of effect, overlap of data points between phases, and consistency of data points within phases.

Research Question #2

To answer the second research question, regarding whether teachers endorse more student on-task behavior during break days than non-break days, data from the teacher

DBRs were analyzed across baseline, 4-min, and 8-min break times. Higher average percentages indicated increased student on-task behavior.

Research Question #3

To address research question 3, regarding teacher acceptability of active classroom breaks, data on the IRP-15 were examined. Higher overall scores on this measure indicated higher preference for active breaks.

Research Question #4

To address research question 4, regarding student acceptability of active classroom breaks, data on the KIP were examined. Higher scores on the measure indicated higher preference for active breaks. In addition, student acceptability of 4- versus 8-min breaks were examined to determine if one dosage of break was more acceptable to students.

Chapter 3

Results

Effects of Active Breaks on On-Task Behavior

Observed On-Task Behavior by Classroom

To determine the effects of active breaks on student on-task behavior, visual

analyses were conducted for both Classroom A and B and teacher DBRs were analyzed.

Classroom A's pattern of student on-task behavior is shown in Appendix E. Student on-

task behavior during baseline was relatively stable (M = 77.5%) with a slightly

decreasing trend during the last three sessions. On-task behavior ranged from 75% to

80% during this initial baseline phase. When 4-min breaks were introduced, student on-

task behavior immediately increased to 88.8% and stabilized with a mean (M = 85.3%)

higher than baseline. Classroom A's percentage of non-overlapping data (PND) was 75%

as 3 of the 4 data points in phase two exceeded the highest data point from phase one

when comparing on-task behavior during the initial 4-min break phase to the initial

baseline. When the class returned to baseline for the third phase, a carryover effect was

initially present as on-task behavior remained at 86.3%. Then, on-task behavior dropped

in the next session and remained stable for the rest of the phase. Student on-task behavior

had a mean of 81.0% during the second baseline phase, indicating a slightly higher level

in comparison to the first baseline phase (M = 77.5%). PND from phase three compared

to phase two was 20% as only 1 of the 5 data points fell below the range of behavior

exhibited during the initial 4-min phase. When 4-min breaks were re-introduced in the

fourth phase, student on-task behavior increased to 85%, and remained stable for the

duration of the phase, with a mean on-task behavior of 84.2%. The level of on-task behavior during the second 4-min break phase was similar to the level of the initial 4-min breaks phase. PND from phase four to phase three was 0% as all 3 data points fell within the range of behavior during the third phase. During phase five, Classroom A was presented with 8-min breaks which resulted in an immediate increase in student on-task behavior. Student on-task behavior remained high and stable during this phase, with a mean of 94.7%, which was higher than all previous phases. PND for phase five was 100% as all four data points exceeded the range of behavior exhibited in phase four. During last phase of the study, the class shifted back to 4-min breaks. Student on-task behavior decreased to 80% for the initial session of the last 4-min break phase. On-task behavior during this last phase had a mean of 84.1%, replicating the means found during the first two 4-min break phases. PND from phase six compared to phase five was 100% as all data points were below the lowest data point from phase five.

Classroom B's pattern of student on-task behavior is shown in Appendix E. Student on-task behavior during the initial baseline phase was stable (M = 67.2%) and ranged from 65.0% to 68.8%. When 8-min breaks were introduced, student on-task behavior immediately increased to 83.8% and had a mean (M = 80.9%) higher than baseline. Classroom B's PND was 100% as all four data points in phase two exceeded the highest data point from phase one. When the classroom returned to baseline in the third phase, there was an immediate decrease in student on-task behavior (M = 61%). Student on-task behavior remained low for the remainder of the phase with slightly lower levels of on-task behavior in comparison to the first baseline phase (M = 67.2%). PND from

phase three compared to phase two was 100% as all five of the data points in phase three fell well below the range exhibited during the initial 8-min phase. When 8-min breaks were re-introduced in the fourth phase, student on-task behavior increased immediately to 81.3%, and remained stable for the duration of the phase. This phase's mean on-task behavior of 82.1% is similar to the mean (80.9%) of the initial 8-min break phase. PND for the change from phase four to phase three was 100%. During phase five, Classroom B was presented with 4-min breaks which resulted in a slight increase of student on-task behavior. Student on-task behavior remained high and stable during this phase, with a mean of 86.5%, which was slightly higher than the previous 8-min break phases. PND from phase five to phase four was 100%. The increased student on-task behavior from 8- to 4-min breaks was unexpected, as it was hypothesized that as the dosage of break increased, so would student on-task behavior. During phase six of the study, Classroom B shifted back to 8-min breaks. Student on-task behavior dropped to 80.0% for the initial session of the last 8-min break phase. On-task behavior during the last phase had a mean of 73.4%, which was slightly lower than previous means during the 8-min break phase. PND from phase six compared to phase five was 100%, as all data points were below the lowest data point observed during phase five. This decrease in student on-task behavior from 4- to 8-min active breaks was unexpected as it was hypothesized that higher doses of active breaks would increase student on-task behavior.

Teacher DBRs

Teacher DBR data were analyzed to determine whether teachers endorsed more student on-task behavior during break days than non-break days. For Classroom A,

during the initial baseline phase, the teacher's DBRs ranged from 55-75%, with an overall mean of 66% on-task behavior observed. When four-minute breaks were introduced during the second phase, the teacher's DBRs ranged from 65-80% with an overall mean of 76% on-task behavior observed. In comparison to the first phase, the teacher's rating of on-task behavior increased with the introduction of 4-min breaks. During the third phase, Classroom A returned to baseline. The teacher's observed on-task behavior ranged from 65-85% with an overall mean of 76.9% on-task behavior across the phase as reported by the DBRs. Classroom A's teacher's DBR ratings in the third phase were similar to those reported during the second phase. In addition, DBRs reported during the second baseline phase were higher than those reported during the initial baseline phase. Four-minute breaks were re-introduced during the fourth phase and the teacher's mean DBR increased to 83.3%, with a range between 80-85%. With the re-introduction of 4-min breaks, the teacher's ratings of on-task behavior increased slightly when compared to the third phase and were higher than those reported during the initial introduction of 4-min breaks. During the fifth phase, the class was presented with 8-min breaks for the first time. Teacher DBRs increased, with a mean of 92.5% on-task behavior, ranging from 85-95%. This was the highest teacher-reported overall mean of student on-task behavior across all phases. During phase six, when the class shifted back to 4-min breaks, the teacher's DBRs ranged from 85-95% with an overall mean of 90%. Overall, as reported by the teacher in Classroom A, the mean DBR ratings for the baseline phases was 79.3% on-task behavior, 84.5% on-task behavior for 4-min breaks, and 92.5% on-task behavior for 8-min breaks.

