Children's Responses to a Mastery Motivation Climate in an Inclusive Physical Education Setting: A Multiple Baseline Study

by

Benjamin John Miedema

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Approved by

Alice M. Buchanan, Chair, Associate Professor of Kinesiology
Vanessa Hinton, Assistant Professor of Special Education, Rehabilitation, and Counseling
Peter A. Hastie, Wayne T. Smith Distinguished Professor of Kinesiology
Mary E. Rudisill, School Director and Wayne T. Smith Distinguished Professor of Kinesiology

Abstract

This study examines the use of mastery motivational climate in an inclusive physical education setting. Mastery motivational climates (MMC) are grounded in achievement goal theory and the TARGET principles. Research has found mastery motivational climates to be effective for children with disabilities' skill acquisition. The purpose of this study was (1) to examine the effects of a mastery motivational climate on the attainment of two skills in children with developmental delays, (2) to determine how long it takes for a mastery motivational climate to be effective for students with developmental delays in an inclusive setting, and (3) to determine participants' retention of those skills at least two weeks after the removal of the motor skills intervention. Three teams of six, four non-disabled peers and two children with a disability (dyad), each independently participated in a multiple baseline design measuring skill mastery of overhand throwing and hopping. The intervention took place during physical education class at a public elementary school. Results revealed that all children with a disability achieved skill mastery in both throwing and hopping after a total of 12 to 13 sessions. One hundred percent retention of skill acquisition was present for two of the three dyads while the third dyad regressed in skill performance; however, they did maintain a higher skill performance than they had at baseline. The findings from this study add to the literature by supporting the use of a MMC in an inclusive physical education setting.

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Table of Contents

List of Tables

List of Figures

CHAPTER I

INTRODUCTION

Children in American schools face numerous obstacles for accessing quality physical education (PE). Lack of administrative support within each school as well as education policy are two such obstacles. The latest reauthorization of the Elementary and Secondary Education Act (ESEA, 1965) known as the Every Student Succeeds Act (ESSA, 2015), has for the first time provided federal education funding to physical education. The Every Student Succeeds Act previously had been called the No Child Left Behind Act (NCLB, 2001), which at the time provided new standards and accountability requirements public schools had to meet in order to qualify for federal education money. However, NCLB only provided education funding to core content areas. ESSA included physical education as part of a well-rounded education qualifying it for money. While this is promising for PE, a wide variance of policies still exists across levels of government and states (Cooper et al., 2016). Additionally, resources are lacking, and the implementation of these policies is inconsistent. The support for general PE from the federal government with ESSA does come with challenges and meeting the requirements of ESSA is a new obstacle teachers, administrators, and government officials must face together. The obstacles can become more challenging when deciding the best course of action for students with disabilities.

Physical education has played a unique role in American public schools since the introduction of the Education for All Handicapped Children Act (PL 94-142, 1975). PL

94-142, now known as the Individuals with Disabilities Education Improvement Act (IDEA), has since its passage required specialized instruction in PE for students with disabilities. IDEA calls for the use of the least restrictive environment (LRE) for the individual for all instruction. These environments range from a separate school to the general education setting. The overall goal is to have all children participating in general education one hundred percent of the time.

In school PE the most restrictive setting for a child would be in a separate PE class with other students who require a similar level of support to be successful. Because of their disability, these children are unable to access the general curriculum without significant modifications, therefore making the setting more restrictive. Another level of support would be to provide PE in the general setting but with the assistance of an adapted physical education specialist. The least restrictive environment possible is in the general PE class with no assistance.

Elementary PE teachers typically provide instruction to multiple classrooms of students at one time, thus making the size of the PE class at least twice the size of a typical classroom teacher's class. When class size increases the amount of individualized instruction tends to decrease (Gross & Buchanan, 2014; Konstantopoulos & Sun, 2014). This decrease in individualized instruction is especially detrimental to a child with a disability. While the child may or may not have motor delays, other delays such as communication, cognition, and behavior tend to reduce the quality of learning for these children (Mayes & Calhoun, 2007). Establishing an instructional environment that factors in large class sizes and a wide range of abilities can be challenging. Teachers are tasked with creating instructional environments, or climates, which optimize student motivation

(Brophy, 1983). Teachers create the instructional climate by considering what is valued in the classroom, how success is defined, motives for effort, the assessment of mistakes, and how students are evaluated (Ames & Archer, 1988) Research shows that when a performance climate is established students' attitudes towards physical education and their abilities decreases when compared to a mastery climate (Standage, Treasure, Hooper, & Kuczka, 2007). Performance climates emphasize competition and dominance of the highly skilled over the lower skilled students. Dweck (1986) and Dweck and Leggett (1988) note that the establishment of this type of climate leads to students avoiding tasks that are challenging.

In contrast to a performance-based climate, mastery motivational climate (MMC) focuses on a student's ability level and feeling of self-worth based on self-established goals (Ames, 1992; Dweck, 1986; Nicholls, 1984a). MMC is rooted in Ames (1992) TARGET classroom structures. TARGET stands for task, authority, recognition, grouping, evaluation, and time. Prior PE research, examines the use of the TARGET structure. Valentini and Rudisill (2004b) looked at the effectiveness of TARGET with kindergarten age children while Todorovich and Curtner-Smith (2001, 2002) examined children in third and sixth grade. Valentini, Rudisill, & Goodway (1999) make the argument that MMC empowers teachers to meet the needs of a wide range of skill abilities.

Statement of the Problem

Inclusive PE has been around for many years; in fact, PE has traditionally been one of, if not the only inclusive setting in which many students with disabilities participate (McClenaghan, 1981). Also, the general education setting includes an

increasing number of students with disabilities with more substantial needs for support. As Morningstar, Kurth, and Johnson (2017) point out less than ten percent of students with autism spectrum disorder (ASD) and intellectual disabilities (ID) receive education in a separate environment, meaning 90% or more of these students are accessing the general education setting at some point during the school day. PE teachers have embraced this push but still struggle to effectively instruct students with disabilities (Lieberman, Cavanaugh, Haegele, Aiello, & Wilson, 2017).

The climate of an educational setting may impact student motivation and engagement in learning. (Ames & Archer, 1988). Teachers can structure the climate in their classroom to be one that is mastery or one that is performance which consequential may sway the motivation orientation of the students (Walling, Duda, & Chi, 1993).

Meeting the needs of a varying spectrum of skill abilities is essential when providing instruction to students with disabilities in an inclusive setting. The use of a MMC has been shown as an effective strategy for improving the motor skills of children with and without disabilities (Valentini, Pierosan, Rudisill, & Hastie, 2017; Valentini & Rudisill, 2004c, 2004b).

Purpose of the Study

The purpose of this study is to examine the effects of a MMC physical education intervention on children with developmental delays. Specifically, the purposes will be to determine:

- What are the effects of MMC on the ball skill of overhand throwing in children with developmental delays?

- What are the effects of MMC on the locomotor skill of hopping in children with developmental delays?
- How long does it take for participants to become competent with the skill of overhand throwing?
- How long does it take for participants to become competent with the skill of hopping?
- Are the skill gains acquired in overhand throwing and hopping retained by participants at least two weeks after the intervention has concluded?

Definition of Terms

Mastery motivational climate: A teaching environment that is based on the TARGET principles (Epstein, 1988). It emphasizes task mastery as opposed to performance dominance. Mastery motivational climate aligns with the mastery or task facet of achievement goal theory (Nicholls, 1984b)

Single subject research design: A case study design that evaluates a specific intervention technique but often fails to include a control group (Kratochwill & Levin, 1992)

Students with disabilities:

"The term 'child with a disability' means a child with intellectual disabilities, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to in this chapter as "emotional disturbance"), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and who, by reason thereof, needs special education and related services" (Individuals With Disabilities Education Improvement Act of 2004, 2004).

Team: A team in this study consists of six children in total, two children with a disability and four typically developing peers.

Dyad: For this study, a dyad is defined as the two children with a disability from a team. Data were only collected from the members of the dyad.

CHAPTER II

REVIEW OF LITERATURE

Student achievement motivation has been a subject of educational research for more than 20 years. This chapter will provide an overview of the literature on achievement goal theory, mastery motivational climate, inclusive physical education, and evidenced-based practices in physical education.

Achievement Goal Theory

Achievement goal theory began as a dichotomous model for understanding motivation in classrooms (Ames, 1992; Dweck, 1986; Nicholls, 1989). It consists of two main constructs, achievement goal orientation and achievement goal climate (Ames, 1992; Duda & Nicholls, 1992; Xiang, Bruene, & McBride, 2004). Achievement goals are broken down into two types of orientations: mastery, also referred to as task, and performance, also referred to as ego (Ames, 1992; Nicholls, 1989). Mastery goals have an emphasis on mastering a task while performance goals are ego-centered with an emphasis on dominance over others (Ames, 1992; Nicholls, 1984; Xiang et al., 2004).

More recently two additional goal orientations have become part of achievement goal theory. These additions place the original two orientations in an approach-avoidance relationship. Duda & Nicholls (1992) added performance-avoidance, and Elliot & McGregor (2001), and Pintrich (1999) added mastery-avoidance. When the goal orientations are broken down further into the four-goal constructs, the achievement behaviors become explained more specifically. For instance, a performance-approach

goal means the individual wants his or her performance to be judged as competent, while a performance-avoidance goal oriented individual avoids the task for fear of judgments that are unfavorable based on the individual's incompetence (Elliot & Church, 1997; Guan, Xiang, McBride, & Bruene, 2006). Mastery-approach goal individuals aim to master the task and have a better understanding while mastery-avoidance goal orientation individuals avoid the task for fear of not being able to master it (Chen, Wu, Kee, Lin, & Shui, 2009; Elliot & McGregor, 2001; Guan et al., 2006).

The other main construct of achievement goal theory suggests that the environment or climate has a goal structure that may affect motivation and engagement of students' learning (Ames & Archer, 1988). The teacher's instructional style or other learning setting can emphasize a mastery or performance achievement goal. Such an environment can in turn influence the motivation orientation of the student (Walling et al., 1993).

TARGET

Epstein (1988) introduced the six dimensions of a learning environment known as the TARGET structure. The six dimensions of TARGET are task, authority, recognition, grouping, evaluation, and time. Ames (1992) established principles for classrooms of each dimension for teachers to consider. A mastery motivational focused classroom must consider each of the TARGET dimensions.

Task

The task component involves planning for various levels of difficulty based on curricular outcomes (Valentini et al., 1999). Tasks need to match the range of abilities of each child's skill and ability level, be challenging, be novel, and offer multiple options.

Todorovich and Curtner-Smith (2002) in their study compared ego and task climates. In a task or mastery climate, they allowed children to choose the tasks they wanted and could set their own goals for the task. The presence of choices was in contrast to an ego or performance climate that required all children to complete the same tasks with goals that were set by the instructor.

Authority

Authority includes the responsibilities of decision making, management and monitoring of work (Ames, 1992; Valentini et al., 1999). Students and teachers within a mastery climate share these responsibilities. These responsibilities could include choosing in which tasks to participate (Todorovich & Curtner-Smith, 2002; Valentini & Rudisill, 2004a), or in the making of and enforcement of rules (Valentini et al., 2017; Valentini & Rudisill, 2004a).

Recognition

Recognition is the use of formal and informal motivators (Valentini et al., 1999). Providing recognition in private is essential in a mastery climate. Children receive private recognition for effort and achievement of goals as well as feedback (Barkoukis, Tsorbatzoudis, & Grouios, 2008; Logan, Robinson, Webster, & Rudisill, 2015; Morgan & Carpenter, 2002; Todorovich & Curtner-Smith, 2002; Valentini et al., 2017; Valentini & Rudisill, 2004a). Xiang, McBride, and Solmon (2003), described the use of a ticket system used by a teacher in their study. Students received tickets for effort and displaying appropriate behavior that could be cashed in for prizes at the end of each week. Such motivators, awarded privately, can increase the impact of private recognition and reduce the impact of public comparison.

Grouping

Grouping takes into consideration the commonalities and differences of varying characteristics that either include or exclude a child from a group. An example of grouping that is not mastery is putting all boys together, or all high skilled children together. In devising mastery climates teachers let students form heterogeneous groups, or they remove the use of groups altogether (Logan et al., 2015; Martin, Rudisill, & Hastie, 2009; Morgan & Carpenter, 2002; Todorovich & Curtner-Smith, 2002; Valentini & Rudisill, 2004a). In other words, groups can be varied sizes, and children can work in groups or work independently.

Evaluation

Evaluation is the monitoring of progress (Valentini et al., 1999). Both teachers and students evaluate progress within a mastery climate in physical education (Barkoukis et al., 2008). Each's abilities, and goals form the basis for assessment of one's progress. Teachers can assist with the self-evaluation of a child's performance through the use of task cards or posters to be used to give visual cues of what a task looks like (Valentini et al., 1999).

