

Running Head: PHYSICAL PLAY AND HYPERACTIVITY

Footloose and Fancy Free:

The Impact of Physical Play on Hyperactivity in School-Age Children

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Abstract

In the United States, the average school day for children is anywhere from 6.5 to 7.5 hours. In that time, children remain seated in a classroom or lunchroom for approximately 5.5 to 7 hours. Sitting for long periods of time, without a break, can result in inappropriate behaviors for typically developing students. For students with attention disorders (e.g., Attention Deficit/Hyperactivity Disorder, or ADHD), particularly those involving excessive amounts of active energy, sustained periods of inactivity are almost guaranteed to lead to inappropriate behaviors in an attempt by the student to release his/her excess energy. Using a 14-question Web-based survey, this research examined teacher perceptions of the impact of physical play on hyperactive behavior. The results show the majority of teachers perceived positive changes in behavior following engagement in physical play activities. Teachers in grades K-6 reported the most positive changes in behavior following physical play activities. Even though teachers mostly reported positive changes to behavior, some negative changes to behavior were also reported.

There has been much speculation in previous research as to the cause of Attention Deficit/Hyperactivity Disorder (ADHD). However, the majority of experts in the field of ADHD seem to attribute the disorder to a combination of genetic, neurological, psychological, psychiatric, emotional, social, and environmental factors (Brandau & Pretis, 2004; Cooper, 2008; Cratty, 2004; Faber Taylor & Kuo, 2009; Da Fonseca, Segulier, Santos, Poinso, & Deruelle, 2009; Goodlin-Jones, Waters, & Anders, 2009; Havey, 2007; Saudino & Plomin, 2007; Shillingford, Lambie, & Walter, 2007; Stormont & Zentall, 1999; Taylor, 2009).

Until recently, both children and adults with ADHD went unrefereed, undiagnosed, and untreated for the disorder (Goldstein & Naglieri, 2008). Aside from the complexity of the causes of the disorder, attitudes toward the disorder may also factor into the delay in its recognition. According to Cooper (2008), ADHD is a medical construct intended to remove blame from educators for creating environments that do not serve all students, resulting in learning and behavior problems. Brandau and Pretis (2004) note the relief parents often experience with a diagnosis of ADHD because their child “is no longer described as lazy, wild, stupid, etc” (p. 21).

The purpose of this study was to examine teacher perceptions of the impact of physical play on hyperactive behavior in school-age children. Survey data was analyzed to identify trends in how often hyperactive behavior occurred in the classroom, how long teachers spent addressing hyperactive behavior, which methods teachers used to address hyperactive behavior, what types of and access to physical play activities were available to all children in the school setting, and what effect engaging in physical play activities had on hyperactive behavior. More specifically, this study offers insight into the following questions: What are the characteristics of hyperactive behavior at different grade levels? How is hyperactive behavior

typically addressed by teachers? What types of physical play activities are available to school-age children? Is there a difference in engagement in hyperactive behavior after children with hyperactivity have engaged in physical play activities?

Literature Review

A review of the literature on Attention Deficit/Hyperactivity Disorder (ADHD) was conducted to provide insight into hyperactive behavior. The following sections discuss the definition and characteristics of ADHD, history and prevalence of the disorder, diagnostic measures, and treatment methods and interventions.

Definition of Attention Deficit/Hyperactivity Disorder (ADHD) and Characteristics

Several sources cite the definition of ADHD as a psychiatric disorder, diagnosed by the American Psychiatric Association (APA), characterized by impulsivity, inattention, and hyperactivity (Brandau & Pretis, 2004; Cooper, 2008; Cratty, 2004; Faber Taylor & Kuo, 2009; Da Fonseca, Segquier, Santos, Poinso, & Deruelle, 2009; Goodlin-Jones, Waters, & Anders, 2009; Havey, 2007; Saudino & Plomin, 2007; Shillingford, Lambie, & Walter, 2007; Stormont & Zentall, 1999; Taylor, 2009). Persons with ADHD may be diagnosed as having one of three subtypes: (a) inattention; (b) hyperactive-impulsive; or (c) combined type, when both symptoms of inattention and hyperactivity-impulsivity are present (Brandau & Pretis, 2004). For persons with the first subtype, problems may manifest themselves in failure to sustain age-appropriate effort and attention, complete tasks, follow instructions, and avoid making careless mistakes (Brandau & Pretis). Persons with the hyperactive-impulsive subtype experience high levels of activity seen beyond what is considered age-appropriate and difficulty controlling impulsive behavior, typically manifested in words and/or actions (Brandau & Pretis).

Goldstein and Naglieri (2008) offer a five-part definition of ADHD, where individuals

experience problems in the following five areas: impulsivity and planning, inattention, hyperactivity, gratification modulation, and emotional regulation.

Persons with ADHD experience difficulties controlling their inhibitions (Cratty, 2004; Da Fonseca, Segui, Santos, Poinso, & Deruelle, 2009; Goldstein & Naglieri, 2008; Ketch, Brodeur, & McGee, 2009). These persons often blurt out answers, interrupt others' speech, or have difficulty waiting their turn (Shillingford, Lambie, & Walter, 2007). They are often characterized as persons who speak or act before they think.

In a study conducted by Ketch, Brodeur, and McGee (2009) examining the effects of focused attention on inhibition in children both with and without ADHD, 93 participants (59 males, 34 females), ages 5-9 years old, took part in a "Go-NoGo" task. This task, involving a computer-based program designed to study attention and impulsivity, required participants to follow an arrow to the target, or "Go" stimulus (a star) and to respond to its presence. Participants were told to inhibit responding to the "NoGo" stimuli (a square and a circle) when presented. Both the "Go" and the "NoGo" stimuli were presented to participants in a series of three trial speeds: slow (8-second interval), medium (4-second interval), and fast (1-second interval). After dividing participants into three groups (without ADHD; with attention difficulties, but not meeting the diagnostic criteria for ADHD; with ADHD), the results showed both the group with attention difficulties and the group with ADHD performed worse in all three trials than the group without ADHD. Aside from the absence of data on racial background, the overabundance of male participants, and the difficulty in controlling for co-morbidity (e.g., having a diagnosis of ADHD and another disorder, such as Oppositional Defiance Disorder or Conduct Disorder) the study was able to provide evidence of differences in regulating inhibition between children without ADHD and children with ADHD.

In addition to impulsivity, persons with ADHD also exhibit poor planning skills. Planning, according to Goldstein & Naglieri (2008), “requires the efficient choice of strategies and the ability to self-monitor, self-correct, flexibly shift, and adjust to feedback” (p. 862). In other words, to be successful at planning, one must have the ability to evaluate one’s actions within a given context and to adjust his/her actions to meet the standards of socially acceptable behavior within that context. For a person with ADHD, the ability to recognize inappropriate contextual behavior and to remedy it may be impaired. Goldstein and Naglieri (2008) point out that, while persons with ADHD may know that their behavior is inappropriate, they are often unable to make the necessary adjustments to their behavior because problems with working memory create a gap between the past and future. Therefore, repetition of past actions, even those that yielded negative consequences, is characteristic of persons with ADHD. There seems to be an inability to actively reflect on what did not work in the past and to change it for the future (Cooper, 2008; Goldstein & Naglieri, 2008).

Similar problems are faced for persons with ADHD in the area of attention. According to Goldstein and Naglieri (2008), the issue is not that a person with ADHD cannot pay attention; instead, the issue lies in the person’s inefficient manner in which he/she pays attention. In settings that require repetitive actions or a great deal of effort, persons with ADHD do not function well. They may be unable to complete tasks or devote the effort necessary to complete a task to a satisfactory level (Goldstein & Naglieri). But in new or novel settings, or in tasks that interest the person with ADHD, attention may not be an issue (Goldstein & Naglieri).

Much of the literature tends to focus on the hyperactivity component of ADHD. This could be, according to Brandau and Pretis (2004), in part because hyperactive behavior is more noticeable, especially in younger children, than inattention. Cratty (2004) offers three categories

for hyperactive behavior: (a) visual hyperactivity; (b) bodily hyperactivity; and (c) manipulative hyperactivity. Visual hyperactivity manifests itself in the eye movements of a person with hyperactivity. On other words, the person's body remains still, but the eyes "dart from place to place" (p. 2). Bodily hyperactivity refers to the physical movement from places, often seen in the child that is constantly out of his/her seat in the classroom or out of place for any type of classroom activity. Lastly, manipulative activity involves the constant movement of one's hands while remaining fixated in a location.

According to Goldstein and Naglieri (2008), "individuals with ADHD often appear driven toward immediate, frequent, predictable, and meaningful consequences" (p. 863). It is difficult for these individuals to create and sustain efforts toward achieving long-term goals. Instead, they respond to "brief repeated payoffs" (p. 863). However, given a structured, reinforced schedule with the appropriate supervision, persons with ADHD can learn to manage their need for immediate gratification in their daily lives.

The last part of Goldstein and Naglieiri's (2008) definition of ADHD includes emotional regulation. Perhaps tied to impulsiveness, persons with ADHD "often appear to be on a roller coaster ride of emotions" (p. 863). They either experience a range of emotions at a rapid pace or they experience emotions so intensely that it can affect others.

Other sources cite emotional regulation as a confounding component of ADHD. For example, Harty, Miller, Newcorn, and Halperin (2009) report on the high levels of aggression in individuals diagnosed with ADHD and individuals diagnosed co-morbidly with either ADHD and Oppositional Defiant Disorder (ODD) or ADHD and Conduct Disorder (CD). Their study, conducted with a group of 85 clinically referred adolescents between the ages of 17-21 (75 males, 10 females), contained 44 adolescents meeting the criteria for a co-morbid diagnosis of

ODD and 22 adolescents meeting the criteria for a co-morbid diagnosis of CD. Through completion of the Buss-Perry Aggression Questionnaire (AQ), the State-Trait Anger Expression Inventory-2 (STAXI-2), and an ADHD symptom checklist similar to the SNAP-IV, the authors found that ADHD symptoms accounted for differences in verbal aggression and anger, leading the authors to believe that “emotional dysregulation may be an important component of ADHD” (p. 86).

ADHD is a complex psychiatric disorder affecting attention, impulse control, activity level, and emotional regulation. Because ADHD shares many of the same characteristics of other behavior disorders, it has been difficult to establish as a separate disorder. The next section discusses the origins of ADHD and its prevalence as a diagnosis.

History of ADHD and Prevalence

ADHD, according to Taylor (2009), was originally referred to as “minimal brain dysfunction” (p. 126). The disorder has roots in the areas of psychoanalysis and social learning. From there, the perspective shifted from that of a neurological cause to a psychiatric cause. Researchers began to focus on the behaviors associated with the disorder, namely inattentiveness, overactivity, and impulsivity (Taylor, 2009).

In the 1960s and 1970s, the term “hyperkinesis” was used by the World Health Organization (WHO) in the United Kingdom to refer to the disorder (p. 126). In the United States, the American Psychological Association (APA) included, as a behavior disorder, a condition known as “Hyperkinetic Reaction of Childhood” in its May 1968 publication of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-II) (Goldstein & Naglieri, 2008). When the *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition, Text Revision* (DSM-IV-TR) came out in 2000, the disorder became known as ADHD, with the original eight-

line description replaced by “a set of diagnostic criteria and accompanying descriptions of eight pages” (Goldstein & Naglieri, 2008, p. 860).