For Classroom B, during the initial baseline phase, the teacher's mean DBR was 72.1% on-task behavior with a range between 50-85%. Eight-minute breaks were introduced during the second phase, where the mean DBR increased to 85%, with a range between 75-95%. In comparison to the first phases, the teacher rated higher levels of student on-task behavior throughout the initial 8-min break phase. During the third phase, the classroom returned to baseline and the teacher's mean DBR (M = 66.7%) decreased to the lowest across all phases, with a range between 50-75%. DBRs reported by the teacher in the third phase were similar to those reported during the initial baseline phase. Eight-minute breaks were re-introduced during the fourth phase. The teacher's mean DBR was 78.8% on-task, ranging from 70-90%. With the re-introduction of 8-min breaks, the teacher's ratings of student on-task increased when compared to the third phase but were slightly lower than those reported during the initial introduction of 8-min breaks. In the fifth phase, Classroom B was presented with 4-min breaks. The teacher's DBRs ranged from 70-85%, with a mean DBR of 76.3%. Overall student on-task behavior as rated by teacher DBRs was slightly lower when 4-min breaks were presented in comparison to 8-min breaks. During phase six, the class shifted back to 8-min breaks. The teacher's mean DBR was 80.8% on-task behavior, ranging from 65-90% on-task behavior observed. DBRs reported by the teacher during phase six were comparable to the means reported during the other phases in which 8-min breaks were implemented. Overall, as reported by the teacher in Classroom B, the mean DBR score for the baseline phases was 69.6%, 76.3% for 4-min breaks, and 81.7% during the phases in which the 8-min breaks were implemented.

To determine the level of agreement between data collected by the teacher and observer, direct observational data were compared to teacher reported DBRs on days they were both collected. For Classroom A, the average difference between teacher and observer ratings of student on-task behavior was approximately 6%. Specifically, 19 of 23 (82.6%) data points reported by the teacher and observer fell within +/- 10% of each other, indicating consistency between the teacher and observers regarding student on-task behavior. See Appendix F for further information about the comparisons between DBRs and observer data for Classroom A.

For Classroom B, the average difference between teacher and observer ratings of student on-task behavior was approximately 8%. Specifically, 16 of 23 (69.6%) data points reported by the teacher and observer fell within +/- 10% of each other, indicating consistency between the teacher and observers regarding student on-task behavior. See Appendix G for further information about the comparisons between DBRs and observer data for Classroom B.

Social Validity

Teacher Ratings

Each teacher participant completed the Intervention Rating Profile-15 (IRP) to determine acceptability of the teacher-led active breaks intervention. Both teachers produced total scores of 72 and 74, respectively. Majority of the items were rated as "agree" or "strongly agree" by both classroom teachers. Some examples of the items that were rated highly by teachers included "I would suggest the use of AB as a classroom management intervention to other teachers", "Most teachers would find AB suitable for

classroom management deficits", "AB as a classroom management intervention would be appropriate for a variety of children". Across both teachers' ratings, two items were rated at "slightly agree", which included item 8 ("Active Breaks as a classroom management intervention would not result in negative side effects for students") and item 11 ("Active Breaks was a fair way to handle students on-task behavior deficits"). In addition, at least one of the teachers marked item 5 ("The students' on-task behavior deficit is severe enough to warrant use of AB as a classroom management intervention") and item 12 ("AB is reasonable for addressing classroom management deficits") as "slightly agree".

Student Ratings

Students who returned signed parent consent forms completed the KIP at the end of the intervention to assess intervention acceptability. A total of 36 students responded, with an equal number of student respondents from each classroom. Between groups, the average total score on the KIP was 27.8 with scores ranging from 18-32. Overall, these scores indicated general acceptability of the active break intervention from students. In addition, students across both classrooms endorsed higher ratings for the 8-min breaks, with an average rating of 3.86, in comparison to an average score of 2.81 for the 4-min breaks. See Appendix H for further information.

Chapter 4

Discussion

The purpose of the present study was to address several gaps in the published literature related to dosage of breaks, teacher implementation, and assessment of teacher and student acceptability and perceptions of active classroom breaks. The initial research question examined the extent to which increasing the dosage of active classroom breaks affected student on-task behavior. It was hypothesized that as the dosage of active breaks increased, so would student on-task behavior. This hypothesis was supported in Classroom A as student on-task behavior increased as the dosage of active breaks increased. When comparing 4-min breaks to 8-min breaks, student on-task behavior was slightly increased when Classroom A engaged in 8-min breaks. In Classroom B, however, the initial hypothesis was not supported as 4-min breaks produced a slightly higher increase in student on-task behavior in comparison to 8-min breaks.

Similar trends were observed in on-task behavior across phases in Classroom A and Classroom B. This suggests that active breaks overall in comparison to baseline were effective for both classrooms regarding increasing student on-task behavior. Interestingly, the dosage of active breaks the classrooms were exposed to the least amount of time were observed to have a slightly higher positive effect on student's on-task behavior. A potential explanation for this finding could be that appropriate dosage of breaks may vary between classroom settings or that students may benefit from alternating dosages of breaks to provide some variability. These findings could suggest that teachers may need

to experiment with what dosage of breaks works best with their own students. However, future research is needed to confirm and understand these findings in more depth.

The findings in the current study are generally consistent with previous research, indicating that active breaks lead to increased student on-task behavior (Goh et al., 2016; Mahar et al., 2006; Watson et al., 2017). In addition, current findings supported previous research that active breaks as little as 4-min can increase positive student outcomes (Daly-Smith et al., 2018; Ma et al., 2014). Furthermore, these findings addressed the gap in the active break literature regarding the dosage of active breaks required in order to increase positive student outcomes. Findings in Howie et al. (2014) across 4th and 5th grade classrooms suggested that active breaks that lasted 10-min were most effective for increasing student on-task behaviors, when comparing doses of 5-, 10-, and 15-min. As mentioned previously, one of the biggest barriers noted by teachers was the time required to successfully implement breaks in their classrooms, indicating that breaks took away from required instructional time (Dinkel et al., 2017). Findings from the current study indicated that teacher-led breaks as short as 4-min produced positive effects on 3rd grade student on-task behavior, adding support to the research that shorter breaks have the ability to produce positive outcomes in elementary school classrooms.