Time

Time deals with the pace of the lesson, and the total time each task is worked on by a student during a lesson (Valentini et al., 1999). Freedom is provided to students in a mastery climate to come and go from tasks as they see fit for their individual needs (Barkoukis et al., 2008; Martin et al., 2009; Valentini et al., 2017; Valentini & Rudisill, 2004a). Increasing opportunities for engagement is another example of increasing time on task for children in an MMC. Morgan and Carpenter (2002) provided task progressions

during their track and field intervention to reduce waiting at throwing events. This use of differentiated instruction allowed for students to spend more time engaged in a task that aligned with their ability level.

Some research demonstrates the effectiveness of mastery climates for children with disabilities, but the pool is somewhat limited. Valentini and Rudisill (2004a) ran a mastery-based intervention in Brazil with nineteen children with a mean age of 8.14 years. When compared to other disabled children who did not receive a mastery instructional approach they made significant improvements in their locomotor abilities. The intervention these children received was structured on the TARGET principles and applied to all who participated; not just those with a disability.

Valentini and Rudisill (2004b) ran a similar mastery based intervention in the United States with comparable results. Participants who are developmentally delayed took part in this study. A follow-up assessment found children who received the mastery intervention not only significantly outperformed the control group at the end of the intervention but did so six months later as well.

Robinson (2011) investigated preschoolers in another study that looked at the effectiveness of a mastery approach for children with developmental delays. These children saw significant improvement after a 9-week intervention on their ball skills. Also, they reported a higher level of perceived physical competence as the time went on.

A recent study (Valentini et al., 2017) looked at how children with and without disabilities performed on both physical skill development and verbal recall. Similar to the first study, this one took place in Brazil and included a total of 64 children. Eighteen children with a disability participated in this study. Motor skill performance was found to

increase for both children with and without a disability assigned to the mastery group. Such a finding demonstrates that mastery climate is useful for children with a disability in a physical education setting. Lastly, this study found that children with a disability in the mastery group showed better verbal recall of the motor skills when compared to the other group.

Mastery Motivational Climate

Epstein (1988) maintains that when teachers focus on the environment of their classroom, they can better create programs that are more responsive to the students. Research has shown that classroom environments based around mastery motivational climate demonstrate positive response from students (Dorogi, Szabo, & Bognár, 2008; Hastie, Rudisill, & Boyd, 2016; Valentini & Rudisill, 2004c, 2004a)

Mastery motivational climates place value on the process of learning by providing individualized standards for learning and opportunities for the student to guide their learning (Ames, 1992). Mastery motivational climate uses strategies for implementing the six dimensions of the TARGET structure (Epstein, 1988) in the classroom setting (Ames, 1992; Ames & Archer, 1988).

Physical education researchers have explored teacher preferences for a climate, and student preferences of goal orientations. Researchers have aimed to understand student behaviors, responses and predicted beliefs. Xiang and others (2004), set out to better understand what achievement goals children had while participating in a school running program. They found that mastery approach oriented students had stronger persistence and better one-mile run performance. Treasure and Roberts (2001) wanted to see if learning climates played a role in the achievement beliefs for students in physical

education and discovered that students had a positive perception of mastery climate and a negative perception of performance climate. Other research has focused on age and how it relates to the possible change of climates by teachers (Xiang, McBride, & Solmon, 2003). Video analysis of 505 lessons showed that 95% of the lessons for second graders and 70% of the lessons for the fourth graders provided a variety of activities. However, during interviews, the teachers said that they believed that the fourth graders got more choices than the second graders.

Another study compared students for 4th, 8th, and 11th grades in the USA and China to see if cultural differences exist with goal orientations. Overall, regardless of culture or grade, mastery orientation was preferred over performance. Additionally, they found that American children in fourth and 11th grade to be more mastery-oriented than their Chinese counterparts. Shen, Chen, & Guan (2007) examined how achievement goals and interest influence in-class physical activity and learning achievement. They found that mastery goals and interest are predictors of knowledge gain. They also found that students with performance-avoidance were more active in class and took more pedometer-measured steps. All these findings support the use of a mastery climate for the learning environment.

The studies just discussed demonstrate that mastery motivational climates are an effective instructional approach for children with a disability in physical education. These studies used the TARGET principles to direct instruction. Some of the techniques used for each dimension are as follows. Task: novel tasks, and varying levels of difficulty; Authority: individualized goals, and creating of rules; Recognition: private recognition and praise for effort and achievement; Grouping: choice to play with whomever or

individually, and use of a peer models; Evaluation: peer-check of performance, and self-check of performance with use of task cards; Time: lessons paced by the child, and child could spend as much or as little time working on a skill.

Special Education and Adapted PE

Special Education law has seen numerous changes over the years and can trace its origins back to the civil rights movement and the Brown versus Board of Education of Topeka, Kansas supreme court case. The decision that education is a right for all children and must be provided in an equal fashion laid the groundwork for special education today.

Special Education Law

Fourteen years later, in 1968, the Handicapped Children's Early Education Assistance Act (HCEEP), or PL 90-538, was passed and created funding and early education programs with the requirement of parental involvement. In 1972, Mills v. Board of Education in the District of Columbia was heard by the United States District Court to decide if the school district could withhold the enrolling of some 12,000 students with a disability because of insufficient funding. The court ruled that school districts cannot make enrollment decisions due to lack of resources or funding because of the equal protection clause of the Fourteenth Amendment. These cases and law established a rationale for the creation of Section 504 of the Rehabilitation Act, PL 93-112, in 1973 and the Education for All Handicapped Children Act (EAHCA), PL 94-142 in 1975.

Section 504 is a civil rights law which requires equal access to an individual with a disability to programs receiving federal money. Specifically, it prohibits the discrimination in an educational setting. Section 504 established access to education and

the prohibition of discrimination against children with disabilities but did not put forth specific regulations for how to effectively educate such a child.

It was PL 94-142, EAHCA, that established the Individualized Education Program (IEP), Free Appropriate Public Education (FAPE), and least restrictive environment (LRE) for children 3 to 21 years of age. EAHCA required procedural safeguards and the requirement of multidisciplinary assessments for services. PL 94-142 states "The term 'special education' means specially designed instruction, at no cost to parents or guardians, to meet the unique needs of a handicapped child, including classroom instruction, instruction in physical education, home instruction, and instruction in hospitals and institutions." The 1986 amendment of PL 99-457 added the rights and fortifications of PL 94-142 to children ages 2 and under with early intervention services. In 1990, the definition of special education changed slightly with PL 101-476 but still states instruction explicitly in physical education. Other provisions included adding two more disability categories to the eligibility criteria, autism, and traumatic brain injury, bringing the total to 13 qualifying conditions for special education. Another notable change came with the introduction of person first terminology and a new title for the law: the Individuals with Disabilities Education Act (IDEA).

Also in 1990, the Americans with Disabilities Act (ADA), PL 101-336, was signed into law providing all Americans, including children, access to government facilities, transportation, and nondiscriminatory practices by employers as well as other rights, regardless of disability. This required schools to make sure they were accessible to all students; for instance, building ramps to use instead of stairs for a child with a mobility disability or redesigning buildings and other school environments to be more

acoustically appropriate for children with hearing loss or noise sensitivities (Sorkin, 2000). Accessibility concerns have implications on the physical education setting as well since environmental barriers such as grass and dirt are inherently inaccessible to children with disabilities (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004). Furthermore, physical education is a social setting and provides a venue for appropriate interactions with disabled and nondisabled peers. (Block & Malloy, 1998; Helmstetter, Peck, & Giangreco, 1994; Vogler, Koranda, & Romance, 2000).

Despite subsequent reauthorizations and one more name change, the Individuals with Disabilities Education Improvement Act (IDEIA) (2004), instruction in physical education remains a part of the definition for special education and the specially designed instruction of it. It was the inclusion of physical education in the original 1975 law that started adapted physical education (APE) (Roth, Zittel, Pyfer, & Auxter, 2016; Winnick & Porretta, 2017). Roth and colleagues explain APE is "a direct special education service provided to all qualifying children" (2016, p. 11). APE modifies the general physical education setting with instruction based off specific needs that are identified by assessment for a child with a disability. While special education services, including adapted physical education, have always been required to meet a certain level of accountability when it comes to child progress, it was the latest revision of the law that required more specific criteria (Roth et al., 2016, p. 20). The No Child Left Behind Act (NCLB), PL 107-110, set academic achievement standards that all children were to meet including those with a disability. IDEIA set out to align special education code with that of NCLB and placed a stronger emphasis on inclusion and the use of evidence-based practices (Roth et al., 2016, p. 21).

Evidenced Based Instruction

Evidenced-based practice has definitions that vary by profession. However, Jin and Yun (2010) suggest a three-step collaborative approach for APE. The first step requires researchers to create appropriate evidence through various means. Next, the distribution of this evidence must be understandable and easily accessible for practitioners. Lastly, practitioners must think critically about the application of the evidence in their circumstances. These steps are essential to children who receive APE since IDEIA states that child outcomes are to come from the "child's response to scientific, research-based intervention." Even though federal law calls for intervention to be research-based, only a handful of states have specific eligibility criteria and leave the decision of qualifying a child for APE up to experience and professional judgment of the school staff (Roth et al., 2016). Providing services in this fashion fails to recognize the importance of step one and potentially step two of Jin and Yun's model, for unless the practitioner sets his or her criteria based on the research, there is no way to determine if services are evidence-based (Hutzler, 2011). While Jin and Yun (2010) summarized the varying hierarchy of evidence, they placed expert opinion and anecdotal information at the bottom. Therefore, the argument of a practitioner making their criteria being evidence-based is at the lowest level on the hierarchy. Higher levels of evidence would come from research that is systematic and randomized (Glaros, 2003). Binkley (2000), on the other hand, recognizes the importance of clinical judgment as a part of the process for making evidence-based decisions for assessment and intervention, helping to emphasize the need to include judgment and opinion as part of the rich evidence base but to not use it exclusively. Concerning making evidence-based instructional strategies in the physical

education setting, the use of explicit and direct instruction, and task analysis are some of the evidenced-based strategies (Stephens, Silliman-French, Kinnison, & French, 2010). Evidence has shown instruction provided by peers in an inclusive physical education setting to be effective (Cervantes, Lieberman, Magnesio, & Wood, 2013; Klavina & Block, 2008; Lieberman, Dunn, Van der Mars, & McCubbin, 2000), but many physical educators still fail to utilize this strategy (Aufsesser, 1991; Tripp, Rizzo, & Webbert, 2007). Task analysis, or the separation of a skill into smaller parts, has shown to be useful in physical education (Davis & Burton, 1991). Task analysis is also often used in the writing of annual IEP goals and objectives for children in APE (Davis, 1989; Davis & Burton, 1991; Kowalski, Pucci, Lieberman, & Mulawka, 2005). Stephens and colleagues (2010) go on to suggest that the use of evidenced-based instruction will reduce the number of unnecessary referrals of students to APE because of inadequate instruction. Assessment plays a role in the evidenced-based approach as well.

Placement in APE

Special education and APE function in a cyclical fashion. Assessment takes place to determine placement and need, goals are established and worked toward with specialized instruction, and finally, goals are checked for fulfillment. The cycle then resets based on goal attainment (Roth et al., 2016; Winnick & Porretta, 2017). This check is referred to as progress monitoring and came about from the requirements from PL 94-142 which requires an evaluation of present levels of performance, annual goals with short-term objectives, and evaluation of goals and objectives to occur at least annually for all special education students. This monitoring of progress guides new goals and placement.

Placement in APE is not the same for all who qualify. Some children will receive services directly from an APE specialist individually or in a small group. Others may have an APE specialist or trained paraprofessional attend physical education with them in an inclusive class. Consultation with the APE specialist with the general physical education teacher is another way in which APE is provided (Roth et al., 2016; Winnick & Porretta, 2017). Assessments such as the TGMD-2 (Ulrich, 2000) determine which type of service an individual receives, and what gross motor needs to address.

In conclusion, the literature supports the use of evidenced-based instructional strategies. A focus on a learning environment that encourages learning over performance is beneficial to children. Mastery motivational climates are shown to be effective in increasing both ball and locomotor skills of children. While developing a mastery climate the TARGET dimensions of task, authority, recognition, grouping, evaluation, and time must be considered. Studies on individuals with disabilities engaging in a mastery motivational climate may establish a reference point for the effectiveness on the improvement of their motor skills.