The research is varied on the prevalence of ADHD, with some reporting 3-5% of school-age children in the United States (Da Fonseca, Segulier, Santos, Poinso, & Deruelle, 2009; Havey, 2007), 3-7% of school-age children in the United States (Goodlin-Jones, Waters, & Anders, 2009; Harty, Miller, Newcorn, & Halperin, 2009) and 3-9% of school-age children in the UK (Cooper, 2008).

Havey, Olson, McCormick, and Cates (2005) reported male-female ratios between 3:1 and 9:1. As a result of the higher diagnosis rate in males, several studies conducted with children with ADHD have a higher proportion of male participants than female participants (Faber Taylor & Kuo, 2009; Ketch, Brodeur, & McGee, 2009; Harty, Miller, Newcorn, & Halperin, 2009). Differences in socioeconomic status and race are also present, with higher rates of ADHD for children from low socioeconomic status backgrounds or African American children (Havey, Olson, McCormick, & Cates, 2005). In addition, Cratty (2004) points out the likelihood of a child with hyperactivity to be part of a family where one or both parents have hyperactivity.

Diagnostic Measures

According to Angello, Volpe, DiPerna, Gureasko-Moore, Gureasko-Moore, Nebrig, and Ota (2003), ADHD is defined by the American Psychological Association (APA, 2000) as “a neurological disorder characterized by a persistent pattern of inattention and/or hyperactivity/impulsivity” (p. 241). To make a diagnosis, a licensed health professional must “[establish] the developmental deviance and pervasiveness of symptoms, level of impairment, age of onset, and [rule] out...alternative explanations for deviations in child behavior” (p. 241). Angello et al., (2003) recommend three stages of assessment: (a) screening, (b) multimethod

assessment/comprehensive evaluation, and (c) progress monitoring or program evaluation.

For each stage of assessment, behavior rating scales may be used. Behavior rating scales, according to Angello et al., (2003) “help establish the severity of ADHD-related behaviors across settings relative to a normative sample of children of the same age and gender” (p. 241). Below is a review of six such scales.

The first behavior rating scale reviewed by Angello et al. (2003) was the ADHD Rating Scale-IV (ADHD-IV). This scale contains both a Home and School version, gathering information for the past six months from both parents and teachers across multiple settings. Scale items adhere to DSM-IV diagnostic criteria for ADHD. The scale is appropriate to use for children ages 5-18, but tends to be biased toward African American children in terms of symptom severity. Overall, the ADHD-IV is found to have both strong stability and internal consistency, validity in measuring symptom criteria for ADHD, and best used for screening and assessment purposes. It is not recommended as a measure of treatment progress, as data for treatment sensitivity is not available.

The Behavior Assessment System for Children: Monitor for ADHD (BASC Monitor) has a form for both parents and teachers, including an observation component that can be used by teachers, to distinguish subtype (predominantly inattentive type, predominantly hyperactive-impulsive type, combined type) (Angello et al., 2003). Its primary purpose is to assist in treatment program design and to evaluate the effects of treatment for children ages 4-18. It is not suitable for assessment purposes because not all DSM-IV criteria are included in the scoring. Recommended use is for ages 6-11, for which the most evidence to support use is available.

Perhaps the most widely recognized behavior rating scale is the Conners' Rating Scale-Revised (CRS-R). This scale, appropriate for ages 3-17, is filled out by parents, teachers,

and adolescents. Both long and short versions of the scale adhere to DSM-IV criteria. While simple to use and score and generally strong in the areas of stability and consistency, the normative sample is underrepresentative of ethnic minority groups. It is best used to get information about problem behaviors related to ADHD and to evaluate the effects of treatment (Angello et al., 2003).

The ADHD Symptom Checklist-4 (SC-4) serves the dual purpose of screening and monitoring the effectiveness of treatment for both ADHD and ODD. One of its components is a section of questions addressing side effects children may experience while taking stimulant medication for treatment and peer conflict, thus making it relevant to use in the evaluation of treatment methods. It adheres to the DSM-IV diagnostic criteria and is appropriate for use with children ages 3-18. Rating scales are available for both parents and teachers. While the stability and internal consistency are high, one significant limitation is the absence of factor analytic data verifying internal structure of the entire scale. Also, minority groups are an underrepresented population in the normative sample.

Designed for three purposes, the Attention Deficit Disorders Evaluation Scale-Second Edition (ADDES [2nd ed.]) can be used for screening, assessment of ADHD, and the development of interventions. A scale exists for both parents and teachers. Parents may fill out a scale for children ages 3-19, while teachers may fill out a scale for children ages 4-19. Much like the Conners' Rating Scale-Revised, the ADDES (2nd ed.) is simple to use and to score, as it has computerized scoring forms. While the differences between racial groups were not investigated, the overall internal consistency and reliability measures were excellent. Validity is somewhat questionable, as the sample sizes were small (Angello et al., 2003).

Of the six scales assessed by Angello et al., (2003) the ADD-H Comprehensive

Teacher's Rating Scale (ACTeRS) received the poorest evaluation. Though intended for use as a screening and treatment monitoring tool filled out by both parents and teachers, it is plagued with problems. A gap exists between scale items and DSM-IV diagnostic criteria. Little information is provided on the normative sample used. And lastly, there is little evidence to support the measurement goals of the scale.

Once a diagnosis is made, a person with ADHD may choose to learn what treatment options are available. The following section discusses medical, cognitive-behavioral, and physical interventions used to treat individuals with ADHD.

Treatment Methods and Interventions

One of the most widely used and controversial methods of treatment for ADHD is the use of stimulant medication. Amphetamines were used first, followed by methylphenidate in the 1960s (Taylor, 2009). Currently, non-stimulant drugs, such as atomoxetine, are being used in addition to methylphenidate (Taylor). Stimulant medication can be used to treat chemical imbalances of dopamine, serotonin, and norepinephrine in the brain, which are chemicals in the brain shown to regulate attention and impulse control (Brandau & Pretis, 2004).

The controversy with stimulant medication lies in the over-reliance on it as a method of treatment. According to Taylor (2009), "clinicians' descriptions of [the] disorder became influenced by what stimulants could treat" (p. 126). Taylor goes on to describe the different views in using stimulant medication in the United Kingdom and the United States. In the United Kingdom, stimulant medication is used "if the problem is severe or psychological approaches failed" (p. 127). In the United States, Taylor states the use of stimulant medication is the "first choice of treatment" (p.127). Cooper (2008) blames the overuse of stimulant medication on "the failure to admit the validity of ADHD," which, in turn "creates a major obstacle to the

development of educational interventions for the condition, leaving diagnosed individuals in a situation in which the only source of informed intervention is the medical practitioner” (p. 467).

Aside from stimulant medication, another treatment option is the cognitive-behavioral systemic approach, as outlined in Shillingford, Lambie, and Walter (2007). This approach suggests the use of cognitive restructuring to encourage the shift in maladaptive thoughts and inappropriate behaviors to positive thoughts and appropriate behaviors. This approach can be particularly useful in social situations, where a child with ADHD who exhibits difficulties with impulse control, can experience social rejection by peers. What cognitive restructuring offers is an opportunity to reflect on negative thoughts associated with negative experiences and to develop a plan to change those thoughts to create positive experiences. The rewards with this treatment option may either be intrinsic (by increasing self-esteem) or extrinsic (by using tangibles).

The systemic component of this approach draws on the support of family members of the child with ADHD. Family members must be willing to continue the efforts of the school and/or health professionals working with the child. Implementing the treatment interventions at home and following the reward system contributes to the success of the child in settings outside the initial treatment setting (Shillingford, Lambie, & Walter, 2007).

Brandau and Pretis (2004) advocate the systemic approach as well. They place an emphasis on training for parents, specifically in teaching parents how to create an environment in which consequences for behavior are consistent and encourage appropriate behavior while discouraging inappropriate behavior. They also recommend the use of small goal-oriented games, with increases to the challenge and attention aspects to aid in prolonging the child's concentration.

Several studies cite the use of physical activity as an intervention strategy for students with ADHD. Cratty (2004) suggests that physical education teachers should make themselves aware of the causes of distractible behaviors, such as hyperactivity and inattention, and provide techniques and treatment methods to positively change the behaviors. Muscular relaxation, paired with guided imagery, is one possible physical intervention strategy. This strategy involves talking a child through progressive stages of tightening and relaxing the muscles in the body, often starting from the top of the body and progressing downward. The use of guided imagery is meant to further enhance the relaxation experience.

To help students with hyperactivity and impulse-control behaviors, Cratty (2004) describes working through impulse-control activities. For this technique, a peer model may be used that performs a series of movements at both fast and slow rates. The child with hyperactivity and impulse-control behaviors imitates the movements of the peer model. Varying the rates at which tasks are performed assists the child in gaining control of him/herself as he/she makes the speed transitions.

Prolonged walking tasks are also mentioned to increase focused attention for children with attention difficulties (Cratty, 2004). For this activity, the child follows a narrow, winding path that contains objects along the way. He/she must pay close attention to the direction of the path and the placement of objects so as not to stumble over them.

In a study conducted by Faber Taylor and Kuo (2009), 17 children ages 7-12 years old diagnosed with ADHD took part in 20-minute guided walks in three different settings: a city park, a residential area, and a downtown area. Results from the study concluded that participants showed better concentration after the walk in the city park than in the walks in the other two settings. Though no demographic data was provided for race, possibly affecting the ability of the

results to generalize to minority populations, the study demonstrated that a brief bout of physical activity had a positive affect on the behavior of children diagnosed with ADHD.

Azrin, Ehle, and Beaumont (2006) studied the effects of scheduled vigorous physical activity on the calmness of a four-year-old boy with ADHD as part of a contingency management intervention program. Based upon the Premack Principle of scheduling an activity producing high-frequency behavior to serve as reinforcement for completing an activity producing low-frequency behavior, the study authors wished to determine whether the exercise affected calmness or the descriptive praise provided to the child accompanying reinforcement (Azrin, Ehle, & Beaumont, 2006). Results concluded that after performing trials where exercise only was used and praise only was used, the child's behavior improved following engagement in a session of vigorous physical activity. The small sample size (one child) and the location outside of the classroom for the study make it difficult to generalize to the larger population of children diagnosed with ADHD. However, this study is encouraging in the need for further studies to be conducted on the use of exercise as a positive reinforcement to decrease hyperactive behavior and increase calm behavior.

Within the schools, administrators, teachers, staff, and students begin to see the benefits of incorporating more physical activity in the school day for all students. In a focus-group study conducted by Bauer, Yang, and Austin (2004), 26 students and 23 faculty and staff in two suburban public middle schools in New England worked with clinical social workers to answer questions about access to physical activity before, during, and after the school day. Though the sample lacked the perspective of Hispanic populations and the familiarity of participants had the potential to limit the candidness of answers, the results showed that barriers existed at all times to physical activity. Prior to the school day, girls noted that the open gym

period was dominated by boys, making girls uncomfortable in using the gym. During school, participants noted the competitive nature of physical education classes discouraged participation from students less physically coordinated. This same problem was mentioned in after-school, or extracurricular sports activities that discouraged students with less athletic ability to try out for sports teams. Study participants suggested offering physical education classes more frequently and for longer periods of time, offering sports teams or clubs for students with average or below-average athletic abilities, and additional physical activities that appeal to girls or encourage their participation (Bauer, Yang, & Austin, 2004).