The second hypothesis was that through the use of DBRs, teachers would endorse more on-task behavior during active break days in comparison to baseline. This hypothesis was supported by both participating classrooms. For example, in Classroom A, teacher DBRs exhibited higher averages of student on-task behavior for both 4-min and 8-min break days when compared to baseline. More specifically, students in

Classroom A were rated by their teacher to be most on-task during days when 8-min breaks were implemented. Similarly, in Classroom B, teacher DBRs endorsed higher average student on-task behavior during the days in which the 4-min and 8-min breaks were implemented in comparison to baseline. Students in Classroom B were also rated by their teacher to be most on-task during the days in which 8-min breaks were implemented. Between classrooms, both teachers indicated higher average percentages of student on-task behaviors when their classroom participated in the 8-min active breaks. Teachers may have indicated more student on-task behavior during the 8-min breaks for reasons such as students being more tired after the longer breaks, teacher confirmation bias towards longer breaks resulting in more student on-task behavior, or teachers believing that the longer 8-min breaks were necessary for some students who struggle to stay on-task.

These findings contribute to the existing literature and converge with previous research in regard to dosage of active breaks and teacher acceptability. In addition, this study adds a direct measure of teachers' perspectives of the effectiveness of the active break intervention to the research. As mentioned in McMullen et al. (2014), teachers were more likely to implement physical activity breaks for students if the breaks produced positive and observable outcomes for their students. Previous research did not collect direct data on effectiveness or acceptability from teachers. The current study addressed this limitation by obtaining information directly from teachers, indicating that 4- and 8-min active breaks produced increased student on-task behavior.

Relatedly, previous research suggested that teacher DBRs converge with observer direct observational data (Chafouleas et al., 2005; Christ et al., 2011; Riley-Tillman et al., 2008). In the current study, on days when both observer and DBR data were collected, teacher and observer ratings of student on-task behavior were similar, with average differences between raters within 6-9% of each other. These findings support teachers being able to provide accurate information related to student on-task behavior and that external observers may not be warranted to accurately measure intervention effects.

The third hypothesis predicted that both teachers would rate active breaks as acceptable and enjoyable as measured by a teacher acceptability scale, the IRP-15, at the conclusion of the study. This hypothesis was supported by both classroom teachers as the teacher in Classroom A produced a total score of 72 and the teacher in Classroom B produced a total score of 74, endorsing intervention acceptability (Carter & Wheeler, 2019). Overall, both teachers responded "Agree" or "Strongly Agree" in that the active break intervention is: an acceptable intervention for increasing student on-task behavior (Q1), a classroom management intervention that is effective in supporting student's needs (Q3), a classroom management intervention they would suggest to other teachers (Q4), an appropriate classroom management intervention for a variety of children (Q9), a classroom management intervention that is consistent with those that have been used in classroom settings (Q10), a good way to handle the class's on-task behavior deficit (Q14), and was overall beneficial for students in their classes (Q15). Additionally, teachers responded "Agree" or "Strongly Agree" in that they believed that: most teachers would find active breaks as a classroom management intervention appropriate for

classrooms with similar needs (Q2), most teachers would find active breaks suitable for classroom management deficits (Q6), they would be willing to use active breaks as a classroom management intervention in the classroom setting (Q7), and they liked the procedures used in the intervention (Q13). The lowest rating produced by both teachers was "Slightly Agree" on two items, including item 8 ("Active Breaks as a classroom management intervention would not result in negative side effects for students") and item 11 ("Active Breaks was a fair way to handle students on-task behavior deficits").

In addition to the IRP-15, one of the two participating teachers provided qualitative feedback. When asked what the teacher enjoyed most about the active break intervention, they responded that they "liked that the kids knew what was expected at the same exact time each day. It was predictable, exposed them to new movements, and got the students up and moving in a structured way." In addition, when asked what the teacher liked least about the active break intervention, they responded that the 8-min breaks took a bit of time. The teacher felt that the 8-min breaks were necessary but sometimes made them feel rushed in regard to timing. When asked how the teacher liked the GoNoodle program, they responded that they enjoyed GoNoodle. The teacher followed up by saying that they'd like to learn more about other forms of active movement breaks as GoNoodle is a pretty common program used in schools. Lastly, when asked if they believed their class was more on-task during the 4- or 8-min breaks, they responded they believed their class was more on-task during the days in which 8-min breaks were implemented.

These findings align with previous research related to teacher acceptability and implementation of active break interventions, indicating that despite barriers to implementing active break interventions, there are many reasons why teachers find them to be beneficial. As mentioned in Dinkel et al. (2017), despite the time required to implement breaks, teachers felt they could still find time to incorporate them in their classrooms, especially if teachers felt that the breaks are beneficial to their students. Relatedly, McMullen et al. (2014) found that teachers believed breaks were beneficial to their students only if they positively affected their student's academic success. Teachers in the current study agreed that the active break intervention was beneficial to addressing deficits in on-task behavior and increasing student on-task behavior, which may help increase student's engagement and focus on academic activities (Howie et al., 2014; Watson et al., 2017). McMullen et al. (2014) found that teachers were more likely to implement active breaks if they were easy to adopt and aligned with their teaching skills and philosophies. In the current study, teachers rated the procedures used in the active break intervention highly and indicated they would be willing to implement active breaks in their classroom. These findings provide support that active breaks are feasible and easy for teachers to adopt and implement.

The study's fourth hypothesis was students would rate active breaks as acceptable and enjoyable as measured by a student acceptability scale, the KIP, at the conclusion of the study. This hypothesis was supported by students who completed the KIP in both classrooms as students produced an average total score of 27.8 on the KIP, indicating intervention acceptability (Eckert et al., 2017). Student responses indicated that they liked

taking activity breaks in general, breaks helped them stay focused in class, and their schoolwork got better after taking breaks. Students had a general preference for the longer, 8-min breaks, in comparison to the 4-min breaks and they often wished they had a longer break. Furthermore, students did not report enjoying the days in which they did not have a break and indicated there were not many times when they did not want to take a break. Overall, students reported general acceptability of the active break intervention, preferring 8-min breaks in comparison to 4-min breaks. Students may have preferred the longer, 8-min breaks in comparison to the 4-min breaks because it gave them a longer break from academic activities, they enjoyed the break activities, and longer breaks helped them re-focus and reset.

The findings from the current study are similar to those reported in Howie et al. (2014). In that particular study, students through focus groups indicated that classroom breaks were fun, increased their alertness and focus on academic tasks, and reported that they preferred longer breaks. In addition, the current study addressed a gap in the literature by directly measuring student acceptability of active breaks. Most of the information provided in the published literature had been obtained indirectly, as reported through teacher interviews, journaling, or teachers' ratings of student behavior (Cothran et al., 2010; Dinkel et al., 2017; Klatt et al., 2013).