CHAPTER III

METHOD

Mastery motivational climate has been found to be an effective teaching style that improves the motor ability for both children with and without disabilities (Martin, Rudisill, & Hastie, 2009b; Valentini & Rudisill, 2004; Wadsworth, Rudisill, Hastie, Boyd, & Rodríguez-Hernández, 2014). Additionally, the use of evidence-based practices has been found to improve student engagement and success in inclusive physical education settings (Valentini & Rudisill, 2004c; Valentini et al., 1999). Furthermore, the effectiveness of a multiple baseline approach with a mastery motivational climate is absent in prior research.

Purpose

This study has multiple aims: (1) to examine the effects of a mastery motivational climate on the attainment of two skills in children with developmental delays, (2) to determine how long it takes for a mastery motivational climate to be effective for students with developmental delays in an inclusive setting, and (3) to determine participants' retention of those skills at least two weeks after the removal of the motor skills intervention.

Participants

Recruitment of children took place at one public elementary school in a small southeastern town serving children in grades kindergarten through two. Eligibility to participate required that children have a current individualized education program (IEP).

Four typically developing peers who attended physical education during the same class period as each child with an IEP served as peer models. Data were collected only on the children with IEP's. Students at the school received 30 minutes of daily physical education. A description of each participant's disability category, age, and sex is in Table 1.

Table 1

Participant Demographics

Participant	Age[a]	Sex	Disability Category
101	7 years 0 months	F	Developmental Delay
102	7 years 2 months	F	Speech or Language Impairment
201	7 years 6 months	F	Intellectual Disability
205	7 years 3 months	M	Intellectual Disability
302	7 years 1 month	F	Autism
303	6 years 11 months	M	Specific Learning Disability

[a] All participants attended 1st grade

The Institutional Review Board at Auburn University approved this study, and all children who had intervention data collected on them provided parental informed consent to participate. All children provided verbal assent. The cooperating school and governing body provided consent as well.

Design

This study employed a multiple baseline design. Three teams in all participated in the study, a team consisted of two children with a disability, referred to as a dyad, and four typically developing children for a total of six children per team. Each dyad had their scores recorded for the hop and overhand throw subtest of the Test of Gross Motor Development, third edition (TGMD-3). More baseline data points were collected until each dyad achieved stability in their performance. Intervention sessions for any one group did not begin until the skill was found to be stable, that is, there was no more than

a twenty percent difference in the data points, and data points were not trending up. Horner and colleagues (2005) recommend the use of at least five data points and that the points should not demonstrate a trend in the direction predicted by the intervention. However, according to the single-case intervention research design standards only three points in any phase, baseline or intervention, are required to demonstrate the presence of an effect (Kratochwill et al., 2013). The standards also note that a minimum of six phases is required to show an effect in a multiple baseline design.

The researchers implemented multiple probe across participants design. Researchers measured the effects of MMC across three dyads for the skills of overhand throwing and hopping. Both overhand throwing and hopping were considered achieved with a score of 7 or higher in skill performance for each subtest (see Appendix A for scoring rubrics). Both hopping and overhand throwing has a maximum score of eight points. Research shows that by the age of seven children will show mastery of the skill of hopping on their preferred foot. (Roberton & Halverson, 1988) Boys are expected to master the skill of overhand throwing by the age of seven and a half and by age eight for girls (Roberton & Halverson, 1988). Age expectancies for each skill relate to the developmental sequences introduced by Roberton and Halverson (1984). Roberton and Halverson outlined four steps for hopping. The four criteria for hopping on the TGMD-3 relate to Roberton and Halverson's (1984) developmental sequences at step three and four for the leg action and step four for the arm action. Therefore, a score of seven out of eight on the TGMD-3 subtest of hopping is considered having attained skill mastery for first graders. For throwing a score of seven out of eight is considered skill mastery for first graders. The TGMD-3 criteria for throwing align with step three for trunk action, step four for

backswing and forearm action, and step three of four for foot action (Roberton, 1984).

Each dyad completed baseline probes. Once data were stable, defined as no more than 20% variance across three consecutive probes, intervention for the first dyad began. Once a dyad demonstrated skill attainment, the next dyad moved from baseline to intervention phase. Dyad 1 and 2 were tested for skill retention four weeks after completing all intervention sessions. Intervention sessions consisted of four throwing or four hopping/jumping stations (see Appendix B). Dyad 3's retention data were collected three weeks after completing all intervention sessions.

The intervention took place during the children's already scheduled physical education classes up to three times per week. Because space was needed to run the intervention, weather, school closures, holidays, and school events occasionally inhibited our ability to run sessions on three scheduled intervention days. Days on which intervention took place were Mondays, Wednesdays, and Fridays. The principal investigator planned and instructed all intervention sessions. The principal investigator is a licensed adapted physical education specialist with over eight years of teaching experience at the elementary and secondary level.

Interobserver Agreement

Data were collected live without the aid of video recording, thus increasing the importance of interobserver agreement. Establishing interobserver agreement helps to protect the data from observer drift. Observer drift, as explained by Richards, Taylor, Ramasamy, and Richards (1999), is when an observer begins to place a personal definition on performance as opposed to the predetermined definition. Observer drift can happen when an observer establishes a rapport with the participant and has a belief that

the participant can perform certain criteria correctly and scores them as such despite the participant's incorrect performance. Two individuals demonstrated reliability in the scoring of the predetermined skills using training. Training involved each observer scoring four performance videos independently without stopping the video. The observers then compared scores and discussed differences to establish a scoring standard based on the protocol from the TGMD-3. After establishing standards for scoring the observers live scored, meaning each video was viewed once and scored, 5 new videos which resulted in a 100% agreement for hop and 96.15% agreement for overhand throw. A 90% agreement falls on the high end of the recommended acceptable value for interobserver agreement outlined in the single-case research design standards (Kratochwill et al., 2013). During the treatment period, both scorers recorded the participants' performance live. Thirty percent of the scores for the hop and overhand throw performances produced an interobserver agreement of 90.32% for hop and 87.1% for overhand throw. A total of 34 hop performances and 31 overhand throw performances were randomly selected to check for agreement. The total number of scores in agreement were then divided by the total number of scores selected.

Intervention: TARGET

Lesson design used each of the TARGET principles. Tasks allowed for a varying degree of abilities. Throwing tasks had options of different size, weight, and texture of balls and beanbags. The distance from which the ball was thrown also varied based on the need of the individual participant. For hopping/jumping tasks, participants had the opportunity to decide how to complete the task based on the overall goal. For example, participants chose to focus on a goal of distance, height, or duration. Task variations that

were safe and did not interfere with another's ability to participate were allowed. An example of a task variation is if a participant chose to underhand throw instead of overhand, or to leap over a hurdle instead of jumping.

Both the instructor and participants shared authority. Rules and protocols were established for each team before any instruction took place. Participants had the opportunity to provide input on rules and protocols. The instructor required the inclusion of safety and choice rules even if the participants failed to suggest any. The instructor also used positive language for all rules. Positive language is listing the desired outcome as opposed to listing undesired outcomes. An example of a positive rule is "I will use equipment in a safe manner" instead of saying "I will not hit others with equipment." Participants also had authority in holding themselves and others accountable for following the rules. The instructor encouraged participants to police themselves and to stop potentially unsafe behaviors of their peers. Please refer to Appendix C for the finalized daily expectations.

The instructor provided encouragement and praise in private to the participants within close proximity to the recipient. During each session, the instructor recognized each participant's effort at least one time. The instructor encouraged participants to keep working or to modify a task that was not at the correct level of difficulty when necessary.

Participants could stay at any one station as long as they wished. Physical education sessions are 30 minutes in length at the cooperating school research sites. A daily reminder of rules and an overview of the day's stations took place during the first five minutes of each session. The next twenty minutes were for partaking in the stations and the last five minutes for the closure of the lesson. The closure addressed any safety

issues that arose during the day's lesson as well as providing feedback on modifications and other choices that were made by the participants.

Treatment Fidelity

To verify the implementation of a MMC the principal researcher's mentor and a first-year doctoral student completed a check for fidelity of the six TARGET components, plus a safety component, for ten weeks, completing checks on 14 sessions. Thus, checks were conducted on one or two days per week, resulting in an average of 43% of the sessions being checked per week. Interobserver agreement for the check of treatment fidelity indicated a 94% agreement.

Single-Case Research Design

Single-case research dates back 50 years to applied behavior analysis (Baer, Wolf, & Risley, 1968). Baer and colleagues outline applied research and two types of single-case design, reversal, and multiple baseline. They refer to applied research as "a close relationship between the behavior and stimuli under study and the subject in whom they are studied (p. 92)." More specifically, single-case research looks at a participant response to an attempt to change a behavior. The attempt to change is usually through an intervention. In a reversal design a behavior is measured for stability, and then an experimental variable is applied to see if the behavior changes. Once this happens, the experimental behavior is removed to determine if it is the cause of the change in the behavior. If the participant reverts to the prior behavior, then it is believed that the experimental variable was the cause. Reverting to an undesired behavior is not always safe or practical. The other type introduced by Baer and colleagues (1968), known as multiple baseline, is applied when this is the case.

Multiple baseline establishes a baseline of current function measured over time. Once a baseline is established then an experimental variable is applied and measured against the baseline. Once the single subject has reached the desired change, another behavior or participant receives the experimental variable. Multiple baseline design is common in special education research. This design has been used to look at students with disabilities' learning in math (Butler, Miller, Lee, & Pierce, 2001; Hinton, Strozier, & Flores, 2014), and English language arts (Cumming & Rodriguez, 2013; Kamps, Barbetta, Leonard, & Delquadri, 1994).

Social Validity

Social validity was addressed through a closed and open-ended questionnaire after the study. The physical education teacher who plans and provides instruction to all students from the cooperating school completed a brief online questionnaire that consisted of six Likert type questions relating to the TARGET structure and a comments section (see Appendix D).

CHAPTER IV

RESULTS

A multiple baseline across participants design was utilized to evaluate the effects of MMC on the ball control skill of overhand throwing and the locomotor skill of hopping for students with developmental delays. Data were interpreted by visual inspection, and the following was noted: overlap between baseline and intervention, slope of each treatment data path, and number of data points from the beginning of intervention to criterion. A functional relation was demonstrated using a MMC to improve throwing skills for Dyad 1, 2, and 3. Results for Dyad 1, 2 and 3 are summarized in Figure 1 and Figure 2.

Dyad 1's baseline data for overhand throw ranged from 4 to 6 with stability of skill performance ranging from five and half to six. Dyad 2's baseline performance for overhand throw had less variability with scores ranging from 4.5 to 5.5. Dyad 3's performance at baseline for overhand throw was dramatically lower than that of Dyad 1 and 2 with scores ranging from .5 to 2 points.

For hopping, Dyad 1's baseline scores ranged from 4.5 to 5.5 with stability of skill performance ranging from 5 to 5.5. Dyad 2's baseline performance for hopping started at 5 and dropped to as low as 3 and demonstrated stability of skill performance at 4. Dyad 3 had skill performance for hopping at baseline that was variable from 2 to 5. Stability for skill performance occurred between 4.5 and 5.