In another study on increased physical activity during the school day, Sibley, Ward, Yazvac, Zullig, and Potteiger (2008) report on the effects of the *Making the Grade with Diet and Exercise* (MGDE) program implemented in 2000 at Springfield Local Elementary School in New Middletown, OH. Developed by teachers, the school nurse, the food service supervisor, and the school principal, this program offered access to breakfast every day for all students, a 10-20 minute classroom teacher-led physical activity period in the morning before breakfast, and placed recess before lunch. Breakfast for all students offered them the opportunity to have a nutritious meal in the morning. The morning physical activity period included such activities as walking, running, exercise videos, calisthenics, resistance training, and games in the gymnasium or on the playground (Sibley, Ward, Yazvac, Zullig, & Potteiger, 2008). The decision to reverse the order of lunch and recess was made because teachers noticed the eagerness of children to expend energy after spending the morning in sedentary classroom activities. Also, students rushed through lunch in an attempt to get to recess faster and, once they returned from recess, experienced difficulty transitioning back into sedentary classroom activities. With the implementation of this program, the school saw a 67% decrease in visits to the school nurse, a

58% decrease in the total number of discipline referrals within the first four years of implementation, and passing scores on all three components of the fourth-grade achievement test during five years of implementation (Sibley, Ward, Yazvac, Zullig, & Potteiger, 2008). Without a control group as a comparison, results may not generalize to other schools, but the study was able to demonstrate a positive influence on academic performance with physical activity and good nutrition for students at Springfield Local Elementary School.

According to Griggs and Wheeler, (2007) “engagement in regular physical activity through PE and school sport has been unequivocally shown to have a positive impact on the physical, mental and emotional health of young people” (p. 275). Lopez-Williams, Chacko, Wymbs, Fabiano, Seymour, Gnagy, Chronis, Burrows-Maclean, Pelham, JR, and Morris (2005) note that participation in athletic activities improves self-esteem, self-confidence, and social skills when children with ADHD have successful experiences. In their research on the effects of athletic performance and social behavior on peer acceptance of children with ADHD, Lopez-Williams et al. (2005) studied 63 children diagnosed with ADHD participating in an intensive 8-week summer treatment program designed to increase academic, social, and athletic skills. For a period of eight hours per day, five days per week, participants spent three hours each day on academic work and the remainder of the time in either social skills training or athletic activities. Two types of athletic skills measures were taken: general athletic performance and performance related to a specific sport (Lopez-Williams et al.). Two general fitness tests to measure strength/endurance and running speed were used (e.g., sit-ups and the 50-yard dash), in addition to key skills from basketball (e.g., dribbling the ball), softball (e.g., throwing the ball), and soccer (e.g., punting, or kicking the ball). While it should be noted that all participants had ADHD, thus affecting ability of the peer acceptance results to generalize to the typically

developing peer population, the results of the study demonstrated that lower rates of negative behavior and better athletic performance were associated with greater group acceptance (Lopez-Williams et al.). Results also showed that participants determined peer likeability based on higher rates of positive behavior, lower rates of negative behavior, and better athletic performance. These findings are significant due to the problems children with ADHD face with impaired peer relations (Lopez-Williams et al.). This study contributes to the positive impact physical activity, including athletics, can have on the multiple aspects of health of a child diagnosed with ADHD.

While much of the literature tends to focus on the positive effects of stimulant medication and cognitive-behavioral therapy for persons with ADHD, recent research has shown the positive effects of physical activity on behavior, self-esteem, peer acceptance, and academic performance. The effects should be apparent in the school setting because children spend a large portion of their time in school. However, the majority of the research on the benefits of exercise for children with ADHD has been conducted in settings outside the school with only the perspective of the researchers given. Not only does this affect the ability of the results to generalize to the school setting, it also neglects to offer the perspective of the persons directly observing any of these effects in the school: teachers. The current study offers the perspective of teachers by gaining insight into teacher perceptions of the impact physical play has on hyperactive behavior in school-age children.

Methodology

The purpose of this study was to examine teacher perceptions of the impact of physical play on hyperactive behavior in school-age children. Data was collected on grade level taught, the type of classroom in which teaching took place, and years of teaching experience to

show perceptual differences, if any, based upon these variables. Types of hyperactive behavior engaged in by a target student with hyperactivity, the duration engaged in the behavior during the school day, the time teachers spend addressing the behavior, and the primary methods teachers used to address the behavior were examined. In addition to hyperactive behavior, data was also collected on types of physical play activities offered at the school, the frequency of engaging in physical play activities, the length of time spent engaging in physical play activities, the time of day the teacher worked with the target student with hyperactivity in relation to engagement in physical play activities, and the changes seen, if any, in the hyperactive behavior of the target student following any type of physical play activity.

Research Design

According to Steeh (1981), Krosnick (1999), and Singer (2006), researchers who gather survey data to study complicated and sensitive health behaviors face challenges to design affordable research strategies that produce timely, valid, and reliable data as response rates to surveys have steadily declined over the past two decades. Groves (2004) and Weisberg (2005) also advise the researcher to balance time and cost against sampling, coverage, nonresponse, and measurement error in making the choice of survey mode. To keep time and cost to a minimum, a Web-based survey was chosen as the instrument for this study.

According to McMorris, Petrie, Catalano, Fleming, Haggerty, and Abbott (2009), “evidence continues to accumulate on the quality and effectiveness of Web-based surveys” (p. 156). Because a link to the survey can be sent directly to teachers through an e-mail account, they may access the survey from any location containing a computer with Internet access. Kept short, a teacher could easily fill out a survey on his/her lunch break or free period, as most teachers have personal computers with Internet access in their classrooms. A word of caution on

Web-based surveys provided by McMorris et al. (2009), is the greater potential for incomplete responses due to the lack of monitoring in filling out the survey. Care must be taken in the data analysis to include measurement errors for data sets that contain incomplete responses.

Participants

The study sample was comprised of teachers in grades Kindergarten through twelve teaching in a public school district located in rural southeastern Ohio. Preschool teachers were invited to participate in the survey, but no responses were received for this grade level. All teaching staff in the district was invited to participate in this study (e.g., general education, special education, art teachers, music teachers, physical education teachers, and paraprofessionals). No responses were received from paraprofessionals.

To access the e-mail addresses for all teachers in the district, the researcher corresponded by e-mail with the Director of Curriculum and Development for the district. In the e-mail, the researcher introduced herself, the content and purpose of the research study, and requested the assistance of the curriculum director in granting permission to distribute a brief 14-question survey in which teachers shared their perceptions of the impact of physical play on hyperactive behavior. The researcher also requested the assistance of the curriculum director to distribute the e-mail to all teaching staff in the district, as the curriculum director had access to a staff e-mail listserv. Permission was granted to distribute the survey and the researcher developed an e-mail for distribution to all teaching staff in the district. In the e-mail, the researcher introduced herself, the content and purpose of her study, the confidentiality of the survey results (e.g., only the researcher and her advisor had access to the raw data), and provided the link for the survey with a disclaimer that clicking on the link signaled consent to participate in the research study. The e-mail went to seven buildings (five elementary schools; one middle

school; one high school), resulting in a total of 231 potential participants invited to participate in the study.

Procedure

An e-mail generated by the researcher was sent out to all teachers in the district through their school e-mail addresses on behalf of the researcher by the Director of Curriculum and Development for the district. The e-mail invited teachers to participate in the study, with a link to the survey instrument and statements concerning confidentiality of survey results and informed consent by clicking on the link to participate. Participants were given a period of two weeks to fill out the survey. After the first week, a reminder e-mail, generated by the researcher, was again sent to participants on behalf of the researcher. Data from the survey was collected via LiveText, a Web-based survey site. The researchers' advisor's LiveText account was used for both creating the survey and collecting the survey data, meaning only the researcher and her advisor had access to the raw data. The researcher's advisor exported the raw data from her LiveText account to the researcher in the form of a Microsoft Excel spreadsheet, which the researcher used to analyze the data.

From a potential 231 participants, 27 participants completed a survey for a response rate of 11.7% of the total sample. Cook, Heath, and Thompson (2000), found the average response rate for electronic surveys to be 39.6% in a meta-analysis of 49 electronic surveys. Therefore, the response rate for this study had a significantly lower response rate than what is considered average for Web-based surveys.

Instrumentation

A 14-question survey, taking approximately ten minutes to complete, was used to collect data for this study. The survey asked teachers to keep a target student in mind that

exhibited hyperactive behavior and to choose the student's corresponding characteristics from a list of hyperactive behaviors. One question asked the frequency in which the target student engaged in the hyperactive behavior during the school day, offering response choices of "rarely," "seldom," "often," "very often," and "constantly." Two questions addressed the duration of time spent during the school day and method of addressing the target student's hyperactive behavior; the first question gave a range of options from 10 minutes or less to more than 60 minutes and the second question gave the following methods: verbal prompts, isolating student in classroom, isolating student outside of classroom, sending student to the principal's office, or other. Six questions asked for information regarding physical play activities; one asking what types of physical play activities were available to students at school (e.g., recess, physical education class, games that involve active movement); one asking the frequency in which students engage in physical play activities; three asking the duration, in minutes, students engage in physical play activities; one asking when the teacher sees the target student in relation to engagement in play activities (e.g., prior to, during, following, both prior to and following, or prior to, during and following); and one asking teachers to explain the changes, if any, seen in the target student's hyperactive behavior following engagement in physical play activities. Three questions asked for demographic information from teachers; one asked for the grade level taught (e.g., Preschool, K-6, 7-8, 9-12); one asked for the type of classroom in which the teacher taught (e.g., general education, lead teacher; general education, intervention specialist; special education, resource room; special education, self-contained classroom; specials, referring to art, music, and physical education; other); and one asking the number of years teaching (e.g., 1st-year teacher, 2-5 years, 6-10 years, 11-20 years, 21-30 years, more than 30 years). The survey instrument is labeled as Appendix A.

Data Analysis

Following the two-week period in which participants could submit responses, the data was exported from the research advisor's LiveText account to the researcher's e-mail account in Microsoft Excel spreadsheet format. Data was used from the 27 completed surveys.

The 27 data sets were analyzed using the sort feature of Microsoft Excel to group like responses. The mean level of minutes per school day for target student engagement in hyperactive behavior was calculated. Differences in teacher responses by grade level taught, type of classroom, and years of teaching experience were also examined.

Results

The purpose of this study was to examine teacher perceptions of the impact of physical play on hyperactive behavior in school-age children. The results are reported under sections corresponding to the survey questions addressed by each of these areas. Differences in teacher responses by grade level taught, type of classroom, and years of teaching experience are also examined.

Of 27 participants, the majority (n=18) or 67% reported teaching in grades Kindergarten through sixth, six (22%) reported teaching in grades seven and eight, three (11%) reported teaching in grades nine through twelve, and none taught preschool. Nineteen teachers (71%), the majority, reported teaching in general education classrooms. There were no intervention specialists working in general education classrooms. Four participants (15%) reported teaching in a special education resource room, three (11%) reported teaching in a self-contained special education classroom, and one (4%) reported teaching in a specials area (e.g., art, music, physical education). One participant (4%) reported being a first-year teacher, two (7%) reported teaching 2-5 years, five (19%) reported teaching 6-10 years, ten (37%) reported

teaching 11-20 years, five (19%) reported teaching 21-30 years, and four (15%) reported teaching more than 30 years.