Implications for Practice

Findings from the current study provide additional support for the effectiveness of active breaks on student on-task behavior in elementary general education classrooms. In addition, the study provided further support that active breaks as little as 4-min can

produce positive effects for students. While student on-task behavior increased for both the 4-min and 8-min active break in comparison to baseline, it is important to note that the dosage required to produce positive effects on student on-task behavior may vary by classroom. That is, teachers may have to experiment with different doses to determine what is most effective for their individual classrooms. Relatedly, longer breaks may be necessary for some students to see a change in on-task behavior. Furthermore, the current study included the addition of teacher DBRs for tracking student on-task behavior to determine if teachers were able to accurately rate student on-task behavior as measured by the alignment with observational data. The majority of teacher's DBR ratings aligned closely with the researchers' observed student on-task behavior, within +/- 10 percent of one another, supporting the notion that teachers can accurately record student on-task behavior during the intervention. Relatedly, teacher's DBR ratings indicated that they did notice positive changes in their students overall on-task behavior. As previously stated, teachers are more likely to implement breaks that directly benefit their students. These findings add to the published literature that active classroom breaks are an easy and effective classroom management strategy that teachers are able to implement independently, without the need for external resources (i.e., additional observers). Lastly, both teachers and students who participated in the current study rated the active break intervention favorably through acceptability scales. Both teacher participants rated the active break intervention as acceptable. This finding adds to the literature that despite barriers to implementing active breaks within their classrooms, teachers believed the intervention was easy to implement, benefitted their students, and indicated the

intervention was an appropriate to manage student on-task behavior. Relatedly, students viewed the active break intervention as acceptable and preferred the longer 8-min breaks. These findings suggest that students found a benefit in taking short breaks throughout the school day and felt more focused after taking breaks.

Based on the findings from the current study as well as the positive feedback provided by teacher and student participants, practicing school psychologists may recommend active break interventions to teachers who are looking for classwide strategies to support student on-task behavior. Additionally, school psychologists can engage in a consultative role to support teachers in determining effective dosages required to positively affect student on-task behavior through collaboratively analyzing DBR data and providing recommendations. Overall, the results from the current study are important to consider for both elementary school classroom teachers and school psychologists who provide consultative support to teachers in elementary school classrooms.

Limitations and Areas for Future Research

While there were many positive implications to take away from the current study, it is important to address the limitations and areas for future research to consider. First, observers were not blind to the conditions of the study. Observers were recruited from the primary investigators research team and consisted of undergraduate and graduate psychology students. While observers did not record on-task behavior until after the active break, they may have been aware of the study conditions, which could have added bias to the collected observational data. In order to limit the potential bias, observers were

trained using the operational definition of on-task behavior and inter-observer agreement data were collected for 33% of the observations to ensure consistency across raters. Future research may consider having observers blind to the study conditions.

A second limitation was having researchers present within the classroom when completing observations. Students may be reactive or modify their behavior when they know that they are being observed. The addition of teacher DBRs helped to limit the potential reactivity and increased reliability of the collected data between teachers and observers. Future research may consider the use of only teacher DBRs or the use of technology (i.e., recording or live) to determine if the active break intervention is as effective when external observers are not physically present in the classroom.

A third limitation was the use of the round-robin observational technique. Observations are, by definition, brief samples of behavior, and behavior can vary day-to-day based on many factors. The round-robin observational technique is an easy-to-use method that requires observer(s) to observe a new student in a pre-set order during each interval during the direct observation period. While this technique is commonly used, there is the potential for random error that could impact observed student time on-task, such as particular students accounting for the most off-task behaviors, lack of observation of the whole classroom, or some students being observed more often than others during the observational periods. Future research may consider the use of other observational methods. In addition, future research should consider the use of statistical techniques to account for random errors, such as calculating the standard error of the mean or using confidence intervals to estimate the range of possible values for the observations.

A fourth limitation was the use of convenience sampling as teachers voluntarily participated through responding to an email sent out to all teachers in the school. While convenience sampling provides the unique opportunity to work with teachers who are willing to participate, not all elementary school teachers may be open to implementing active breaks within their classrooms or allowing for external observers to come into their classrooms. Future research should consider the limitations of convenience sampling.

A fifth limitation was that the participating classrooms did not necessarily require an intervention to increase classroom management. That is, one of the participating classrooms students' on-task behavior was already relatively high during the initial baseline phase. This may have caused the observed ceiling effects and many overlapping data points across the study phases, demonstrating less significant effectiveness for the active break intervention. Furthermore, the current study intended to replicate both dosages of the active break intervention across each classroom to determine the replicability of effects based on dosage. Due to standardized testing days, modified schedules, and the end of the school year, this was not achievable. Future research should replicate both break dosages at least once across classrooms to determine if effects are consistent across phases and to add stronger evidence to support effectiveness of active breaks.

A sixth limitation to the current study was that there were only two participating 3rd grade general education classrooms. These classrooms were located in a rural school district in the Midwest. The lack of participation and the fact that the study took place in a rural community could make it difficult to generalize these findings to other school

districts. Future research should replicate the current study in diverse school districts to add more evidence for the generalizability of active break interventions with a variety of student populations.

<div align="center">**Conclusion**</div>

The active break intervention proved to be an effective classroom management technique in two general education 3rd grade classrooms. Proactive classroom management techniques, such as active breaks, are an easy, effective, and acceptable way to increase student on-task behaviors. Taking breaks throughout the school day can also help increase student focus, academic performance, and decrease disruptive classroom behaviors. Research has provided support for the effectiveness of active breaks in increasing student on-task behavior within elementary school classrooms. However, prior to the current study, research had primarily focused on researcher-led breaks and had not explored the idea of teacher-led breaks or teacher-recorded data for student on-task behavior. Additionally, previous research had not collected direct student acceptability ratings as measured by a student acceptability scale. These additions to the current study increased support for teachers being able to collect accurate data on student on-task behavior and overall teacher and student acceptability of the active break intervention. Finally, findings from the current study determined that both 4- and 8-min active breaks increased student on-task behavior when compared to baseline. Teachers rated student on-task behavior as higher during the 8-min break intervention. Similarly, students rated the longer, 8-min breaks as more acceptable. Overall, continued research is needed to

further solidify the findings in the current study and add generalizability to the

effectiveness of active break interventions in elementary school classrooms.

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Appendix A

Observation Form

On-task behavior: verbal or motor behavior that follows classroom rules and is appropriate for the task at-hand.

Date: ____/_____/2022	Activity Break Used?		Length of Activity Break:
M T W Th F	YES	NO	4 MIN 8 MIN
Teacher:	**# Students Present:**		**Observer(s):**
			IOA? Y or N

Directions: For each 15-second interval, mark with an "X" whether the target student was on-task or off-task.