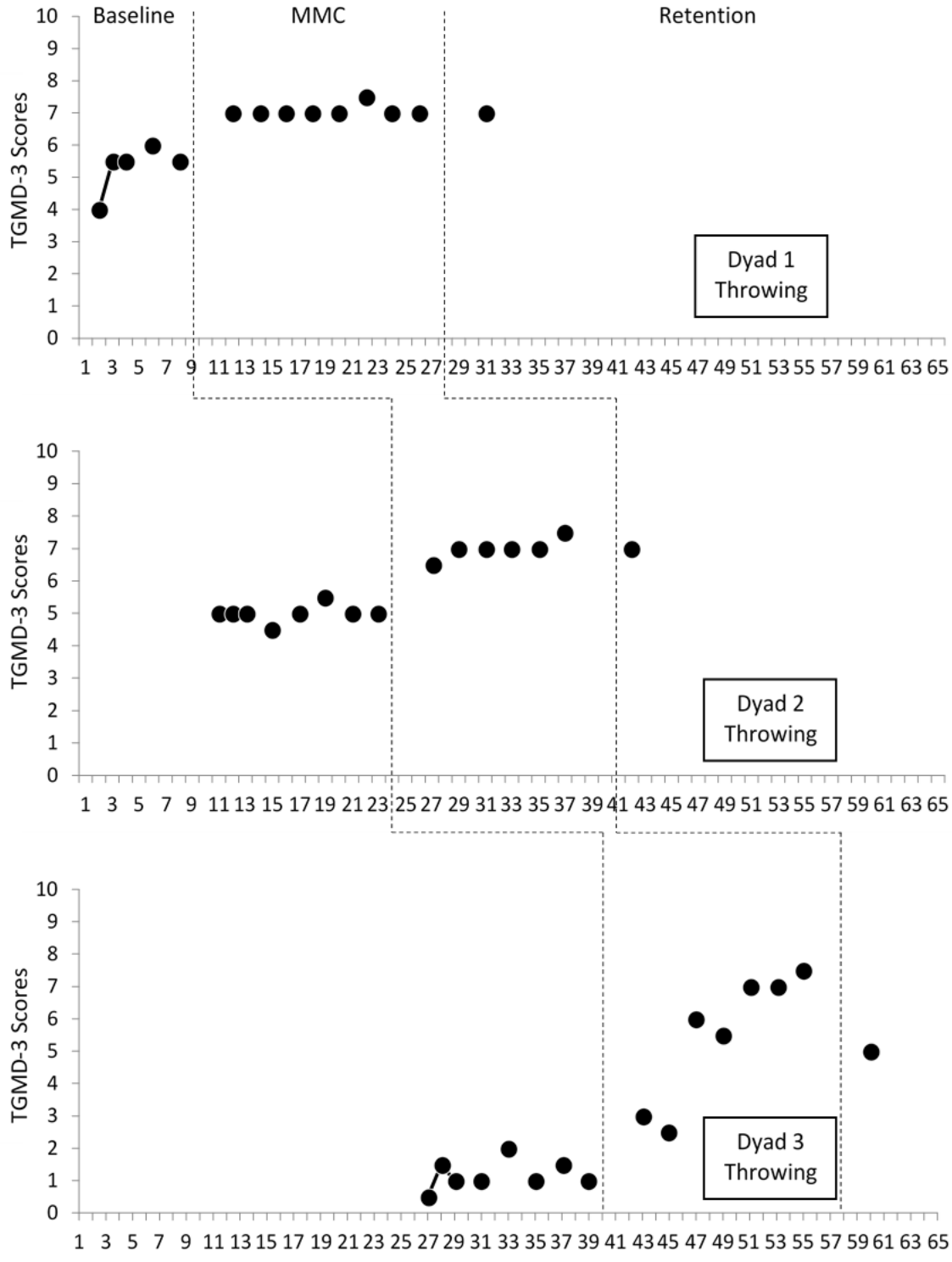

Figure 1. Raw scores for overhand throwing on each Dyad.

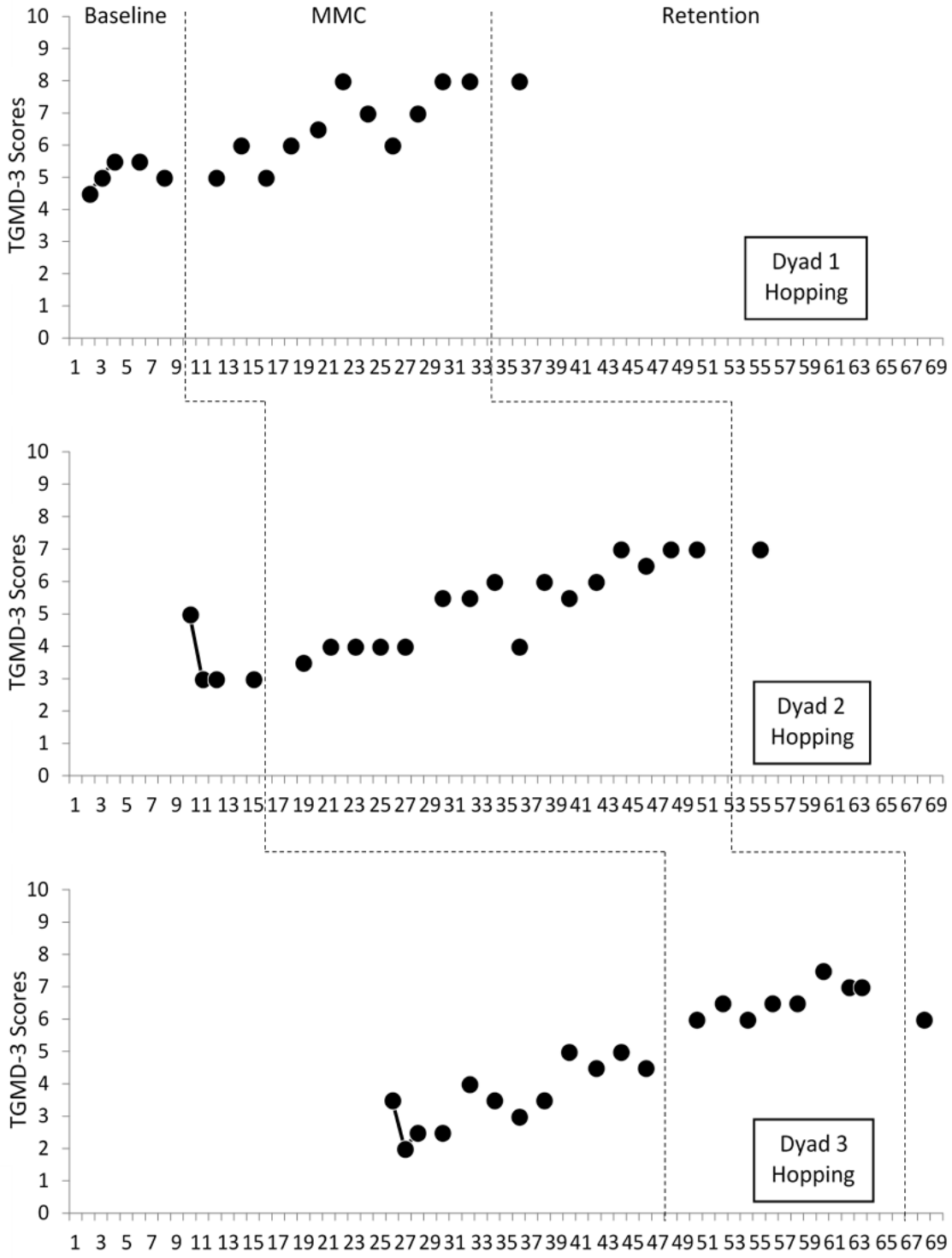

Figure 2. Raw scores for hopping on each Dyad.

Performance after Implementation

Dyad 1. Dyad 1 received six lessons which emphasized overhand throwing over a 4.5-week period with a total of eight probes completed during that time. They reached criterion for overhand throw after just one probe. There was an immediate change in performance between baseline and MMC instruction with no overlapping data points across the baseline and intervention phases. The intervention phase data points show a flat trend which indicates immediate and continued improvement over baseline. Five weeks after the completion of all throwing lessons, retention of skill acquisition was checked, and performance remained the same. Dyad 1 received seven lessons which emphasized hopping and jumping over the same 4.5-week period. Eleven probes in total were completed in which they reached criterion for hopping after six probes. There was a change in performance level; however, the 1st and 3rd data point overlapped with baseline. The intervention phase data points indicate an upward trend. Dyad 2 showed retention for hopping 4 weeks after completing all hopping/jumping lessons.

Dyad 2. Dyad 2 received six lessons which emphasized overhand throwing over a 4-week period with a total of six probes completed during that time. They reached criterion for overhand throw after two probes. There was an immediate change in performance between baseline and MMC instruction with no overlapping data points across the baseline and intervention phases. The intervention phase data points show a flat trend which indicates immediate and continued improvement over baseline. Five weeks after the completion of all throwing lessons, retention of skill acquisition was checked, and performance remained the same. Dyad 2 received six lessons which emphasized hopping and jumping over the same 4-week period. Eleven probes in total

were completed in which they reached criterion for hopping after eight probes. There was a change in performance level; however, the 4th data point overlapped with baseline. The intervention phase data points indicate an upward trend. Dyad 2 showed retention for hopping 4 weeks after completing all hopping/jumping lessons.

Dyad 3. Dyad 3 received six lessons which emphasized overhand throwing over a 4-week period with a total of seven probes completed during that time. They reached criterion for overhand throw after five probes. There was an immediate change in performance between baseline and MMC instruction with no overlapping data points across the baseline and intervention phases. The intervention phase data points show an upward trend which indicates immediate and continued improvement over baseline. Four weeks after the completion of all throwing lessons, retention of skill acquisition was checked, and performance decreased by two. Dyad 3 received six lessons which emphasized hopping and jumping over the same 4-week period. Eight probes in total were completed in which they reached criterion for hopping after six probes. There was a change in performance level with no overlapping points. The intervention phase data points indicate an upward trend. Dyad 3 showed a decrease of one point for hopping 3 weeks after completing all hopping/jumping lessons.

Effect Size

Tau-U was calculated for each dyad; this form of analysis combined non-overlapping data points between phases with trend within the intervention phases while accounting for any trend within baseline (Parker, Vannest, & Davis, 2011). Vannest and colleagues (2016) created an online calculator which was utilized for calculating Tau-U scores for this study. For Dyad 1, there were no significant trends within baseline phase

for overhand throw or hopping. In comparing baseline and intervention phases for overhand throw, a strong effect was indicated (Tau-U = 1). In comparing Dyad 1's baseline and intervention data for hopping, a moderate effect was indicated (Tau-U = .78).

Dyad 2 did not demonstrate a significant trend within baseline phase for overhand throw or hopping. In comparing baseline and intervention phases for overhand throw, a strong effect was indicated (Tau-U = 1). In comparing Dyad 2's baseline and intervention data for hopping, a strong effect was indicated (Tau-U = .94).

Dyad 3 did not demonstrate a significant trend within baseline phase for overhand throw but did have a significant trend within baseline phase for hopping. In comparing baseline and intervention phases for overhand throw, a strong effect was indicated (Tau-U = 1). In comparing Dyad 3's baseline and intervention data for hopping, a strong effect was indicated (Tau-U = 1).

Overall, the intervention had a strong effect across all phases for overhand throw (Tau-U = 1). For hopping there was a strong effect across all phases as well (Tau-U = .91).

Social Validity

The teacher's feedback on the questionnaire indicated a willingness to incorporate some of the TARGET principles into her instructional strategies for students with a disability. Specifically, she stated that she is moderately likely to allow students with a disability to, change a task, choose their grouping, and provide them with authority to choose a station or activity that the child has done previously. The physical education teacher was less likely to allow students with a disability to remain at an activity for a

longer time than their peers, and to allow them to skip some planned activities. Lastly, she specified that she was slightly unlikely to allow a student with a disability to change activities before the allotted time running out.

The findings for this study show a strong effect for all three dyads with overhand throw with no overlapping data points, showing an immediate change in skill performance. No significant trend was found for any of the dyads in the baseline phase, meaning the participants showed stability in their performance and were not improving before the MMC intervention. All three dyads accomplished skill mastery with a score of seven or greater. Only Dyad 3 showed a regression in skill acquisition after being removed from the MMC intervention but did score three points higher than they did at baseline.

Hopping data shows a strong effect for Dyads 2 and 3 and a moderate effect for Dyad 1. Dyad 1 and 2 had overlapping data points from baseline to intervention phase, signifying a delay in hopping improvement during the intervention phase. More precisely, these two dyads did not respond to the intervention as quickly. Dyad 3 had no overlapping data points. Dyad 3 showed a significant trend during baseline while the other two dyads did not, demonstrating a performance increase by Dyad 3 before starting the MMC intervention. All three dyads reached a score of seven or better for hopping and showed some level of skill retention. Dyads 1 and 2 both maintained their skill performance scores after being removed from the MMC intervention while Dyad 3 dropped by one point.

CHAPTER V

DISCUSSION

This study examined the effects of a MMC physical education intervention in children with developmental delays. Specifically, this study examined the skill performance of children with a disability within a MMC for overhand throwing and hopping. The current study also examined the length of time needed to achieve skill mastery for overhand throw and hopping. Finally, this study set out to examine any retention of skills after participants were removed from the intervention.

Skill Performance and Acquisition: Overhand Throw

As mentioned in the introduction of this study, 90% or more of children with a disability access general education during the school day (Morningstar et al., 2017). Physical education is one of the general education opportunities that these children access. The participants in this study all received general physical education and presented with a wide range of ability levels. At baseline, scores for overhand throw ranged from .5 to 6, yet the children in all three dyads achieved skill mastery at 7 after six throwing intervention sessions. While activity choices were the same for all, each child had the autonomy to learn in a fashion that best fits him or her. For instance, one station goal was to throw an object as far as possible participants chose to throw tennis balls, small and large rubber balls, spiky balls, bean bags, and various other projectiles underhand, overhand, with two hands. Some even threw the item directly over their head while standing with their back to the targeted throwing area. Traditionally, a teacher

would stop any performance that was not like the expected skill performance. For example, if the teacher was asking the children to throw in an overhand pattern, then throwing underhand or with two hands would be corrected or redirected. The findings of this study support the idea that children know how to self-regulate their learning (van Hout-Wolters, Simons, & Volet, 2000) and can achieve skill mastery while performing the tasks in a variety of fashions.