Characteristics of Hyperactive Behavior Describing the Target Student

Twenty-four teachers (89%) reported the target student each had in mind talks out of turn or blurts out answers, 24 (89%) reported the target student fidgets or moves around in seat or appears restless, 18 (67%) reported the target student is out of seat constantly at inappropriate times, 12 (44%) reported the target student engages in physical activities in inappropriate settings at inappropriate times, 21 (78%) reported the target student is bored or loses focus easily or seems to need constant stimulation, 21 (78%) reported the target student talks to classmates at inappropriate times, 18 (67%) reported the target student has trouble finishing things, 17 (63%) reported the target student has trouble waiting in line, 18 (67%) reported the target student seems to have energy all the time, and 16 (59%) reported the target student is noticeably loud or noisy during unstructured play times. Teachers were asked to check all options that applied to the target student, resulting in multiple options being selected per teacher. Table 1 shows the reporting, in percentage, of the characteristics of hyperactive behavior engaged in by the target student as reported by their teachers.

Table 1. Characteristics of Hyperactive Behavior Describing the Target Student Reported by Percentage.

Characteristics of Hyperactive Behavior	Percentage
Talks out of turn or blurts out answers	89%
Fidgets or moves around in seat; appears restless	89%
Out of seat constantly, often at inappropriate times	67%
Engages in physical activities in inappropriate settings or at inappropriate times	44%
Is bored or loses focus easily; seems to need constant stimulation	78%
Talks to classmates at inappropriate times	78%
Has trouble finishing things; likes to move from task to task or tries to multi-task	67%
Has trouble waiting in line or waiting for turn during activities	63%
Seems to have energy all the time, even with less sleep	67%
Is noticeably loud or noisy during unstructured play times	59%

By grade level taught. Kindergarten through sixth grade teachers reported the highest numbers of characteristics of hyperactive behavior, with at least ten teachers (56%) reporting their target student as displaying all characteristics of hyperactive behavior. The characteristic with the least number of ratings for all grade levels was engaging in physical activity at inappropriate times or in inappropriate settings, with ten Kindergarten through sixth teachers (56%) reporting the behavior for their target student, one (17%) in grades seven and eight, and one (33%) in grades nine through twelve.

Table 2. Characteristics of Hyperactive Behavior by Grade Level.

Characteristics of Hyperactive Behavior	Percentage K-6	Percentage 7-8	Percentage 9-12
Talks out of turn or blurts out answers	89%	100%	67%
Fidgets or moves around in seat; appears restless	83%	100%	100%
Out of seat constantly, often at inappropriate times	67%	67%	67%
Engages in physical activities in inappropriate settings or at inappropriate times	56%	17%	33%
Is bored or loses focus easily; seems to need constant stimulation	61%	100%	100%
Talks to classmates at inappropriate times	72%	100%	67%
Has trouble finishing things; likes to move from task to task or tries to multi-task	67%	67%	67%
Has trouble waiting in line or waiting for turn during activities	67%	83%	0%
Seems to have energy all the time, even with less sleep	56%	100%	67%
Is noticeably loud or noisy during unstructured play times	56%	67%	67%

By type of classroom. Talking out of turn and fidgeting behaviors had the highest reports from general education teachers (n=19), though teachers in all classroom types reported their target student as displaying these two characteristics.

Table 3. Characteristics of Hyperactive Behavior by Type of Classroom.

Characteristics of Hyperactive Behavior	Percentage Gen Ed	Percentage Spec Ed, Resource Room	Percentage Spec Ed, Self-Contained	Percentage Specials
Talks out of turn or blurts out answers	89%	100%	67%	100%
Fidgets or moves around in seat; appears restless	79%	100%	100%	100%
Out of seat constantly, often at inappropriate times	74%	50%	67%	0%
Engages in physical activities in inappropriate settings or at inappropriate times	53%	0%	67%	0%
Is bored or loses focus easily; seems to need constant stimulation	63%	100%	100%	100%
Talks to classmates at inappropriate times	74%	100%	67%	100%
Has trouble finishing things; likes to move from task to task or tries to multi-task	68%	75%	67%	0%
Has trouble waiting in line or waiting for turn during activities	68%	75%	33%	0%
Seems to have energy all the time, even with less sleep	68%	75%	67%	0%
Is noticeably loud or noisy during unstructured play times	58%	50%	100%	0%

By years taught. The highest reports for all behaviors came from teachers with 11-20 years of teaching experience (n=10). These teachers also reported the highest numbers for talking-out behavior. No teachers with 2-5 years of teaching experience reported talking-out behavior for their target student.

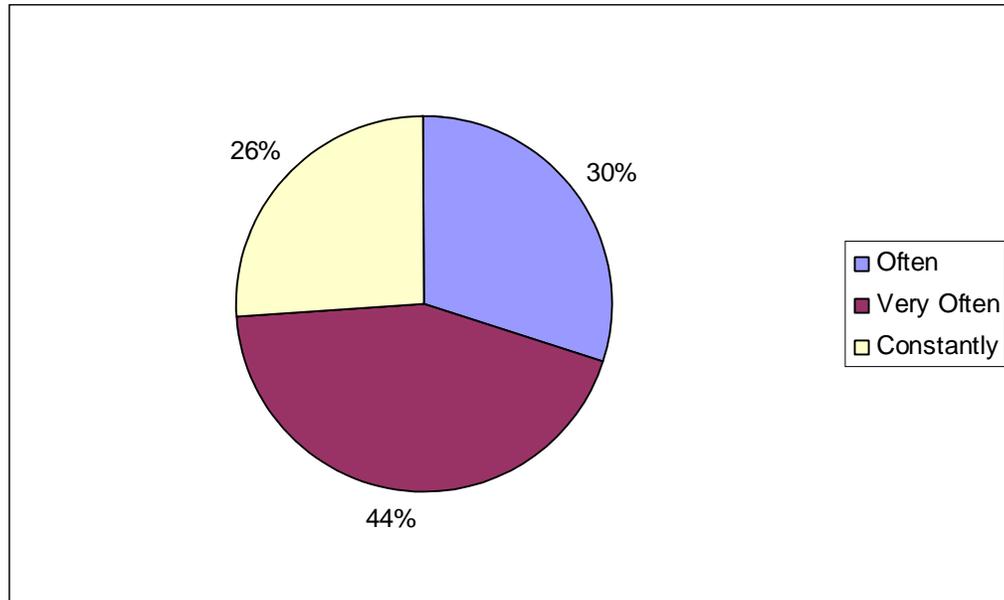
Table 4. Characteristics of hyperactive behavior by years taught.

Characteristics of Hyperactive Behavior	Percentage 1st-year	Percentage 2-5 years	Percentage 6-10 years	Percentage 11-20 years	Percentage 21-30 years	Percentage 30 + years
Talks out of turn or blurts out answers	100%	0%	100%	90%	100%	100%
Fidgets or moves around in seat; appears restless	100%	100%	100%	80%	80%	100%
Out of seat constantly, often at inappropriate times	0%	100%	60%	80%	80%	25%
Engages in physical activities in inappropriate settings or at inappropriate times	0%	100%	20%	70%	20%	25%
Is bored or loses focus easily; seems to need constant stimulation	100%	100%	80%	70%	80%	75%
Talks to classmates at inappropriate times	100%	50%	80%	80%	80%	75%
Has trouble finishing things; likes to move from task to task or tries to multi-task	0%	0%	100%	50%	100%	75%
Has trouble waiting in line or waiting for turn during activities	0%	50%	80%	60%	80%	50%
Seems to have energy all the time, even with less sleep	0%	50%	60%	80%	60%	75%
Is noticeably loud or noisy during unstructured play times	0%	50%	60%	70%	20%	100%

Frequency of Engagement in Hyperactive Behavior

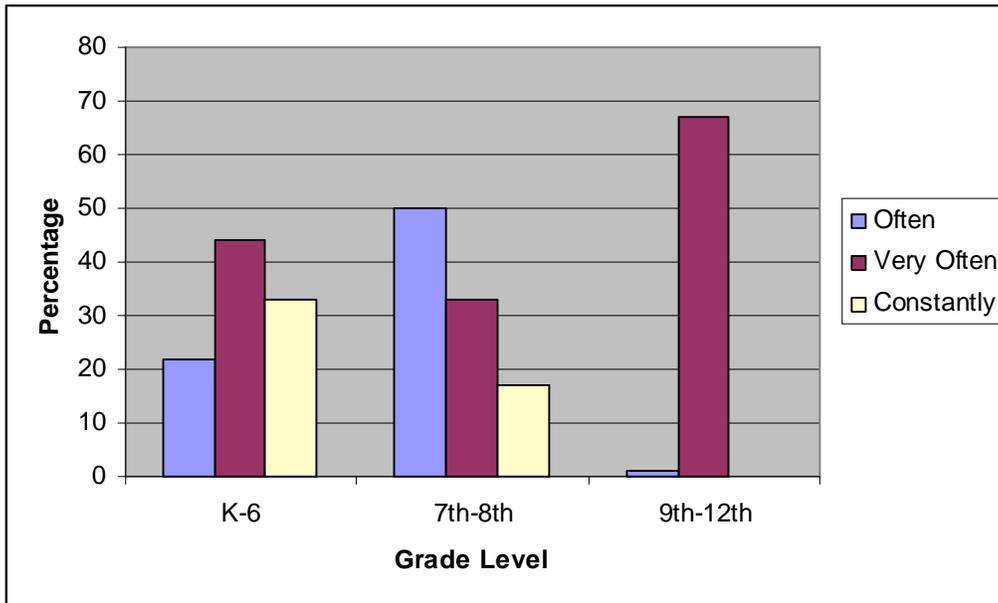
When asked how often the target student engages in hyperactive behavior during the school day, no teachers reported “rarely,” or “seldom,” eight (30%) reported “often,” 12 (44%) reported “very often,” and seven (26%) reported “constantly.” Figure one shows the percentages of frequency of engagement in hyperactive behavior by the target student.

Figure 1. Frequency of Engagement in Hyperactive Behavior of Target Student Reported by Percentage.



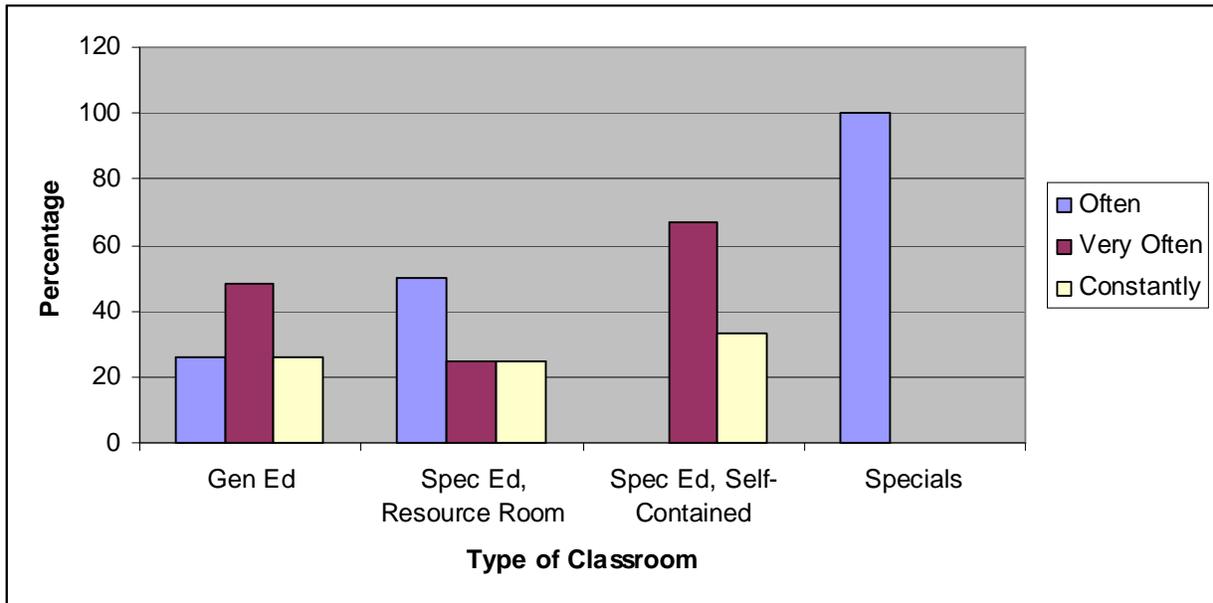
By grade level taught. Four teachers (22%) in grades Kindergarten through sixth, three (50%) in grades seven and eight, and one (33%) in grades nine through twelve reported the target student as “often” engaging in hyperactive behavior. Seven (39%) teachers in grades Kindergarten through sixth, two (33%) in grades seven and eight, and two (67%) in grades nine through twelve reported the target student as “very often” engaging in hyperactive behavior. Six teachers (33%) in grades Kindergarten through sixth, one (17%) in grades seven and eight, and none in grades nine through twelve reported the target student as “constantly” engaging in hyperactive behavior.