% on-task: _____/Total observation intervals = _____%

Interval	1	2	3	4	5	6	7	8	9	10	11	12
On-task												
Off-task												

Interval	13	14	15	16	17	18	19	20	21	22	23	24
On-task												
Off-task												

Interval	25	26	27	28	29	30	31	32	33	34	35	36
On-task												
Off-task												

Interval	37	38	39	40	41	42	43	44	45	46	47	48
On-task												
Off-task												

Interval	49	50	51	52	53	54	55	56	57	58	59	60
On-task												
Off-task												

Interval	61	62	63	64	65	66	67	68	69	70	71	72
On-task												
Off-task												

Interval	73	74	75	76	77	78	79	80
On-task								
Off-task									

Appendix B

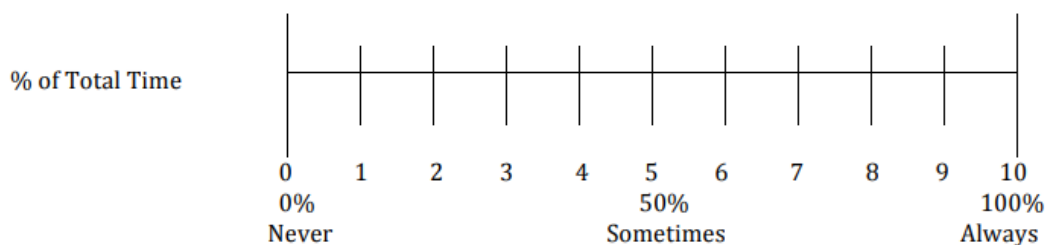Direct Behavior Rating Form and Intervention Fidelity Forms

Direct Behavior Rating Form

Directions: Place a "X" along the line that best reflects the percentage of total time the class exhibited the target

Date:
 	
  M   T   W   Th   F
	Activity Break Used?
	
	    YES NO
		Length of Activity Break:
		
		  4 MIN 8 MIN

behavior.

The class was observed to be on-task during the instructional period.

% of Total Time

```
0    1    2    3    4    5    6    7    8    9    10
0%                      50%                     100%
Never                   Sometimes               Always
```

Additional Comments:

Intervention Fidelity Checklist

M   T   W   Th   F   **BREAK USED:**

DATE: ___/____/2022   4-minutes   8-minutes

Integrity: Y N   **Video Played:**
Reliability: Y N

_____

Directions: During the active break, please fill out the fidelity checklist below with marking a checkmark in "YES" if you completed the step or "NO" if you did not complete the step.

	YES	NO
1. Active break video is ready to go prior to the break time.		
2. Teacher verbally prompted the class that *"It is time to take a 4-minute/8-minute break!"*		
3. Active break used was pre-selected by researcher through GoNoodle.com		
4. Active break video was projected onto large screen in classroom.		
5. At end of break video, teacher says *"Our break is over, please return to your seat and get your materials out for our lesson."*		
6. DBR was completed during the instructional period <u>IMMEDIATELY</u> after the break.		

Intervention Fidelity Checklist (No Break Used)

M   T   W   Th   F
DATE: ___/____/2022

Integrity: Y N
Reliability: Y N

Directions: During no break days, please fill out the fidelity checklist below with marking a checkmark in "YES" if you completed the step or "NO" if you did not complete the step.

	YES	NO
1. The class did not take a break and continued the lesson as usual.		
2. DBR was completed during the instructional period <u>IMMEDIATELY</u> after the break.		

Appendix C

Intervention Rating Profile-15

The purpose of this questionnaire is to obtain information that will aid in the selection of classroom interventions. Please circle the number which best describes your agreement or disagreement with each statement in regard to using Active Breaks (AB) in your classroom.

|	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. AB would be an acceptable intervention for increasing student on-task behavior.	1	2	3	4	5	6
2. Most teachers would find AB as a classroom management intervention appropriate for classrooms with similar needs.	1	2	3	4	5	6
3. AB as a classroom management intervention should prove effective in supporting student's needs.	1	2	3	4	5	6
4. I would suggest the use of AB as a classroom management intervention to other teachers.	1	2	3	4	5	6
5. The students' on-task behavior deficit is severe enough to warrant use of AB as a classroom management intervention.	1	2	3	4	5	6
6. Most teachers would find AB suitable for classroom management deficits.	1	2	3	4	5	6
7. I would be willing to use AB as a classroom management intervention in the classroom setting.	1	2	3	4	5	6
8. AB as a classroom management intervention would not result in negative side effects for students.	1	2	3	4	5	6
9. AB as a classroom management intervention would be appropriate for a variety of children.	1	2	3	4	5	6
10. AB as a classroom management intervention is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11. AB was a fair way to handle students on-task behavior deficits.	1	2	3	4	5	6
12. AB is reasonable for addressing classroom management deficits.	1	2	3	4	5	6
13. I like the procedures used in AB.	1	2	3	4	5	6
14. AB was a good way to handle the class's on-task behavior deficit.	1	2	3	4	5	6
15. Overall, AB as a classroom management intervention would be beneficial for the students in my class.	1	2	3	4	5	6

Adapted from: Witt, J. C. and Elliott, S. N. (1985). Acceptability of classroom intervention strategies. In T. R. Kratochwill (Ed.), Advances in School Psychology, 4, 251-288. Mahwah, NJ: Erlbaum.
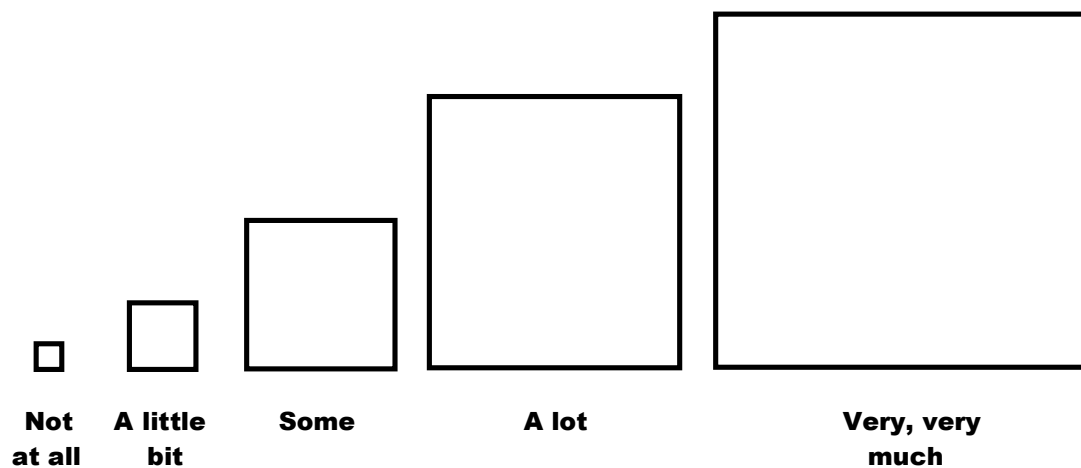
Appendix D

Kid's Intervention Profile

<u>**Question #1**</u>

How much do you like taking activity breaks in general?