Prior research supports the improvement of ball skills for early elementary school-aged children via the use of a MMC (Martin et al., 2009; Valentini & Rudisill, 2004a). The evidence from this study offers support for this finding. More notable is the finding from the current study that suggests the use of a MMC as an effective environment for which to provide instruction to children with a disability. This extends the Valentini and Rudisill (2004a) finding that children with a disability in Brazil improved on ball skills after a MMC intervention and adds support for the same being true in the United States.

Skill Performance and Acquisition: Hop

The current study offers support for the effectiveness of a MMC for students with a disability on the locomotor skill of hopping as well. Hopping showed less variability at baseline among dyads than did throwing, with hopping ranging from 2 to 5.5 with skill mastery after six to seven MMC sessions.

The findings for hopping may have been influenced more by outside instruction than was throwing. During the intervention phase for Dyad 2 and the baseline phase for Dyad 3, the entire school participated in a jump rope event that included two weeks of instruction on the locomotor skills of jumping and hopping. Dyad 2 received physical

education in the MMC intervention during this time three days a week and physical education form their typical teacher the other two days; all other children received physical education five days a week from the cooperating school's physical education teacher. This may explain the significant gains Dyad 3 exhibited in baseline as it has been found that practice predicts improved skills (Johnson, 2018). Additionally, it may explain why the children in Dyad 3 required half as many probes as the other two dyads to reach skill mastery.

Retention: Overhand Throw

Retention findings for overhand throw show a two-point drop off in skill performance for Dyad 3 while both Dyad 1 and 2 maintained their acquired skill performance at seven. The ability level of the two participants in Dyad 3 at baseline was lower than Dyad 1 and 2, and both participants were categorized as intellectually disabled while no other participants were. Children with intellectual disabilities gross motor skill ability, especially with ball skills, is lower than their peers (Westendorp, Houwen, Hartman, & Visscher, 2011). This may be the reason for the drop in skill performance. Dyad 3's skill improvement should be recognized as an example of the effectiveness of a MMC. However, continued instruction appears to be required for individuals with more significant ability restrictions. Perhaps the children of Dyad 3 stopped practicing throwing while the others did not. Prior research suggests that motor skills cannot be learned without the presence of practice and reinforcement in an appropriate movement program (Logan, Robinson, Wilson, & Lucas, 2012). While physical activity was not measured in this study, others have found that children with disabilities tend to be less active than their non-disabled peers (Hogan, McLellan, & Bauman, 2000; Obrusnikova,

Valkova, & Block, 2003; Sit, Lindner, & Sherrill, 2002) including in physical education (Lieberman et al., 2000), and those identified as intellectually disabled are even less active than their peers with a different disability condition (Sit et al., 2002). As Stodden and colleagues (2008) suggested, there may be other variables that contribute to a link between motor skill competence and physical activity, therefore, disability category may be one such factor. It follows, then, that the motor skill competence of children with intellectual disabilities may falter due to their disability type, lack of instruction/practice, and/or lack of physical activity.

Retention: Hop

Retention for hopping was similar to throwing for all three dyads with only Dyad 3 regressing. The regression of skill performance was minimal for Dyad 3 with a drop of only one point. Because Dyad 3 benefited from the additional work on jumping and hopping in physical education before the intervention, it can be concluded that for greater retention to occur for children with an intellectual disability, more than four weeks of intervention is needed. In this study Dyad 3 received a total of six weeks of jumping and hopping instruction, two weeks in physical education and four weeks in the MMC intervention. It should also be noted that children with intellectual disabilities perform better on locomotor skills than they do on ball skills (Hartman, Houwen, Scherder, & Visscher, 2010).

Task

Each component of the TARGET structure had to be uniquely considered for this study. Task was the component that provided for the greatest amount of autonomy for the team members. Each station was planned with modifications in mind. While the

instructor guided the learning outcomes by providing access to specific equipment the children made a choice for how to achieve the outcome. An example of these choices occurred on the running road station. Several types of obstacles, spots, hurdles, aerobics steps, and so on, were placed in a circle around the teaching space. The children used different movements to traverse the obstacles. Some jumped or hopped over hurdles while others chose to crawl or scoot on their backs under. Another modification made to the running road was going over the large trapezoid mat mountain. The example provided by the instructor was to step up on the mountain and then jump down. A few children chose to run and jump up on the mountain and jump straight down, and few others ran and jumped up but chose to jump down while spinning 360 degrees before landing. The freedom to make these changes challenged all the children in an enjoyable fashion that also led to skill performance gains.

Authority

Authority during the intervention was observed in multiple ways as well. While all team members helped to establish and enforce rules, there were other examples of authority during intervention sessions. One child in Dyad 1 used the authority given to take over stations at times. She would direct the other children on how to modify some of the stations. At the block tower station, she would direct how to build the tower and who got to throw. While it was great to see her acting as a leader, she had to be reminded multiple times to allow others to make their own choices and two times was removed from a station for not allowing others to participate the way they desired.

Recognition

Recognition was provided by the instructor daily and focused on the child's effort rather than on their performance. For instance, at the throw for distance station, the instructor encouraged and recognized skill improvement rather than recognizing how far their item went in comparison to others. The instructor used statements such as, "I like how you stepped with your opposite foot," and "That was a strong throw." There were instances of recognition being provided by team members to other team members. At the knockout station, members worked together to move a large ball to a specified location by throwing smaller items at the large ball. One child in Dyad 2 made sure everyone got a turn and would recognize each individuals' effort when it was not their turn. Another example of recognition by the children was during the jump rope station. A group of children decided they wanted to try running in and jumping over a turning long jump rope. Only two children were successful. However, a Dyad 3 member told all those who tried they did a good job trying.

Grouping

Grouping was the most variable of the components during the intervention. A typical intervention session saw team members working in pairs, groups of four to six, and individually. The children had the choice of what grouping they participated in throughout each intervention session. Never was one grouping formation consistent throughout an intervention session.

Evaluation

Evaluation of skill performance was provided by the instructor as well as by the children. While providing recognition, evaluation of skill performance also took place.

When hopping forward, the children would be reminded to use their arms and leg that is up to help pump. Additional demonstrations were provided as needed. Additionally, task card (see Appendix E) with the skill sequence broken down into still photographs were available for self-evaluation. Children from each dyad used the task cards to help guide their skill practice during the intervention.

Time

The time spent at any given station varied greatly among the children of each team. On several days children stayed at one station for the duration of the intervention session, while other children spent their time evenly between the four stations. One child in Dyad 3 spent many of his hopping intervention sessions participating in only one station. It should be mentioned that during physical education class he is directed by an adult at all times which can lead to dependence and hinder the child's ability to participate independently. Even though he only participated in one station at times his active participation in the station most of the time required no encouragement from an adult.

Safety

While discussing daily expectations for MMC lessons, it became apparent that safety needed to be added as part of the daily reminders. Prior to starting the intervention, one major concern for the researchers was safety. Before the children in each team started intervention, a discussion about rules took place. During this discussion, the instructor explained the different choices the children would have during the sessions. While talking about the different choices, examples of safe and unsafe choices were provided. For example, when talking about the choice to change a throwing station, a safe choice

was to throw when no one was standing in front of you, while an unsafe choice would be to throw when a person was in front of the intended target. Since safety was an initial concern, the children were then asked to provide rules they felt would keep everyone safe. The children suggested rules such as, "do not hit" and "do not throw balls at someone," which lead to the creation of the expectation of "I will make safe choices," and "I will remind others to make safe choices." This became a daily emphasis for the sessions and one that is imperative for the successful implementation of a MMC.

Strengths and Limitations

This study suggests that a MMC intervention can be effective in gaining skill mastery in hopping and overhand throwing for children with a disability. One of the main strengths this study has over the prior studies which use MMC with children with developmental delays is that all the participants received some degree of special education services. Additionally, this study took place in the natural educational setting as opposed to a lab. The design of this study is another strength in that the use of single-case research design lends itself well to children with a disability, especially individuals with severe disabilities.

While MMC interventions have been shown effective for children with a disability, this study added a clinically driven design to the MMC literature. While the sample size was small, important practical implications nonetheless arose from this study. All children in this study, regardless of disability, improved to skill mastery for overhand throw and hopping. All demonstrated some level of retention and all participated in a high autonomy setting safely. Adding to the importance of this study, the willingness of the teacher at the school to try some of the TARGET principles in her inclusive physical

education classes demonstrates the practical use of a MMC designed physical education class.

While this study provides valuable information supporting the need to establish a mastery climate for children with a disability, it does have its limitations. The number of participants limits the generalizability of the findings. A greater number of participants involved not only in each dyad, but across schools, and grade level would have helped strengthen the findings.

Future Research

Going forward there are several ways in which this study can be replicated and/or extended:

- Researchers could investigate the addition of a control group that is compared for skill performance at the same intervals as those in the intervention group.
- Future studies can look at extending such a study at multiple schools, and within other regions of the country.
- One specific question that should be considered is the safety of an MMC when implemented in a large physical education setting, such as a class of thirty or more. The current study was done with small groups which may have accounted for the overall safety of the sessions.
- Researchers can arrange dyads by disability and measure performance across other disabilities and within the same disability.

Conclusion

The findings from this study add to the literature by supporting the use of a MMC in an inclusive physical education setting. When children with a disability participate in an MMC with non-disabled peers, they can improve their motor skills, specifically throwing and hopping and show a functional relation. Additionally, the teacher at the intervention site expressed a desire to incorporate components of the TARGET structure to better serve her students with disabilities, adding to the strength of the relation. Demonstrating effective teaching practices in a clinical setting and listening to practitioners share their thoughts on the feasibility of using such practices strengthens the literature base and should be considered in future studies.

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Appendix A

Data Collection Sheet TGMD-3 Scoring Rubrics

Participant:

Hop		Date:			Date			Date:			Date:			Date:			Date:			Date:			Date:			Date:		
15 ft. Hop on preferred foot Repeat	1. Non-hopping leg swings forward in pendular fashion to produce force																								
	2. Foot of non-hopping leg remains behind body																								
	3. Arms flex and swing forward to produce force																								
	4. Hops four consecutive times on preferred foot before stopping																								
		Total:			Total:			Total:			Total:			Total:			Total:			Total:			Total:		

Overhand Throw		Date:			Date			Date:			Date:			Date:			Date:			Date:			Date:			Date:		
Tennis ball One line 20 feet from wall Face the wall Throw the ball hard Repeat a second trial	1. Windup is initiated with downward movement of hand/arm																								
	2. Rotates hip and shoulders to a point where the non-throwing side faces the wall																								
	3. Steps with the foot opposite the throwing hand toward the wall																								
	4. Throwing hand follows through after the ball release, across the body toward the hip of the non-throwing side																								
		Total:			Total:			Total:			Total:			Total:			Total:			Total:			Total:		

Appendix B

Daily Activity Plans

Lesson #1

Throwing

Station 1:

Block Tower – Objective is to build a tower out of cardboard bricks and then throw an item at it to knock it down.

Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (5 each)

Hula hoops (2 of the same color)

Poly Spots (2 of the same color)

Cardboard bricks (5-10 bricks per station make them equal – 2 stations total)

Station 2:

Tic Tac Toe – Objective is to throw an item onto a tic tack toe game board to get 3 in a row.

Equipment:

Bean bags (5 of one color, 5 of another color – get different sizes if possible 5 of each size if possible)

Hula hoops (9 all the same color or 3 of 3 different colors)

Station 3:

Distance Throw – Objective is to throw an item as far as you can.

Equipment:

Poly Spots (4)

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (10 each)

Station 4:

Partner throw and catch – Objective is to throw and item to a partner so that they can catch it.

Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (3 each)

Poly Spots (6)

Lesson #2

Throwing

Station 1:

Pin Knock Down – Objective is to knock down the bowling pins by throwing an item at them

Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (5 each)

10-15 bowling pins

Poly Spots (4 of the same color)

Mats or pop-up goals to catch the thrown items

Station 2:

Target Throw – Objective is to throw an item so that it hits the target

Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (5 each)

Velcro or other wall target (2 total)

Station 3:

Scoot and Throw – Objective is to throw an item into a bucket while seated on a scooter board

Equipment:

cones (2 same color)

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (10 each)

Large bucket or basket

Scooter board (4)

Station 4:

Partner throw and catch – Objective is to throw and item to a partner so that they can catch it.

Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (3 each)

Poly Spots (6)

Lesson #3

Throwing

Station 1:
Knock Out – Objective is to move the large ball across a distance by throwing smaller projectiles at the large ball.
Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (Go crazy, the heavier the better)

1 large ball (exercise ball or covered beach ball, they look like soccer balls)

Poly Spots (4 of the same color)

Mats or pop-up goals to catch the thrown items

(Place spots and bucket of balls/items from end line(about 30 feet away)

Station 2:
Hoops and buckets – Objective is to throw an item so that it lands in a hoop or bucket
Equipment:

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (5 each)

1 large bucket/basket

4 small buckets

8 hula hoops

(Place hoops in a large circle, then place the large bucket in the middle and the small buckets around the large one)

Station 3:

Cones – Objective is to throw an item at a cone so that it moves or knocks over.

Equipment:

Cones (15 small plastic cones)
Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (10 each)
4 Poly spots

Station 4:
Distance Throw – Objective is to throw an item as far as you can.
Equipment:

Poly Spots (4)

Various balls – All-balls(yellow balls), tennis balls, bean bags, whiffle balls (10 each)

Lesson #1

Hopping

Station 1:
Running road – Objective is to use locomotor movements to navigate over around and through obstacles in a circular path

1. Hurdles
2. Steps
3. Hoops/spots
4. Boxes/lines

Equipment:

High and low hurdles (10-15 total)

exercise steps/platforms (enough for 3-4)

hula hoops

12 poly spots

10 short jump ropes

Station 2:
Standing long jump – Objective is to jump as far as you can

Equipment:

Bean bags (5 different colors)

2 cones (same color)

Station 3:
Fill the bucket relay – Objective is to move all the items from the starting point to the bucket by hopping or jumping
Equipment:

Poly Spots (4)

Various items – All-balls(yellow balls), bean bags, tennis balls, bean bags, whiffle balls, etc. (40 total)

Station 4:
Jump ropes – Objective is to jump over a rope as many times as you can

Equipment:

Jump ropes (5 short, 2 long)

Lesson #2

Hopping

Station 1:

Running road – Objective is to use locomotor movements to navigate over around and through obstacles in a circular path

1. Hurdles
2. Ladder
3. Hoops/spots
4. Over under

Equipment:

High and low hurdles (10-15 total)

Agility ladder

hula hoops

15 poly spots

10 short jump ropes

20 Cones (Larger cones that are the same height)

Station 2:

One leg race – Objective is to hop from one cone to another as quickly as you can

Equipment:

2 cones (same color)

Station 3:

Make your own hopscotch – Objective is to hop and/or jump on a pattern

Equipment:

Poly Spots (20)

Station 4:

Jump over the river – Objective is to jump over a gap of varying distances

Equipment:

Jump ropes (4 long)

Lesson #3

Hopping

Station 1:
Running road – Objective is to use locomotor movements to navigate over around and through obstacles in a circular path

1. Mountain
2. Ladder
3. Tunnel
4. Over under

Equipment:

High and low hurdles (10-15 total)

Agility ladder

Tunnel

10 short jump ropes

Mats to create a mountain to jump off of

20 Cones (Larger cones that are the same height)

Station 2:
Mini Trampoline – Objective is to jump or hop on the trampoline as many times as possible

Equipment:

4 mini tramps

Station 3:
Make your own hopscotch – Objective is to hop and/or jump on a pattern

Equipment:

Poly Spots (20)

Station 4:
Standing long jump – Objective is to jump as far as possible

Equipment:

2 cones

2 poly spots

4 bean bags

Appendix C

Daily Expectations

In Physical Education I will be:

Responsible

Respectful

Prepared

Safe

I have choices

I can play with who I want

I can play at which ever station I want

I can stay at a station as long as I want

I can choose the difficulty of the stations

I will make safe choices

I will remind others to make safe choices

I will receive one warning if I make an unsafe choice

I will be removed from a station if I make 2 unsafe choices

Appendix D

Social Validity Survey

The six students with a disability who participated in my sessions all improved to a score of proficiency for hop and overhand throw when given autonomy to pick a station, stay at a station for as long as they want, change the station's difficulty, and play with whomever they would like if they made safe choices. Knowing this how likely are you to consider allowing students with a disability to:

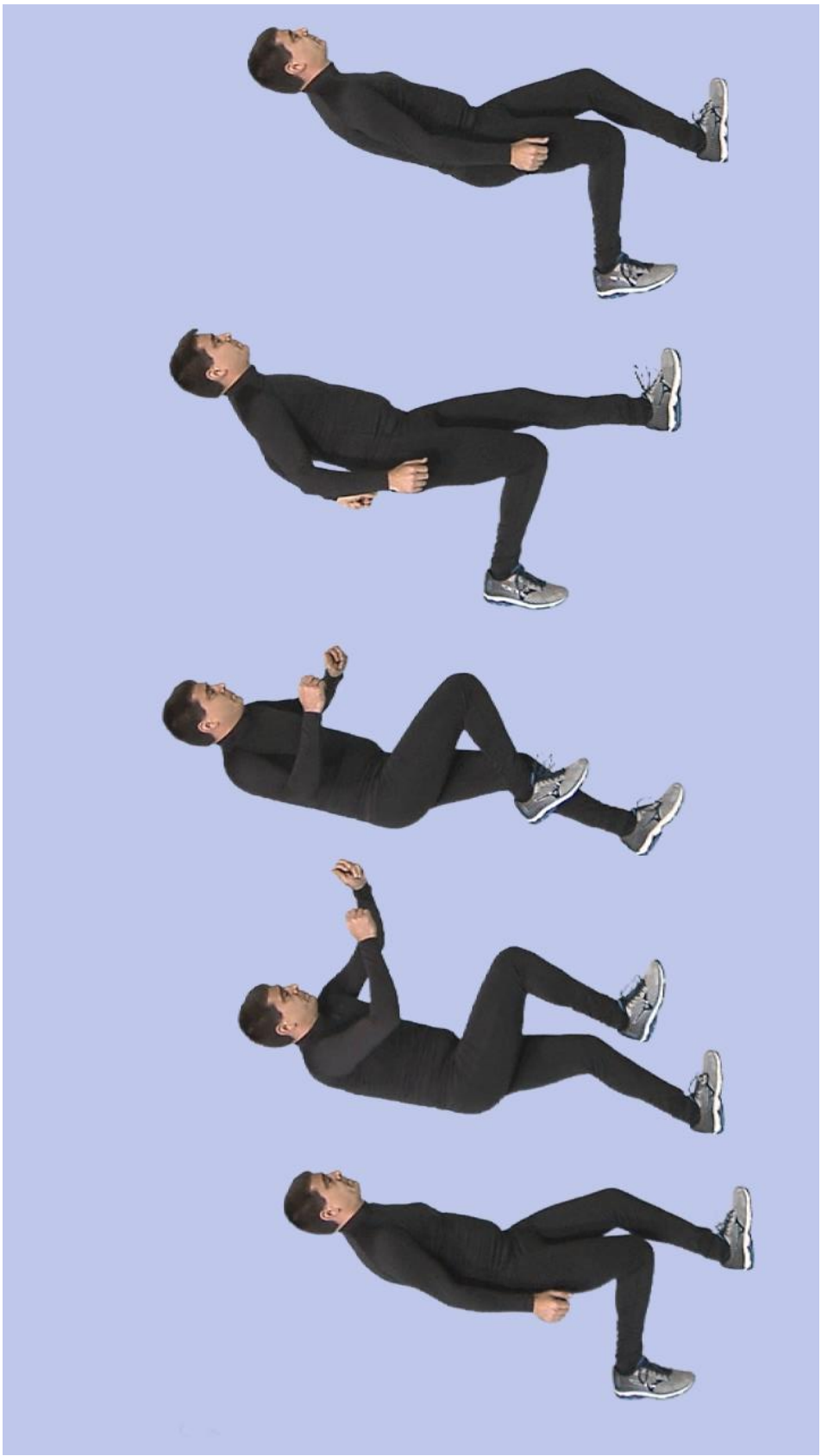
	Extremely likely (1)	Moderately likely (2)	Slightly likely (3)	Neither likely nor unlikely (4)	Slightly unlikely (5)	Moderately unlikely (6)	Extremely unlikely (7)
A. Stay at a station for more than one rotation if they were using the station appropriately? (1)	○	○	○	○	○	○	○
B. Change the task at a station if it does not interfere with others participation? (2)	○	○	○	○	○	○	○
C. Choose to work alone or in a group of any size? (3)	○	○	○	○	○	○	○
D. Pick any station regardless if they have done it before? (4)	○	○	○	○	○	○	○
E. Participate in some, but not all stations? (5)	○	○	○	○	○	○	○
F. Change stations before the allotted time has run out? (6)	○	○	○	○	○	○	○

Appendix E

Visual Task Cards

Throwing

Hopping



Appendix F

IRB Protocol

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

RESEARCH PROTOCOL REVIEW FORM
FULL BOARD or EXPEDITED

For Information or help contact **THE OFFICE OF RESEARCH COMPLIANCE (ORC)**, 115 Ramsay Hall, Auburn University
Phone: 334-844-5966 **e-mail:** IRBAdmin@auburn.edu **Web A ddress:** http://w ww .auburn.edu/research/vpr/ohs/index.htm

Revised 2.1.2014 **Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.**

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

1. PROPOSED START DATE of STUDY: 11/27/17

PROPOSED REVIEW CATEGORY (Check one): ☑ FULL BOARD ☐ EXPEDITED

SUBMISSION STATUS (Check one): ☑ NEW ☐ REVISIONS (to address IRB Review Comments)

2. PROJECT TITLE: Children's response to a mastery motivation climate in an inclusive physical education setting

3. Benjamin Miedema	Doctoral Student	Kinesiology	bjm0023
PRINCIPAL INVESTIGATOR	TITLE	DEPT	AU E-MAIL
301 Wire Rd., Auburn, AL 36849		(760)213-5448	bjmiedema@gmail.com
MAILING ADDRESS		PHONE	ALTERNATE E-MAIL

4. FUNDING SUPPORT: ☑ N/A ☐ Internal ☐ External Agency:_____ ☐ Pending ☐ Received

For federal funding, list agency and grant number (if available). _____

5a. List any contractors, sub-contractors, other entities associated with this project:

b. List any other IRBs associated with this project (including Reviewed, Deferred, Determination, etc.):

PROTOCOL PACKET CHECKLIST

All protocols must include the following items:

☑ **Research Protocol Review Form** (All signatures included and all sections completed)
(Examples of appended documents are found on the OHSR website: http://www.auburn.edu/research/vpr/ohs/sample.htm)

☑ **CITI Training Certificates** for all Key Personnel.

☑ **Consent Form or Information Letter** and any Releases (audio, video or photo) that the participant will sign.

☑ **Appendix A**, "Reference List"

☐ **Appendix B** if e-mails, flyers, advertisements, generalized announcements or scripts, etc., are used to recruit participants.

☑ **Appendix C** if data collection sheets, surveys, tests, other recording instruments, interview scripts, etc. will be used for data collection. Be sure to attach them in the order in which they are listed in # 13c.

☐ **Appendix D** if you will be using a debriefing form or include emergency plans/procedures and medical referral lists (A referral list may be attached to the consent document).

☑ **Appendix E** if research is being conducted at sites other than Auburn University or in cooperation with other entities. A **permission letter** from the site / program director must be included indicating their cooperation or involvement in the project. NOTE: If the proposed research is a multi-site project, involving investigators or participants at other academic institutions, hospitals or private research organizations, a letter of **IRB approval** from each entity is required prior to initiating the project.

☐ **Appendix F** - Written evidence of acceptance by the host country if research is conducted outside the United States.

FOR ORC OFFICE USE ONLY

DATE RECEIVED IN ORC:_____ **by**_____ **PROTOCOL #**

DATE OF IRB REVIEW:_____ **by**_____ **APPROVAL CATEG**

DATE OF IRB APPROVAL:_____ **by**_____ **INTERVAL FOR CO**

COMMENTS:

The Auburn University Institutional Review Board has approved this Document for use from
11/15/2017 to 11/14/2018
Protocol # 17-441 MR 1711

6. GENERAL RESEARCH PROJECT CHARACTERISTICS

6A. Research Methodology

Please check all descriptors that best apply to the research methodology.

Data Source(s): ☑ New Data ☐ Existing Data

Will recorded data directly or indirectly identify participants? ☑ Yes ☐ No

Data collection will involve the use of:

- Educational Tests (cognitive diagnostic, aptitude, etc.)
- Interview
- ✔ Observation
- Location or Tracking Measures
- Physical / Physiological Measures or Specimens (see Section 6E.)
- Surveys / Questionnaires
- Internet / Electronic
- Audio
- Video
- Photos
- Digital images
- Private records or files
- ✔ Other: Gross Motor Test

6B. Participant Information

Please check all descriptors that apply to the target population.