Figure 2. Frequency of Engagement in Hyperactive Behavior by Grade Level.



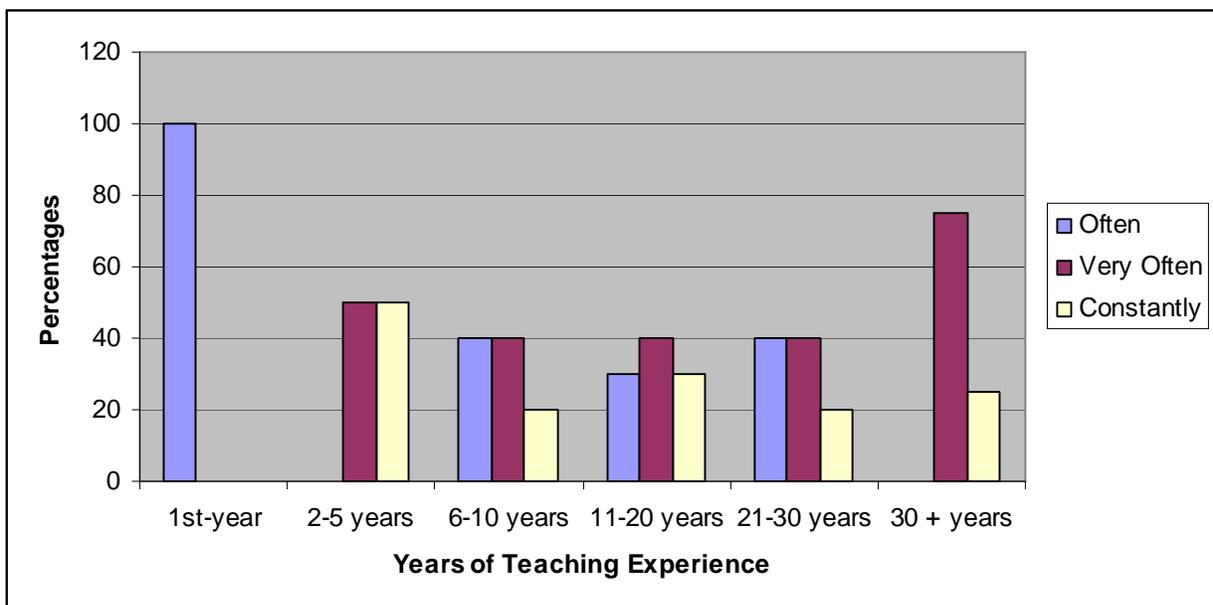
By type of classroom. Five lead teachers (26%) in general education, two (50%) in special education resource rooms, and one (100%) in a specials area reported the target student as “often” engaging in hyperactive behavior. Nine lead teachers (47%) in general education, one (25%) in a special education resource room, and two (67%) in a special education self-contained classroom reported the target student as “very often” engaging in hyperactive behavior. Five lead teachers (26%) in general education, one (25%) in a special education resource room, and one (33%) in a special education self-contained classroom reported the target student as “constantly” engaging in hyperactive behavior.

Figure 3. Frequency of Engagement in Hyperactive Behavior by Type of Classroom.



By years taught. Four teachers (40%) with 11-20 years of teaching experience reported their target student as “very often” engaging in hyperactive behavior. This was the highest frequency category for teachers with all levels of teaching experience.

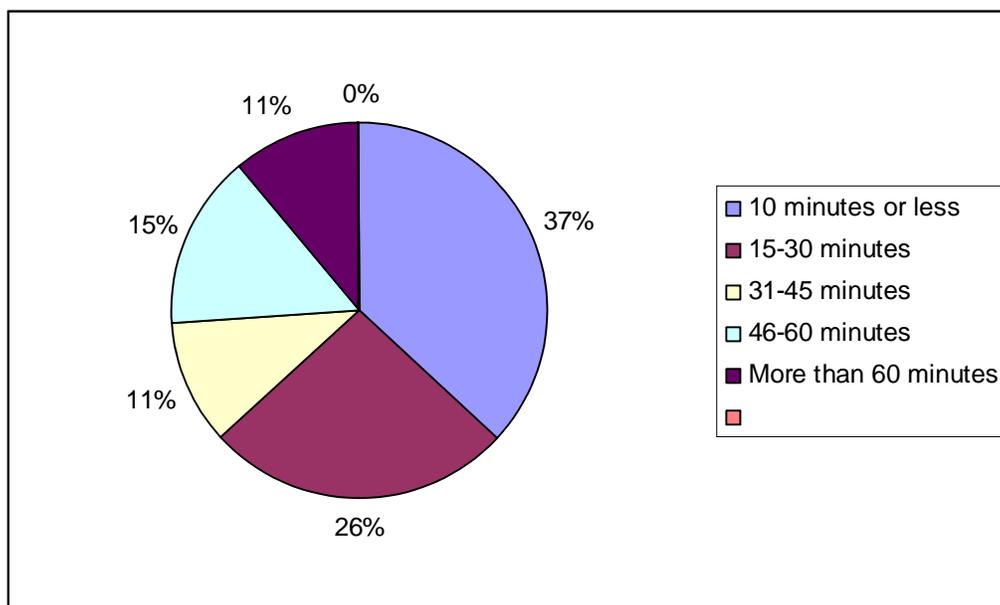
Figure 4. Frequency of Engagement in Hyperactive Behavior by Years Taught.



Amount of Time Addressing Hyperactive Behavior

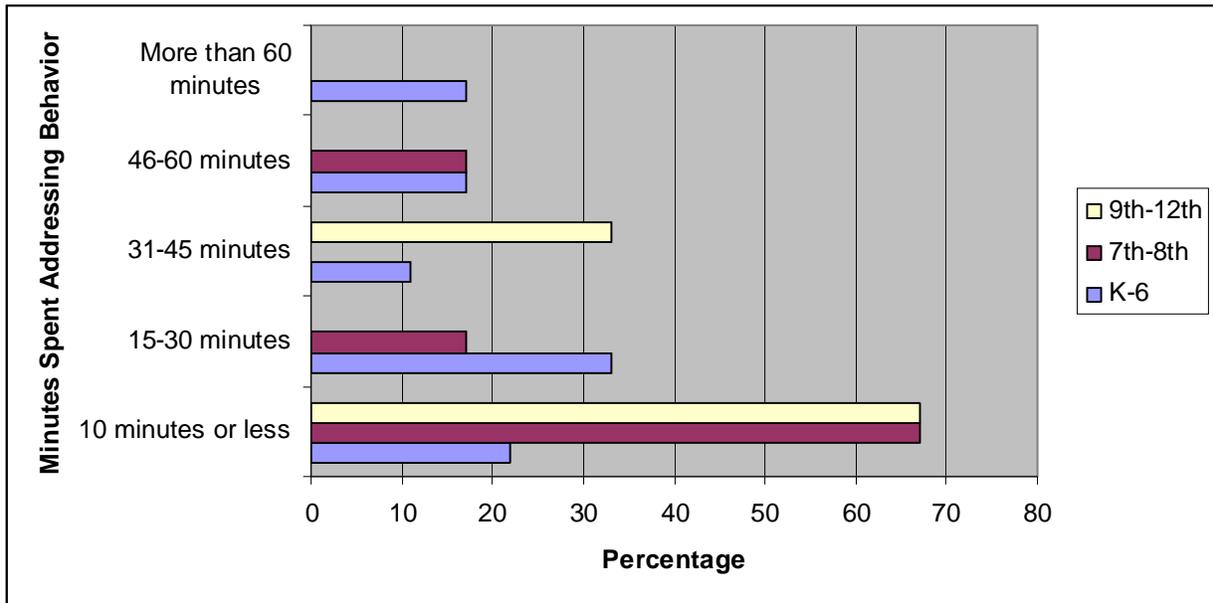
When asked how much time teachers spent addressing the perceived hyperactive behavior of the target student during the school day, ten teachers (37%) reported spending 10 minutes or less time addressing the behavior, seven (26%) reported spending 15-30 minutes addressing the behavior, three (11%) reported spending 31-45 minutes addressing the behavior, four (15%) reported spending 46-60 minutes addressing the behavior, and three (11%) reported spending more than 60 minutes addressing the behavior. Figure five shows the number of minutes spent addressing the behavior and the percentage of teachers reporting.

Figure 5. Percentage of Teachers Reporting the Number of Minutes Spent Addressing Target Student's Hyperactive Behavior.



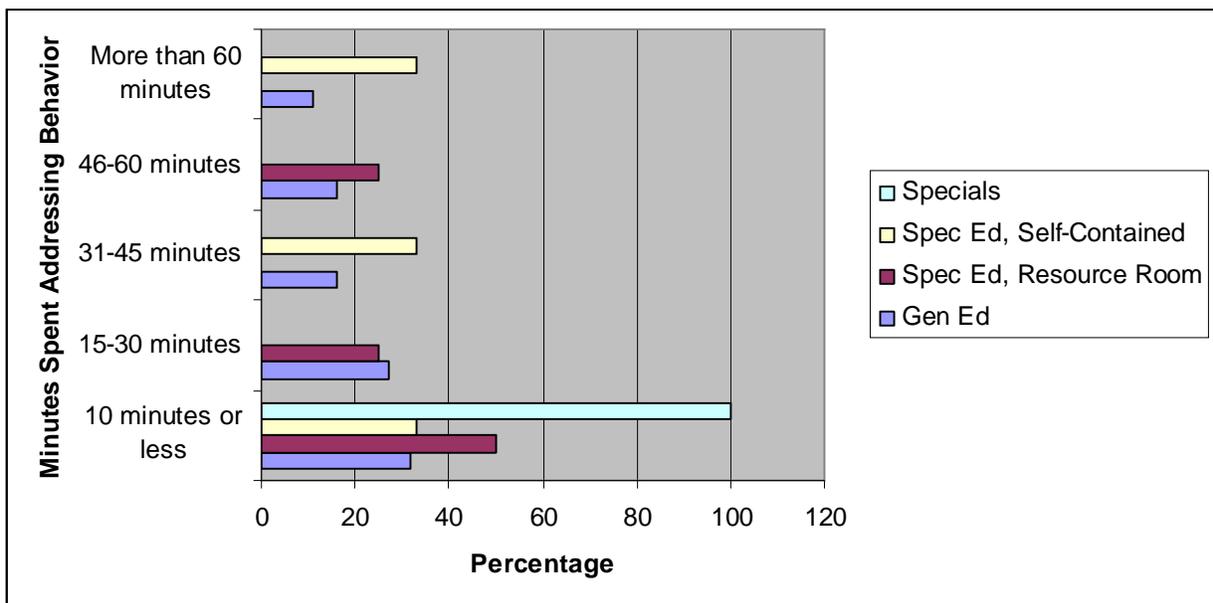
By grade level. Six Kindergarten through sixth grade teachers (33%) reported spending 15-30 minutes addressing hyperactive behavior, which was the highest report for that amount of time. The highest reports for teachers in grades seven and eight and nine through twelve were for 10 minutes or less, with four teachers (67%) in grades seven and eight and two (67%) teachers in grades nine through twelve reporting.