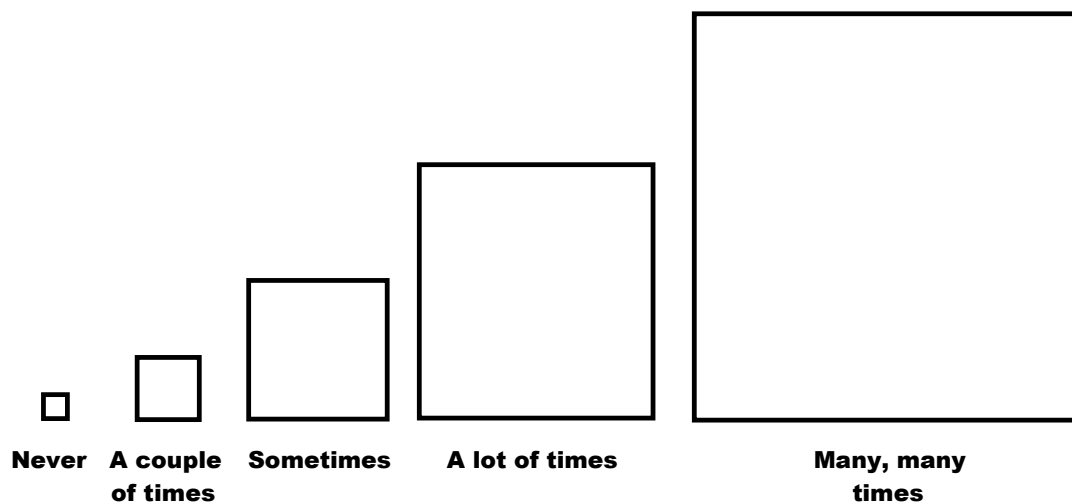| Not at all	A little bit	Some	A lot	Very, very much
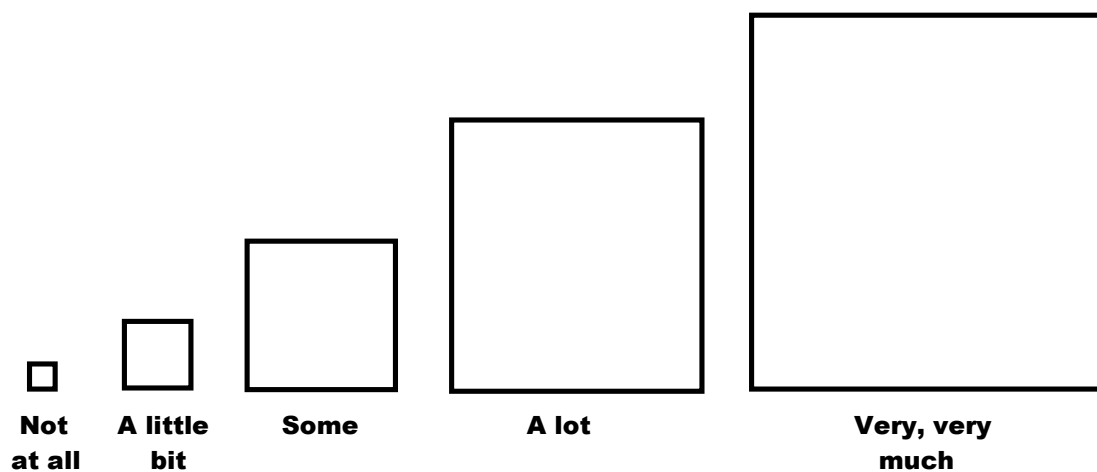
<u>**Question #2**</u>

How much do you like the shorter, 4-minute breaks?

Not at all	A little bit	Some	A lot	Very, very much

Question #3
How much do you like the longer, 8-minute breaks?

| Never | A couple of times | Sometimes | A lot of times | Many, many times |

Question #4
Were there any times when you didn't want to take a break?

| Never | A couple of times | Sometimes | A lot of times | Many, many times |
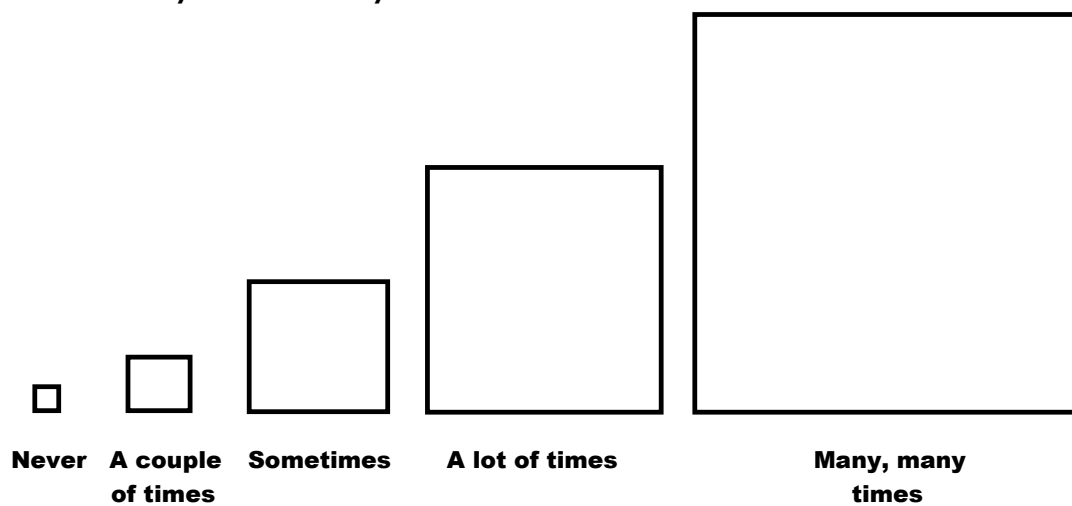
Question #5

How much did you like the days where there was no break?