☑ Males ☑ Females ☐ AU students

Vulnerable Populations

☐ Pregnant Women/Fetuses ☐ Prisoners ☐ Institutionalized

☑ Children and/or Adolescents (under age 19 in AL)

Persons with:

☐ Economic Disadvantages ☑ Physical Disabilities

☐ Educational Disadvantages ☑ Intellectual Disabilities

Do you plan to compensate your participants? ☐ Yes ☑ No

6C. Risks to Participants

Please identify all risks that participants might encounter in this research.

☑ Breach of Confidentiality* ☑ Coercion

☐ Deception ☑ Physical

☐ Psychological ☐ Social

☐ None

☐ Other:

*Note that if the investigator is using or accessing confidential or identifiable data, breach of confidentiality is always a risk.

6D. Corresponding Approval/Oversight

- **Do you need IBC Approval for this study?**
  ☐ Yes ☑ No

  If yes, BUA #_____ _____Expiration date_____

- **Do you need IACUC Approval for this study?**
  ☐ Yes ☑ No

  If yes, PRN #_____Expiration date _____

- **Does this study involve the Auburn University MRI Center?**
  ☐ Yes ☑ No

  Which MRI(s) will be used for this project? (Check all that apply)
  ☐ 3T ☐ 7T

  Does any portion of this project require review by the MRI Safety Advisory Council?
  ☐ Yes ☑ No

  Signature of MRI Center Representative: _____
  Required for all projects involving the AU MRI Center

  Appropriate MRI Center Representatives:
  Dr. Thomas S. Denney, Director AU MRI Center
  Dr. Ron Beyers, MR Safety Officer

7. PROJECT ASSURANCES Children's response to a mastery motivation climate in an inclusive physical education setting

A. PRINCIPAL INVESTIGATOR'S ASSSURANCES

1. I certify that all information provided in this application is complete and correct.
2. I understand that, as Principal Investigator, I have ultimate responsibility for the conduct of this study, the ethical performance this project, the protection of the rights and welfare of human subjects, and strict adherence to any stipulations imposed by the Auburn University IRB.
3. I certify that all individuals involved with the conduct of this project are qualified to carry out their specified roles and responsibilities and are in compliance with Auburn University policies regarding the collection and analysis of the research data.
4. I agree to comply with all Auburn policies and procedures, as well as with all applicable federal, state, and local laws regarding the protection of human subjects, including, but not limited to the following:
    a. Conducting the project by qualified personnel according to the approved protocol
    b. Implementing no changes in the approved protocol or consent form without prior approval from the Office ofResearch Compliance
    c. Obtaining the legally effective informed consent from each participant or their legally responsible representative prior to their participation in this project using only the currently approved, stamped consent form
    d. Promptly reporting significant adverse events and/or effects to the Office of Research Compliance in writing within 5 working days of the occurrence.
5. If I will be unavailable to direct this research personally, I will arrange for a co-investigator to assume direct responsibility in my absence. This person has been named as co-investigator in this application, or I will advise ORC, by letter, in advance of such arrangements.
6. I agree to conduct this study only during the period approved by the Auburn University IRB.
7. I will prepare and submit a renewal request and supply all supporting documents to the Office of Research Compliance before the approval period has expired if it is necessary to continue the research project beyond the time period approved by the Auburn University IRB.
8. I will prepare and submit a final report upon completion of this research project.

My signature indicates that I have read, understand and agree to conduct this research project in accordance with the assurances listed above.

Benjamin Miedema	Benjamin Miedema Digitally signed by Benjamin Miedema Date: 2017.09.24 16:06:07 -05'00'	09/24/17
Printed name of Principal Investigator	**Principal Investigator's Signature**	**Date**

B. FACULTY ADVISOR/SPONSOR'S ASSSURANCES

1. I have read the protocol submitted for this project for content, clarity, and methodology.
2. By my signature as faculty advisor/sponsor on this research application, I certify that the student or guest investigator is knowledgeable about the regulations and policies governing research with human subjects and has sufficient training and experience to conduct this particular study in accord with the approved protocol.
3. I agree to meet with the investigator on a regular basis to monitor study progress. Should problems arise during the course of the study, I agree to be available, personally, to supervise the investigator in solving them.
4. I assure that the investigator will promptly report significant incidents and/or adverse events and/or effects to the ORC in writing within 5 working days of the occurrence.
5. If I will be unavailable, I will arrange for an alternate faculty sponsor to assume responsibility during my absence, and I will advise the ORC by letter of such arrangements. If the investigator is unable to fulfill requirements for submission of renewals, modifications or the final report, I will assume that responsibility.

Alice Buchanan	Alice M. Buchanan Digitally signed by Alice M. Buchanan Date: 2017.10.04 09:25:30 -05'00'	October 4, 2017
Printed name of Faculty Advisor / Sponsor	**Faculty Advisor's Signature**	**Date**

C. DEPARTMENT HEAD'S ASSSURANCE

By my signature as department head, I certify that I will cooperate with the administration in the application and enforcement of all Auburn University policies and procedures, as well as all applicable federal, state, and local laws regarding the protection and ethical treatment of human participants by researchers in my department.

Mary Rudisill	Mary Rudisill Digitally signed by Mary Rudisill DN: cn=Mary Rudisill, o=Auburn University, ou=School of Kinesiology, email=rudisme@auburn.edu, c=US Date: 2017.10.04 09:51:54 -05'00'	October 4, 2017
Printed name of Department Head	**Department Head's Signature**	**Date**

8. **PROJECT OVERVIEW: Prepare an abstract that includes:**
(350 word maximum, in language understandable to someone who is not familiar with your area of study**):**

a) **A summary of relevant research findings leading to this research proposal:**
(*Cite sources; include a "Reference List" as* ***Appendix A.)***
b) **A brief description of the methodology, including design, population, and variables of interest**

Numerous studies have found that specialized interventions can be effective for children with and without disabilities (Apache, 2005; Goodway & Branta, 2003; Goodway, Crowe, & Ward, 2003; Martin, Rudisill, & Hastie, 2009; Robinson, Goodway, Rudisill, & Goodway, 2009; Valentini & Rudisill, 2004; Valentini & Rudisill, 2004). To add to this body of research this project aims to provide evidence that a specialized physical education intervention will increase the motor skill abilities of children with a disability in an inclusive setting. The intervention will take place during physical education classes at Richland Elementary school. In order to create an inclusive environment both children with and without disabilities will participate in the intervention

The PI, who is a licensed Alabama Physical Education Teacher, will lead the intervention with the assistance of his faculty advisor. Participants with a disability will be tested before the intervention using the Test of Gross Motor Development (TGMD). Raw and standard scores will be used to place children in heterogeneous groups. Non-disabled typically developing peers will be placed in the groups based on teacher recommendation and observations to insure comparable ability levels exist within all groups. The PI will begin intervention for one group immediately. Subsequent groups will begin once the group prior to them has achieved a predetermined level of competency on 2 motor skills (i.e., hopping and overhand throwing) based on the greatest area of need from the TGMD (group 2 will begin once group 1 achieves competency, group 3 will begin once group 2 achieves competency). Level of competency will be checked weekly for participants with disabilities in intervention, and every third week for participants with disabilities not currently receiving the intervention. Children without disabilities will participate in the intervention activities but no data will be collected on them. These findings will help to promote and advocate for more specialized motor interventions.

9. **PURPOSE.**
a. **Clearly state the purpose of this project and all research questions, or aims.**

The purpose is to study how students with disabilities respond to a mastery motivational climate (MMC) in physical education. Are these students able to meet short-term objectives and long-term goals through the use of a MMC? How long does it take for these students to respond to a MMC?

b. **How will the results of this project be used? (e.g., Presentation? Publication? Thesis? Dissertation?)**

The results will be used for the PI's dissertation as well as for publication and/or presentation.

10. **KEY PERSONNEL.** Describe responsibilities. Include information on research training or certifications related to this project. **CITI is required. Be as specific as possible.** (Include additional personnel in an attachment.) *All key personnel must attach CITI certificates of completion.*

Principle Investigator Benjamin Miedema **Title:** Doctoral Student **E-mail address** bjm0023

Dept / Affiliation: Kinesiology

Roles / Responsibilities:

Benjamin Miedema will implement the intervention and administer and score the TGMD. He will also analyze all data and will be the lead with recruitment and consent procedures.

Individual: Alice Buchanan **Title:** Asscoiate Prof. **E-mail address** buchaa2

Dept / Affiliation:

Roles / Responsibilities:

Dr. Buchanan will assist with administration of the TGMD and with data analysis and recruitment.

Individual: **Title:** **E-mail address**

Dept / Affiliation:

Roles / Responsibilities:

Individual: **Title:** **E-mail address**

Dept / Affiliation:

Roles / Responsibilities:

Individual: **Title:** **E-mail address**

Dept / Affiliation:

Roles / Responsibilities:

Individual: **Title:** **E-mail address**

Dept / Affiliation:

Roles / Responsibilities:

11. **LOCATION OF RESEARCH. List all locations where data collection will take place.** (School systems, organizations, businesses, buildings and room numbers, servers for web surveys, etc.) **Be as specific as possible. Attach permission letters in** Appendix E.
(See sample letters at http://www.auburn.edu/research/vpr/ohs/sample.htm)

Richland Elementary School, 770 Yarbrough Farms Blvd, Auburn, AL 36832

12. PARTICIPANTS.

a. **Describe the participant population you have chosen for this project including inclusion or exclusion criteria for participant selection.**

☐ **Check here if using existing data, describe the population from whom data was collected, & include the # of data files.**

The sample population will be young children attending Richland Elementary School in Auburn, AL. The sample will comprise of boys and girls ages 5-10. Richland Elementary School is a comprehensive public school serving children who live within the established boundary in Kindergarten through 2nd grade. The children attending the school were chosen to participate because of administration and physical education department support. Richland Elementary School is part of the Auburn City Schools System. Children identified as having a disability will be allowed to participate in the specialized intervention. Additionally, children identified by the physical education teacher at Richland Elementary School who are typically developing will be allowed to participate in the intervention as well. All children identified by school staff, regardless of age or ability, will be allowed to participate in the research project. Depending on parental consent and child assent, assessment data will be collected and disseminated for this research project. The only reason a child will be excluded from the study is if a parent does not consent or the child refuses to participate.

b. **Describe, step-by-step, in layman's terms, all procedures you will use to recruit participants.** *Include in Appendix B a copy of all e-mails, flyers, advertisements, recruiting scripts, invitations, etc., that will be used to invite people to participate. (See sample documents at http://www.auburn.edu/research/vpr/ohs/sample.htm.)*

In order to preserve and safeguard the ethical treatment of the children, we will require parental consent and will obtain verbal assent from the participants prior to conducting assessments and data collection. Representatives (teachers or staff) will be present at all times during the specialized intervention and data collection. No methodology will be implemented outside of school hours. All children not included in the analyses will be allowed to take part in the specialized intervention if they wish. All children indicating a desire to not take part in any data collection and/or the intervention will be allowed to stop immediately. A brief, informative letter will be sent home to parents/guardians inviting their child's participation in the study. In addition, an informed consent letter will be sent home and returned to the school by those parents who wish their child to be included in the study. The PI, who is not a school employee, will provide all forms to school staff and a one week long period will be provided to receive, sign, and return the informed consent. The PI and researchers responsible for recruiting participants will be available throughout the duration of the study to answer any questions.

c. **What is the minimum number of participants you need to validate the study?** 9

How many participants do you expect to recruit? 12

Is there a limit on the number of participants you will include in the study? ☐ **No** ☑ **Yes – the # is** 15

d. **Describe the type, amount and method of compensation and/or incentives for participants.**

(If no compensation will be given, check here: ☑)

Select the type of compensation: ☐ Monetary ☐ Incentives

☐ Raffle or Drawing incentive (Include the chances of winning.)
☐ Extra Credit (State the value)
☐ Other

Description:

13. PROJECT DESIGN & METHODS.

a. **Describe, step-by-step, all procedures and methods that will be used to consent participants. If a waiver is being requested, check each waiver you are requesting, describe how the project meets the criteria for the waiver.**

☐ **Waiver of Consent (including using existing data)**

☐ **Waiver of Documentation of Consent (use of Information Letter)**

☐ **Waiver of Parental Permission (for college students)**

A brief, informative letter will be sent home (in the child's weekly progress report) to parents/guardians inviting their child's participation in the study. In addition, an informed consent letter will be sent home and returned to the school by those parents who wish their child to be included in the study. A one week long period will be provided for parents to receive, sign, and return the informed consent. The PI and the faculty advisor responsible for recruiting participants will be available throughout the duration of the study to answer any questions the cooperating teachers or parents may have. Children who are consented by parents to participate will also be asked, (see assent script) if they choose to do so and will be allowed to stop at any time.

b. **Describe the research design and methods you will use to address your purpose. Include a clear description of when, where and how you will collect all data for this project.** Include specific information about the participants' time and effort commitment. (*NOTE: Use language that would be understandable to someone who is not familiar with your area of study. Without a complete description of all procedures, the Auburn University IRB will not be able to review this protocol. If additional space is needed for this section, save the information as a .PDF file and insert after page 7 of this form.*)

The researchers will send the informative letter and informed consent form to parents of all children identified at Richland Elementary School. The researchers will also be available via phone, or email to answer questions parents may have regarding the specialized intervention or assessments. Following obtaining parental consent and child assent, baseline skill ability will be measured via the TGMD. The TGMD sessions will allow us to determine the motor skill abilities of the program participants prior to exposure of the conditions and the researchers. (Please note that the School's policies and procedures will be followed by the researchers during the intervention and data collection.)