Figure 6. Amount of Time Spent Addressing Hyperactive Behavior by Grade Level.



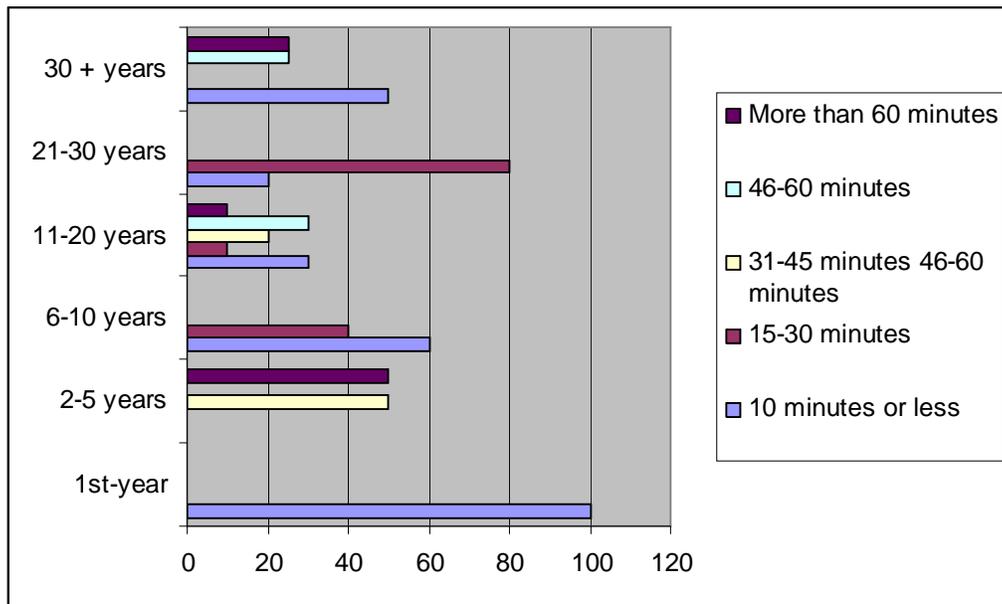
By type of classroom. Ten minutes or less had the highest reports from teachers in all types of classrooms, with six general education teachers (32%), two special education resource room teachers (50%), one special education self-contained classroom teacher (33%), and one specials teacher (100%) reporting.

Figure 7. Amount of Time Spent Addressing Hyperactive Behavior by Classroom Type.



By years taught. Results were mixed, with three teachers with 6-10 years of teaching experience (60%) and three teachers with 11-20 years of teaching experience (30%) reporting 10 minutes or less for addressing hyperactive behavior. The highest majority report came from teachers with 21-30 years of teaching experience, where four teachers (80%) reported spending 15-30 minutes addressing hyperactive behavior.

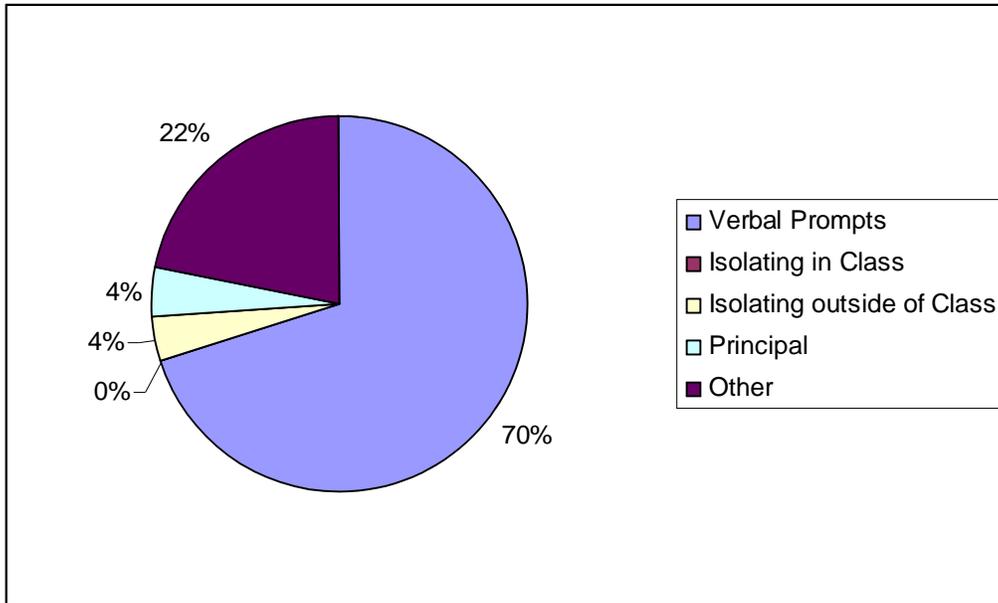
Figure 8. Amount of Time Spent Addressing Hyperactive Behavior by Years Taught.



Method of Dealing with Hyperactive Behavior

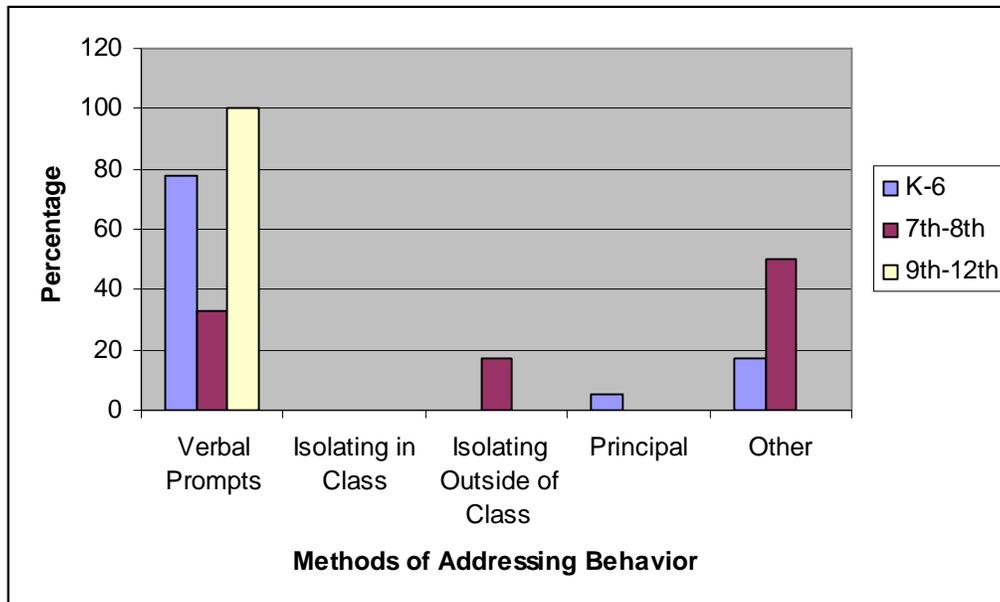
When asked the primary method of dealing with, or addressing, the target student’s hyperactive behavior, 19 teachers (70%) reported using verbal prompts, none reported isolating the student in the classroom, one (4%) reported isolating the student outside of the classroom, one (4%) reported sending the student to the principal’s office, and six (22%) reported “other.” Figure nine shows the methods of dealing with the target student’s hyperactive behavior and the percentage of teachers reporting.

Figure 9. Percentage of Teachers Reporting Primary Method of Dealing with Target Student's Hyperactive Behavior.



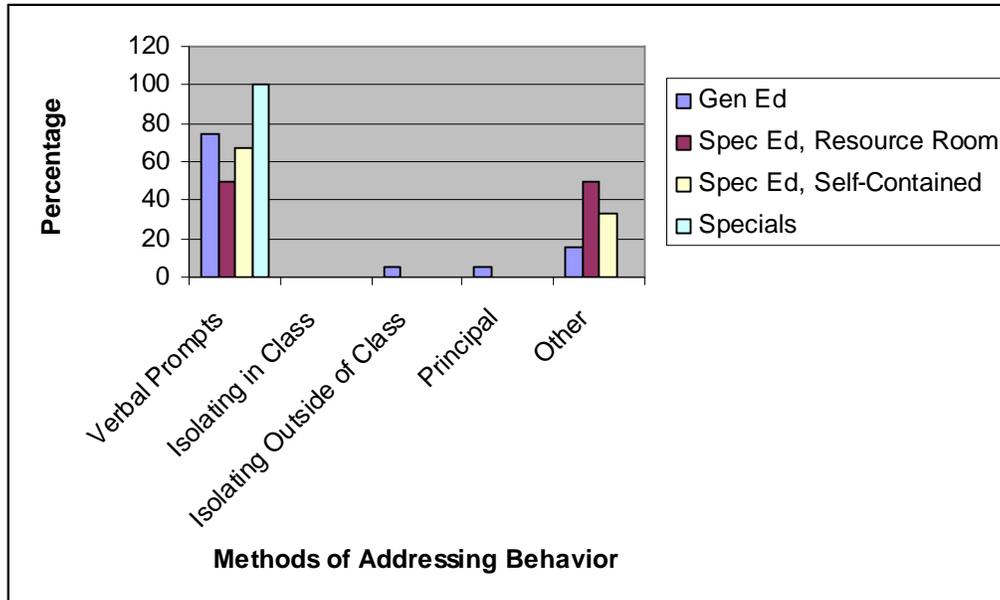
By grade taught. Fourteen Kindergarten through sixth grade teachers (78%) and all teachers in grades nine through twelve (n=3) reported verbal prompts as their primary method of dealing with the target student's hyperactive behavior. Only two teachers in grades seven and eight (33%) reported using this method primarily. Three teachers in grades seven and eight (50%) reported using "other."

Figure 10. Primary Method of Dealing with Target Student's Hyperactive Behavior by Grade Level.