Not at all	A little bit	Some	A lot	Very, very much
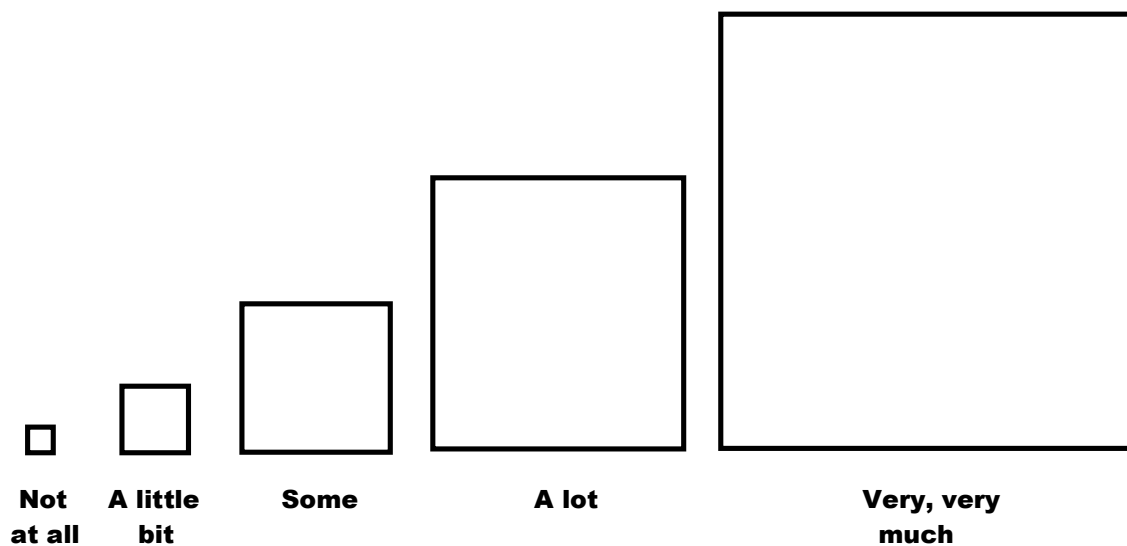
Question #6

Were there any times that you wish you had a longer break?

Not	A little	Some	A lot	Very, very
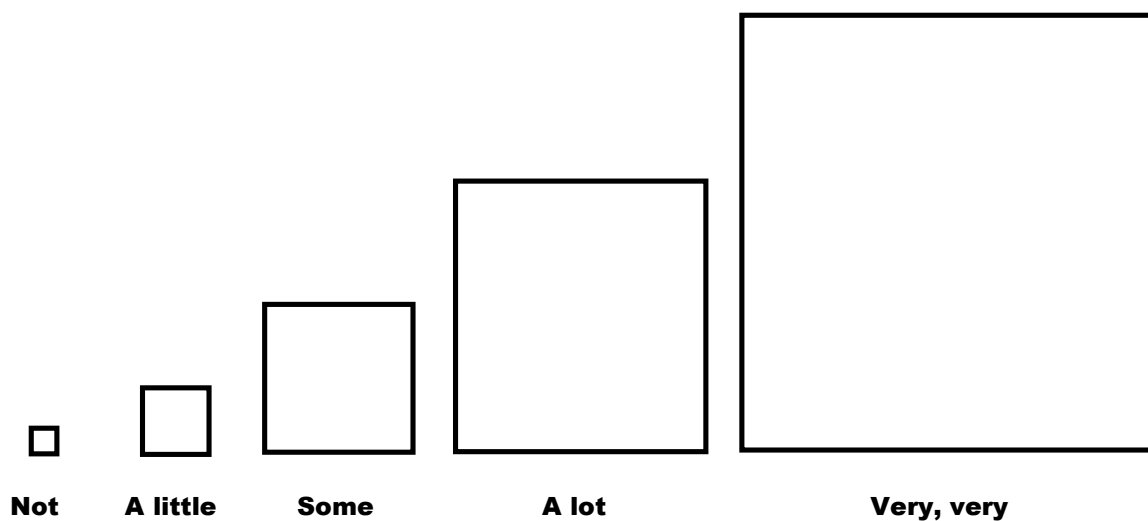
Question #7
How much do you think the breaks helped you focus in class?

**Not
at all** **A little
bit** **Some** **A lot** **Very, very
much**
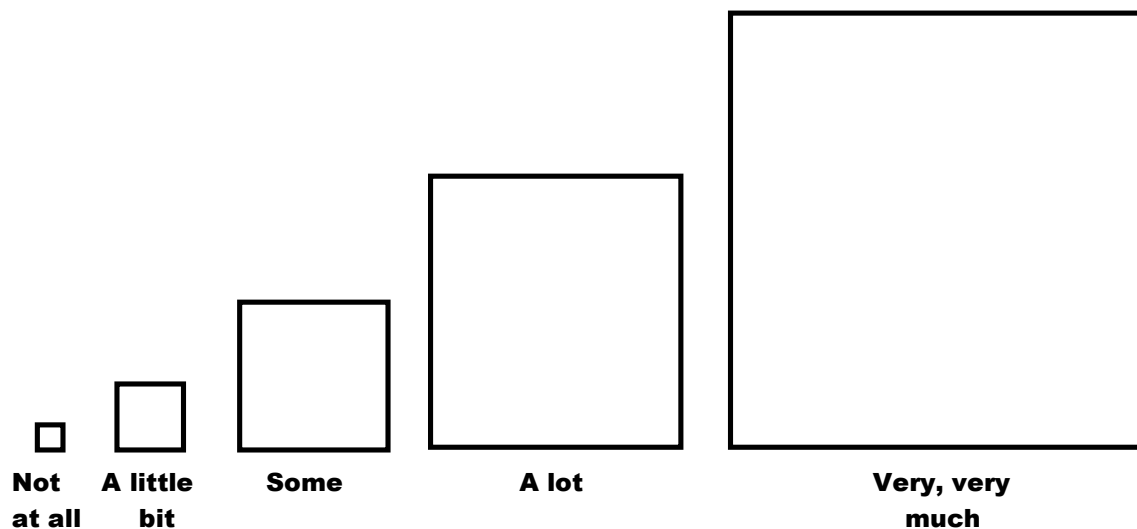
Question #8
Do you think your schoolwork got better after taking breaks?

**Not
at all** **A little
bit** **Some** **A lot** **Very, very
much**
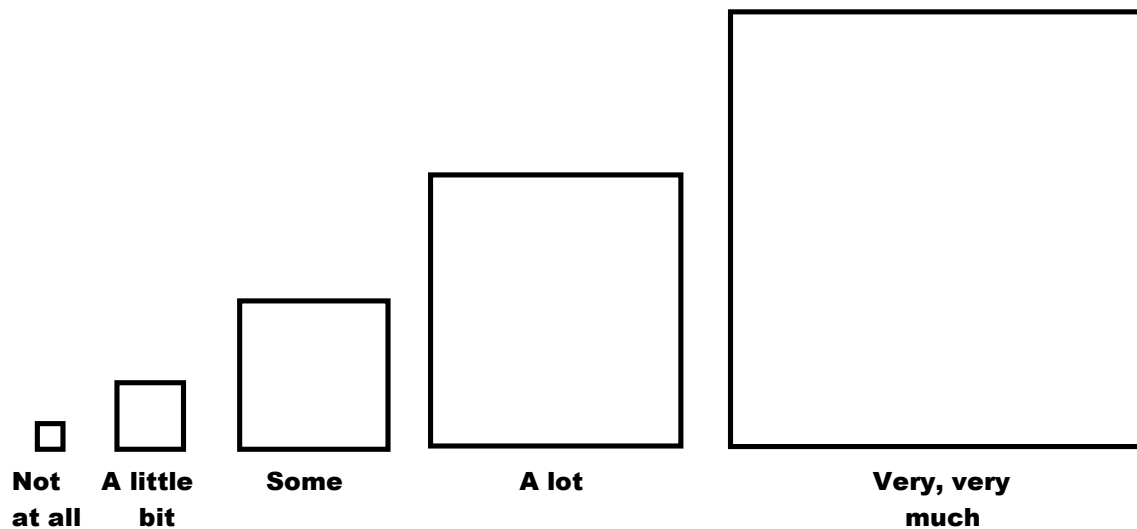
Appendix E