Participants will then receive a specialized physical education intervention three days a week for up to 15 weeks. The daily sessions will consist of 30 minutes of physical play, incorporating activities devoted to promoting motor skill development and physical activity (i.e., playing chase, throwing balls at targets, balancing on stilt cups, etc.). Daily sessions will be planned based on the participants' performance on the TGMD. All participants with a disability will have two overarching goals, one locomotor (running, galloping, hopping, etc) and one object control (striking a ball off a tee, throwing, catching, etc.), that will be monitored for progress weekly during the intervention.

Participants will be placed in groups of 3-5 and provided with the intervention in a delayed fashion. One group will start intervention immediately after being assessed for baseline while the other groups will begin once the prior group has achieved a predetermined level. The intervention will take place during already established physical education class times at each site. Only children who have been consented will receive the intervention. The intervention will share space with the physical education teacher. Outdoor spaces such as grass field and paved courts will be used. Each school's multipurpose room will be utilized for indoor instruction.

Once a group is in intervention they will be assessed weekly on skill performance. Scatter plots will be used to visually check for stabilization of skills in each group. Once stabilization occurs a new group begins the intervention. The first group will complete the intervention three weeks before the others and tested again after the three weeks to check for retention.

13. **PROJECT DESIGN & METHODS.** *Continued*

c. List all data collection instruments used in this project, in the order they appear in Appendix C.
(e.g., surveys and questionnaires **in the format that will be presented to participants**, educational tests, data collection sheets, interview questions, audio/video taping methods etc.)

1. Test of Gross Motor Development (TGMD)
2. Weekly progress record sheet

d. Data analysis: Explain how the data will be analyzed.

Data will be plotted and checked visually for trends and stabilization of skill performance.

14. **RISKS & DISCOMFORTS: List and describe all of the risks that participants might encounter in this research.** ***If you are using deception in this study, please justify the use of deception and be sure to attach a copy of the debriefing form you plan to use in Appendix D.*** *(Examples of possible risks are in section #6D on page 2)*

The participants will encounter no unreasonable risks during participation in this project other than those normally accrued during participation in physical play.

Coercion is a minimal risk as the teachers could encourage the children to participate. To minimize this risk children may withdraw (or parent may withdraw consent) from the study at any time, with no penalty.

Breach of confidentiality is a risk. I will assure potential participants of confidentiality. Each participant will be given an identification number. A list of corresponding ID numbers and names will be stored in a locked cabinet in room 171 of the Kinesiology Building, 301 Wire Rd., Auburn University. Room 171

15. **PRECAUTIONS.** Identify and describe all precautions you have taken to eliminate or reduce risks as listed in #14. If the participants can be classified as a "vulnerable" population, please describe additional safeguards that you will use to assure the ethical treatment of these individuals. ***Provide a copy of any emergency plans/procedures and medical referral lists in Appendix D. (Samples can be found online at http://www.auburn.edu/research/vpr/ohs/sample.htm#precautions)***

The researcher is not a teacher at the school therefore coercion will be minimized. Additionally, to minimize the risk of coercion children may withdraw (or parent may withdraw consent) from the study at any time, with no penalty.

If using the Internet or other electronic means to collect data, what confidentiality or security precautions are in place to protect (or not collect) identifiable data? Include protections used during both the collection and transfer of data.

N/A

16. **BENEFITS.**

a. **List all realistic direct benefits participants can expect by participating in this specific study.**
(Do not include "compensation" listed in #12d.) Check here if there are no direct benefits to participants. ☐

Participants may expect increased physical activity engagement during physical play and motor development. Increases in physical play and improvements in motor skill development have positive implications for future engagement in lifetime physical activity. Since there are minimal risks the benefits out-weigh the risks.

b. **List all realistic benefits for the general population that may be generated from this study.**

This study has the potential to generate benefits for the general population including (1) identifying the effectiveness of additional interventions; and (2) Providing a basis for future research in teaching children with disabilities in the school setting.

17. PROTECTION OF DATA.

a. **Data are collected:**

☐ **Anonymously with no direct or indirect coding, link, or awareness of who participated in the study (Skip to e)**

☐ **Confidentially, but without a link of participant's data to any identifying information (collected as "confidential" but recorded and analyzed as "anonymous") (Skip to e)**

☑ **Confidentially with collection and protection of linkages to identifiable information**

b. **If data are collected with identifiers or as coded or linked to identifying information, describe the identifiers collected and how they are linked to the participant's data.**

Participants will receive a code when informed consent forms are returned and initial assessments are conducted. Data will be recorded using this code, the participant ID number. This will ensure that analyzed data will be confidential.

c. **Justify your need to code participants' data or link the data with identifying information.**

Coding data will be conducted to allow the investigators to collect data over time and link it to each participant, without having to refer and/or report data by mentioning participants by name.

d. **Describe how and where identifying data and/or code lists will be stored.** (Building, room number?) **Describe how the location where data is stored will be secured in your absence. For electronic data, describe security. If applicable, state specifically where any IRB-approved and participant-signed consent documents will be kept on campus for 3 years after the study ends.**

Lists with participants' names and allocated codes will be kept in a locked cabinet in room 171 of the Kinesiology Building, 301 Wire Rd., Auburn University. Room 171 is locked in investigator's absence. All electronic data will be stored on a password protected desktop computer located in room 171 Informed consent documents will be stored in room 171 for 3 years upon completion of this study.

e. **Describe how and where the data will be stored** (e.g., hard copy, audio cassette, electronic data, etc.)**, and how the location where data is stored is separated from identifying data and will be secured in your absence. For electronic data, describesecurity**

Electronic data will be password protected and saved on a computer hard drive and backup disk in room 171 of the Kinesiology Building, 301 Wire Rd., Auburn University. All hard copies of data and video recordings will be securely stored in a locked cabinet in room 171 of the Kinesiology Building, 301 Wire Rd., Auburn University. Room 171 is locked in investigator's absence.

f. **Who will have access to participants' data?**
(*The faculty advisor should have full access and be able to produce the data in the case of a federal or institutional audit.*)

Benjamin Miedema, and Dr. Alice Buchanan

g. **When is the latest date that identifying information or links will be retained and how will that information or links bedestroyed?**
(Check here if only anonymous data will be retained ☐)

This study will remain open until all data has been deidentified. Identifiable data (i.e., code lists and video) will be retained until publication of study (approx. 2 years) or no later than December 2019.

AUBURN UNIVERSITY
SCHOOL OF KINESIOLOGY

INFORMATION LETTER
for a Research Study entitled
Children's response to a mastery motivation climate in an inclusive physical education setting

You are invited to participate in a research study to gain an understanding of how a specialized physical education intervention impacts the motor skill ability of children in school. The study is being conducted by Benjamin Miedema, under the direction of Dr. Alice Buchanan Associate Professor in the Auburn University School of Kinesiology. Your child was selected as a possible participant because they are in grades K-12, receive physical education and attend a public school.

The study consists of a Gross Motor Assessment at the beginning of the study. Based off the assessment results from the first assessment a specialized motor intervention will be implemented by Benjamin Miedema, a doctoral student with the School of Kinesiology at Auburn University. Mr. Miedema is not an employee of Auburn City Schools, or any of its schools, however, is an Alabama State Licensed Physical Education Teacher. Your child will participate in up to 30 specialized physical education sessions that will take place during their physical education class. Your child's teachers (classroom and physical education) recommended your child, suggesting that s/he is an appropriate participant for this study. Your child's classroom teacher and/or other school staff feel that your child's participation in this study will not impact his/her performance or learning opportunities in other content areas.

Your child can still participate in the intervention even if you chose to not have them included in the research study. In other words, your child can receive any benefits of the intervention without their information being used in the research evaluation.

If you have questions about this study, please ask them now or contact Benjamin Miedema at bjm0023@auburn.edu or 909-618-5637, or Dr. Alice Buchanan at 334-844-1472. A copy of this document will be given to you to keep.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

The Auburn University Institutional
Review Board has approved this
Document for use from
11/15/2017 to 11/14/2018
Protocol # 17-441 MR 1711

301 Wire Road, Auburn, AL 36849-5323; Telephone: 334-844-4483; Fax: 334-844-1467

www.auburn.edu

AUBURN UNIVERSITY
SCHOOL OF KINESIOLOGY

(NOTE: DO NOT SIGN THIS DOCUMENT UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMED CONSENT
for a Research Study entitled
Children's response to a mastery motivation climate in an inclusive physical education setting

Your child is invited to participate in a research study to gain an understanding of how children in an inclusive physical education setting respond to a mastery motivational climate (MMC). The study is being conducted by Benjamin Miedema, under the direction of Dr. Alice Buchanan Associate Professor in the Auburn University School of Kinesiology. Your child was selected as a possible participant because they are in grades K-2, receive physical education and attend a public school.

What will be involved if your child participates? If you decide to have your child participate in this research study, s/he will be asked if s/he would like to participate as well. Once you both have given permission to participate your child will be administered the Test of Gross Development (TGMD) to assess their motor skill abilities. This assessment checks the motor behavior and development of children 3 through 10 years of age. Motor development is defined as change in motor behavior over the lifespan and the processes that underlie the change. Gross motor skills are defined as motor skills that involve the large, force-producing muscles of the trunk, arms, and legs and are used to achieve a movement task or goal such as throwing a ball to a friend or jumping over a puddle. It is the movement that transports a person from one place to another. This assessment has two subtests that assess six locomotor skills and six object control skills. After the initial assessment your child will participate in up to 30 specialized physical education sessions that will take place during a time when your child is in physical education class. Your child's teachers (classroom and physical education) recommended your child, suggesting that s/he is an appropriate participant for this study. Your child's classroom teacher and/or other school staff feel that your child's participation in this study will not impact his/her performance or learning opportunities in other content areas. These sessions will be led by the researcher, who is a Licensed Alabama Physical Education Teacher, but not a teacher for the Auburn City Schools or any of its schools. You and your child may choose to do any portion of or all of the research, and you or your child may withdraw from any portion or all of the research at any time without penalty. Your child's total time commitment will be approximately 12 hours. You will be provided with a summary of your child's assessment results.

The Auburn University Institutional Review Board has approved this Document for use from 11/15/2017 to 11/14/2018 Protocol # 17-441 MR 1711

Participant's initials _____

301 Wire Road, Auburn, AL 36849-5323; Telephone: 334-844-4483; Fax: 334-844-1467
www.auburn.edu

Are there any risks or discomforts? The risks associated with participating in this study are minimal. Coercion could be a risk. To minimize the risk of coercion, you may withdraw from participation in the study at any time (see below). To minimize the risk of breach of confidentiality, we will keep your data safe and your child will be given a participant ID number. No one will know which ID number is assigned your child except for me. All score sheets and other identifiable data will be destroyed after the findings are published or no later than August of 2019.

Are there any benefits to yourself or others? If you participate in this study, you can expect to benefit from learning more about your child's gross motor abilities. I cannot promise you that you will receive any or all of the benefits described.

Will you receive compensation for participating? There is no compensation for participation.

Are there any costs? There is no cost for participation.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your child may still participate in this program without their information being used in the research evaluation. Any child who participates in the program but is not a part of the research will not have any data collected on them. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the School of Kinesiology or Benjamin Miedema or Dr. Buchanan.

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Unless otherwise notified by you, I plan to present the results of this research at a professional conference and publish the results as part of my dissertation and in an appropriate journal. In any presentation or publication real names will not be use, that is, the data will be confidential.

If you have questions about this study, please ask them now or contact Benjamin Miedema at bjm0023@auburn.edu or 909-618-5637, or Dr. Alice Buchanan at 334-844-1472. A copy of this document will be given to you to keep.

Participant's initials _____

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS FOR YOUR CHILD, (child's name here)_____, TO PARTICIPATE.

Parent/guardian signature	Date	Investigator obtaining consent	Date
		Benjamin Miedema	
Printed Name		Printed Name	

The Auburn University Institutional Review Board has approved this Document for use from 11/15/2017 to 11/14/2018 Protocol # 17-441 MR 1711