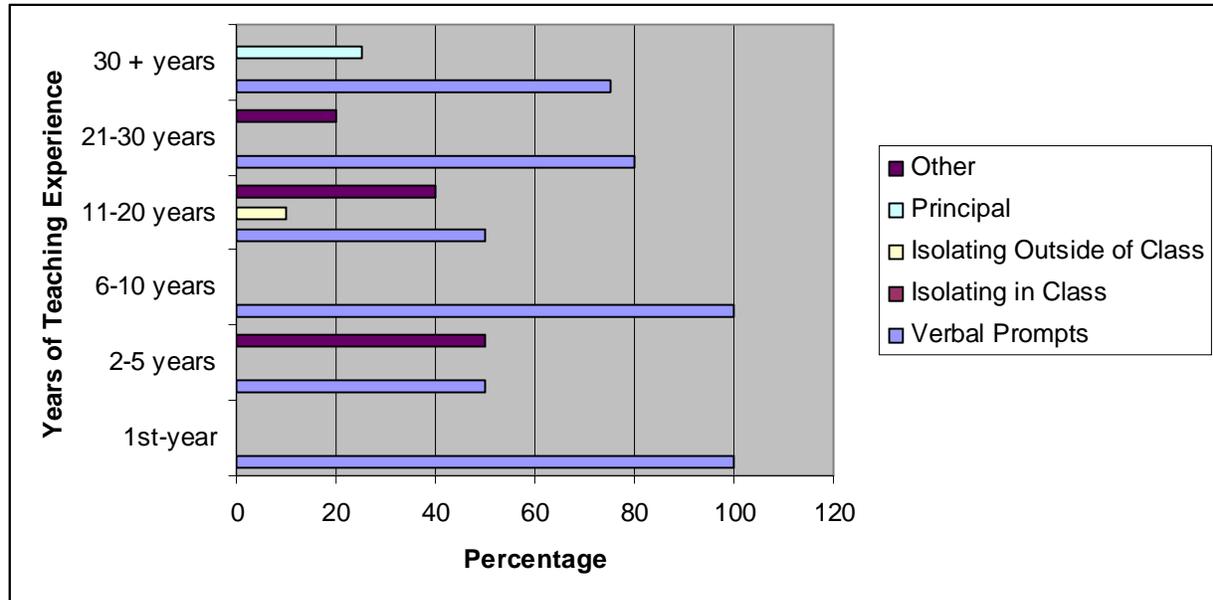
By type of classroom. General education teachers had the highest reports for verbal prompts (74%). Two special education resource room teachers (50%) reported using verbal prompts and two (50%) reported using “other.” Two special education self-contained classroom teachers (67%) reported using verbal prompts and one (33%) reported using “other.” One specials teacher (100%) reported using verbal prompts.

Figure 11. Primary Method of Dealing with Target Student's Hyperactive Behavior by Type of Classroom.



By years taught. Teachers with 6-10 and 11-20 years of teaching experience reported the highest numbers for verbal prompts, with five from each experience level. Four teachers with 11-20 years of experience (40%) also reported using “other.” Four teachers with 21-30 years of teaching experience (80%) and three teachers with more than 30 years of teaching experience (75%) reported using verbal prompts.

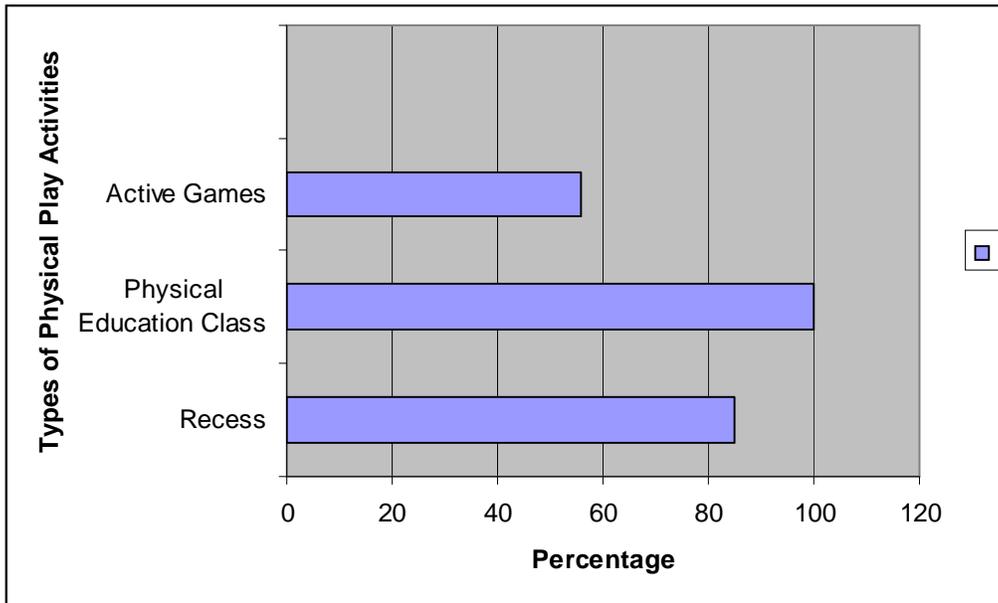
Figure 12. Primary Method of Dealing with Target Student's Hyperactive Behavior by Years Taught.



Types of Physical Play Activities Available to Students

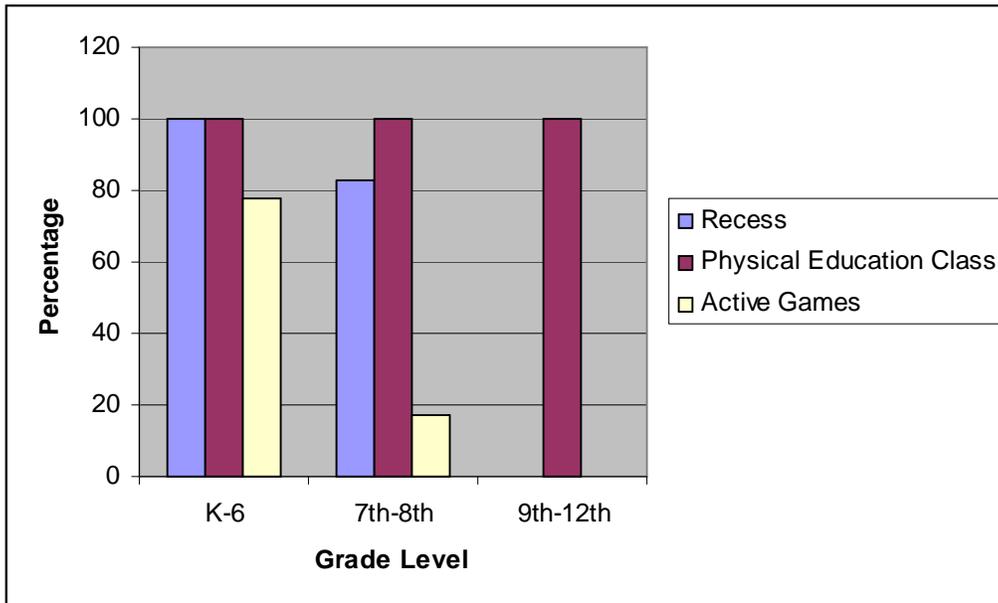
When asked what types of physical play activities were available at their school, 23 teachers (85%) reported recess, 27 (100%) reported physical education class, and 15 (55%) reported games that involve active movement. Participants were asked to select all applicable options, resulting in multiple options selected. Figure 13 shows the types of physical play.

Figure 13. Types of Physical Play Activities Reported by Percentage.



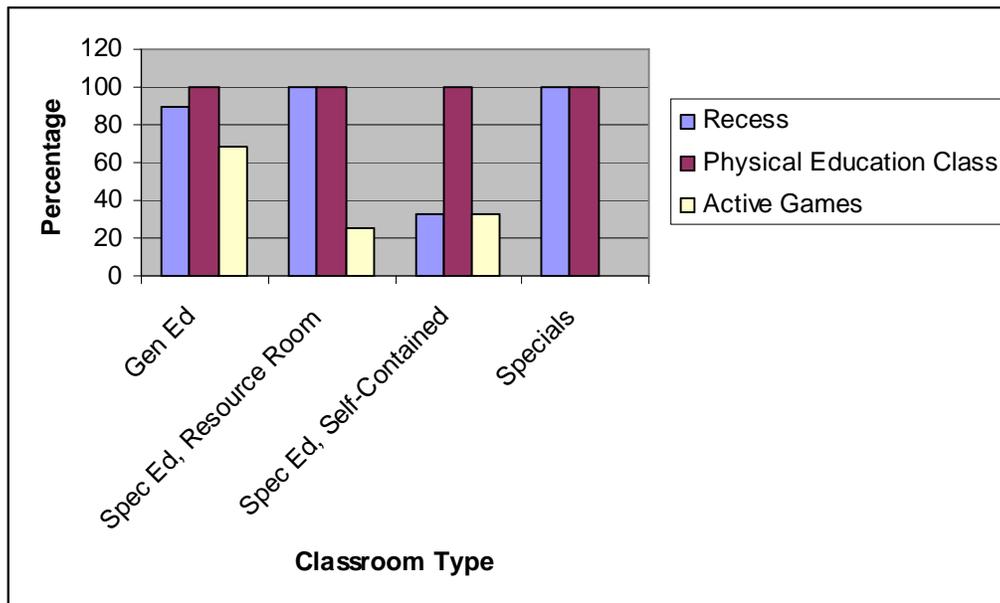
By grade taught. Kindergarten through sixth grade teachers had the highest reports for all types of physical play activities, with 18 (100%) reporting recess, 18 (100%) reporting physical education class, and 14 (78%) reporting games that involve active movement. Five teachers in grades seven and eight (83%) reported recess, six (100%) reported physical education class, and one (17%) reported games that involve active movement. Three teachers in grades nine through twelve (100%) reported physical education class.

Figure 14. Types of Physical Play Activities by Grade Level.



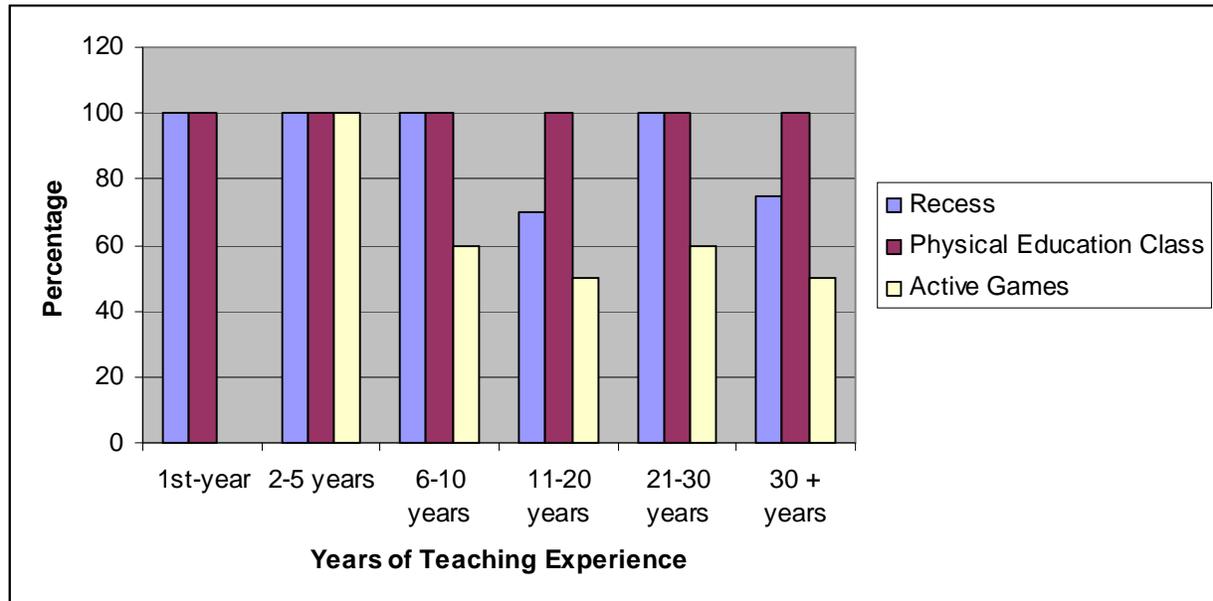
By type of classroom. General education teachers reported the highest numbers for all types of physical play activities, with 17 (89%) reporting recess, 19 (100%) reporting physical education class, and 13 (68%) reporting games that involve active movement. Four teachers in special education resource rooms (100%) reported both recess and physical education class and one (25%) reported games that involve active movement. Three teachers in special education self-contained classrooms (100%) reported physical education class and one (33%) reported both recess and games that involve active movement. One specials teacher (100%) reported both recess and physical education class.