Student On-Task Behavior Across Study Phases
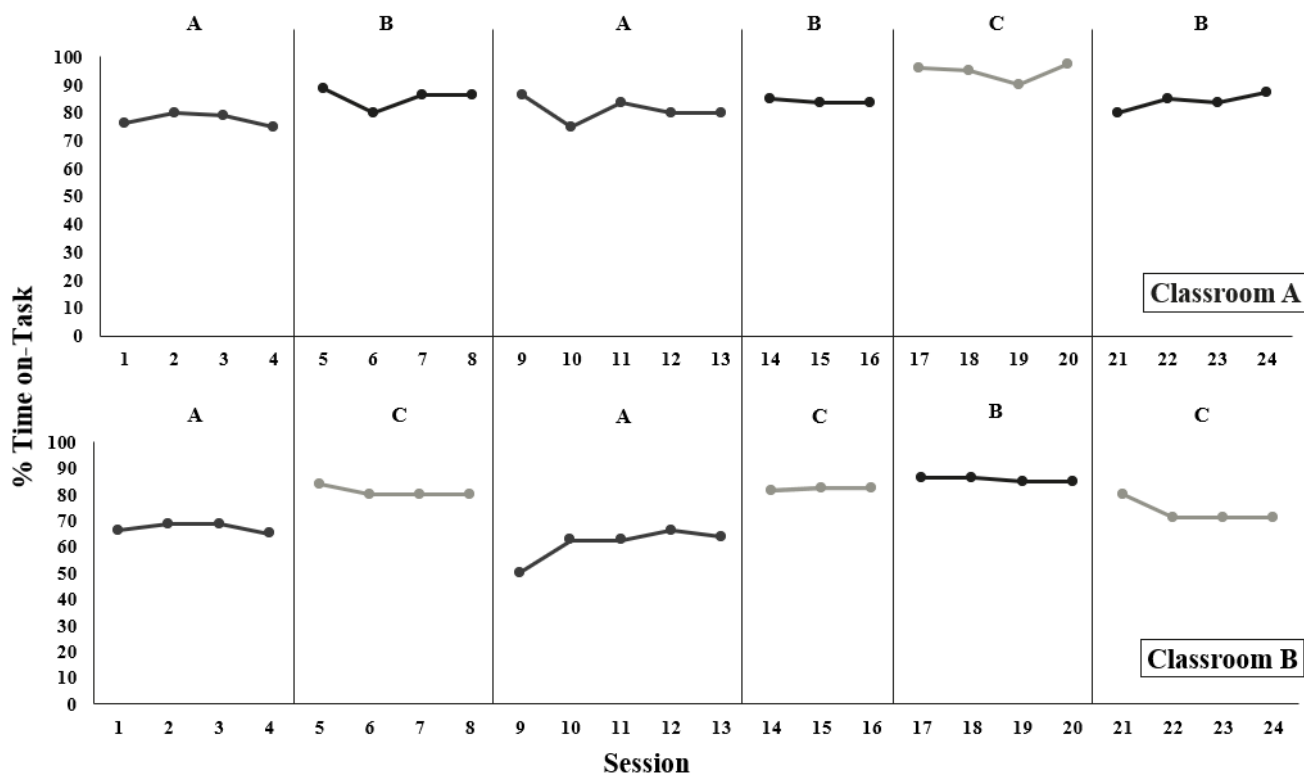
Appendix F

Classroom A Teacher DBRs Compared to Direct Observation Percentages by Phase

Phase	DBR %	Obs. %	Mean Diff. % (+/-)
1	65		
	65	76.25	-11.25
	70	80	-10
	75	78.8	-3.8
	55		
	75	75	0
2	80	88.75	-8.75
	65	80	-15
	80	86.25	-6.25
	80	86.25	-6.25
3	70	86.25	-16.25
	65	75	-10
	75	83.75	-8.75
	80		
	80	80	0
	85	80	+5.0
4	85	85	0
	85	83.75	+1.25
	80	83.75	-3.75
5	95	96.25	-1.25
	95	95	0
	85	87.5	-2.5
		90	
	95	97.5	-2.5
6	95	90	+5.0
	95	85	+10
	85	83.75	+1.25
	85	87.5	-2.5

Note. Blank spaces indicate days where only DBR or direct observation data was gathered.

Appendix G

Classroom B Teacher DBRs Compared to Direct Observation Percentages by Phase

Phase	DBR %	Obs. %	Mean Diff. % (+/-)
1	70		
	70	66.25	+3.75
	75		
	85		
	50	68.75	-18.75
	80	68.75	+11.25
	75	65	+10
2	80	83.75	-3.75
	95		
	75	80	-5.0
	85	80	+5.0
	90	80	+10
3	70		
	50	50	0
	75	62.5	+12.5
	65		
	65	62.5	+2.5
	75	66.25	+8.75
		63.75	
4	80		
	70	81.25	-11.25
	75	82.5	-7.5
	90	82.5	+7.5
5	70	86.25	-16.25
	75	86.25	-11.25
	75	85	-10
	75	85	-10
6	75	80	-5.0
	90		
	90		
	65	71.25	-6.25
	80	71.25	+8.75
	85	71.25	+13.75

Note. Blank spaces indicate days where only DBR or direct observation data was gathered.

Appendix H

Students' Mean Acceptability Ratings on Each Item of the KIP Between and Within Groups

Item	Classroom A mean (n=18)	Classroom B mean (n=18)	Total Sample Mean (N=36)
1. How much do you like taking activity breaks in general?	3.50	4.06	3.78
2. How much do you like the shorter, 4-minute breaks?	2.94	2.67	2.81
3. How much do you like the longer, 8-minute breaks?	4.06	3.67	3.86
4. Were there any times when you didn't want to take a break?*	3.72*	3.83*	3.78*
5. How much did you like the days where there was no break?*	3.06*	3.94*	3.50*
6. Were there any times that you wish you had a longer break?	3.44	3.44	3.44
7. How much do you think the breaks helped you focus in class?	3.39	3.33	3.36
8. Do you think your schoolwork got better after taking breaks?	3.22	3.22	3.22
Total Score	27.3	28.2	27.8

* indicates a reverse-coded item.