Figure 15. Types of Physical Play Activities by Type of Classroom.



By years taught. The highest reports came from teachers with 6-10, 11-20, and 21-30 years of teaching experience for recess and physical education class. Five teachers with 6-10 years (100%) reported recess and physical education class. Seven teachers with 11-20 years of teaching experience (70%) reported recess and ten (100%) reported physical education class. Five teachers with 21-30 years of experience (100%) reported recess and physical education class.

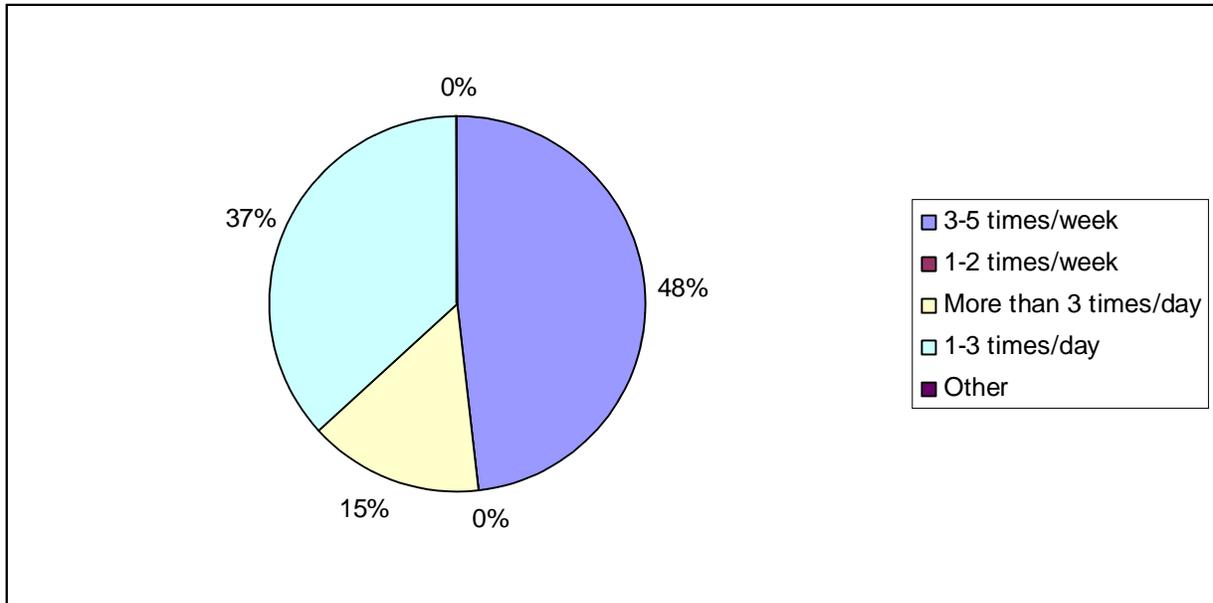
Figure 16. Types of Physical Play Activities by Years Taught.



Frequency of Engagement in Physical Play Activities

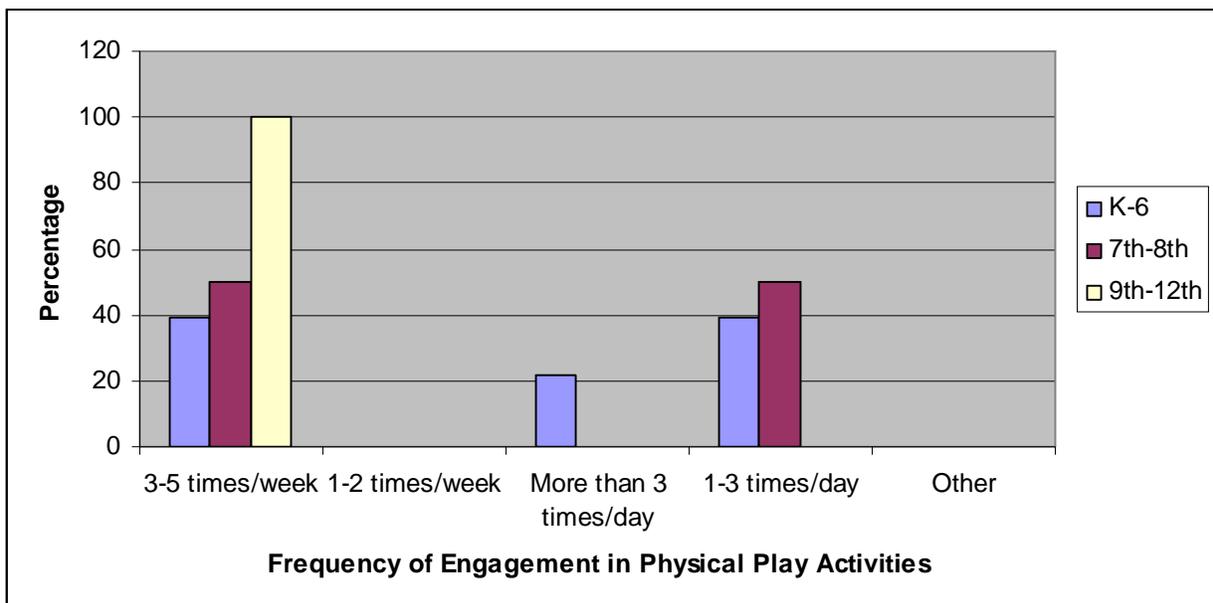
When asked how often students engaged in the aforementioned physical play activities, 13 teachers (48%) reported three-five times per week, four teachers (15%) reported more than three times per day, and ten teachers (37%) reported one-three times per day. Figure 17 shows the frequency of engagement in physical play activities and the percentage of teachers reporting.

Figure 17. Percentage of Teachers Reporting Frequency of Engagement in Physical Play Activities.



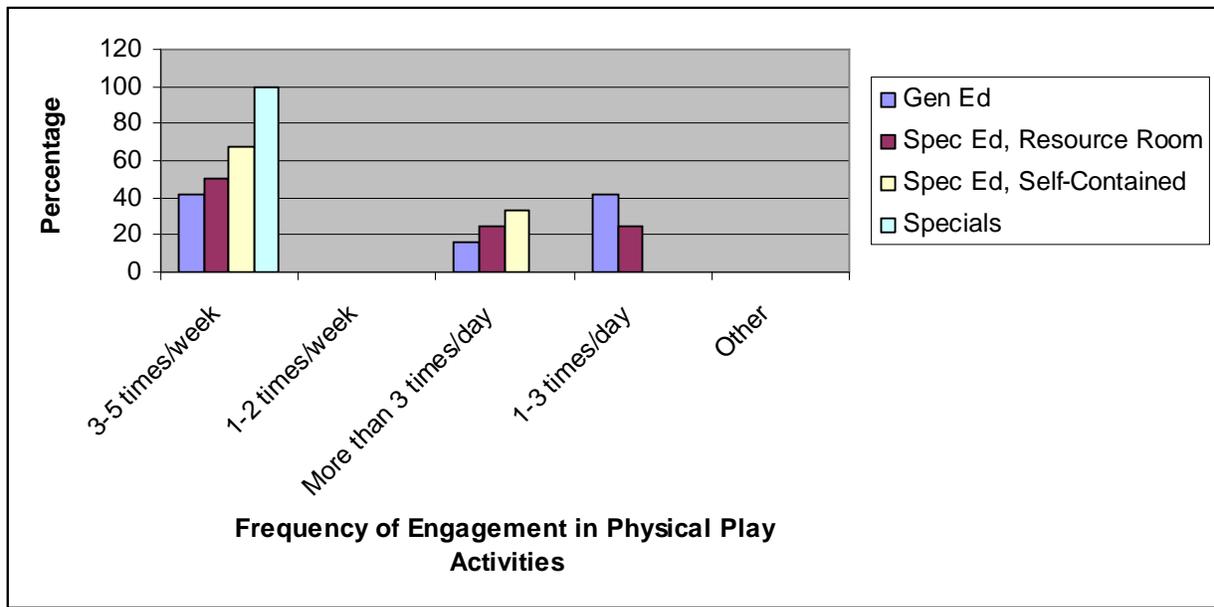
By grade taught. Seven teachers in grades Kindergarten through sixth (39%) reported three-five times per week and one-three times per day. Teacher in grades nine through twelve reported the least amount of engagement, with three (100%) reporting three-five times per week.

Figure 18. Frequency of Engagement in Physical Play Activities by Grade Level.



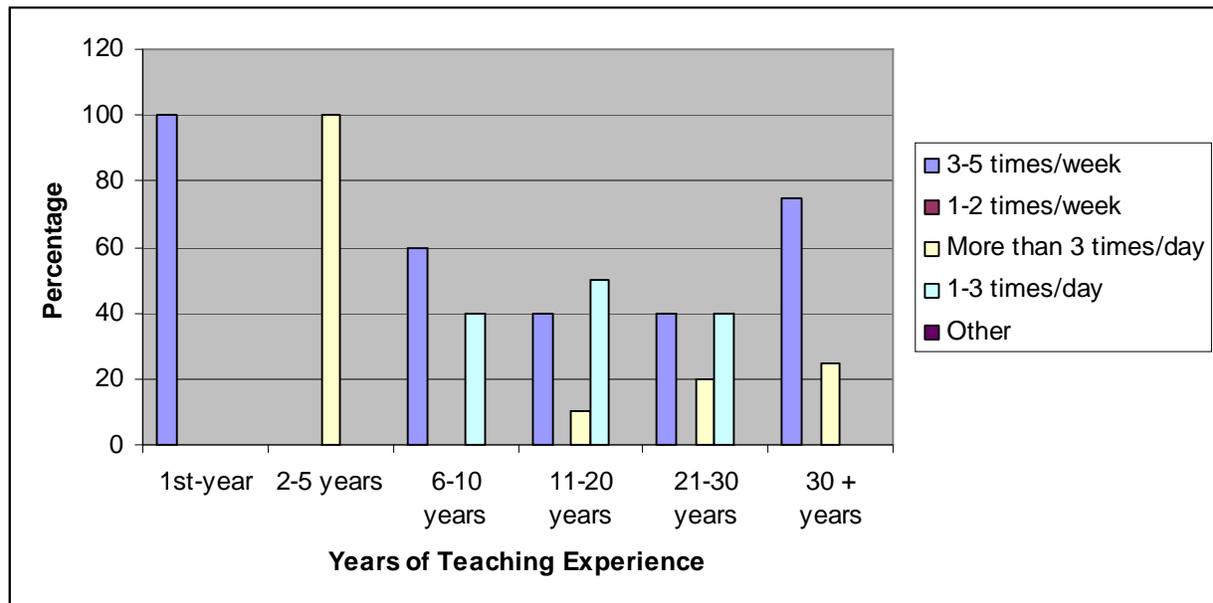
By type of classroom. General education teachers had the highest reports, with eight teachers (42%) reporting three-five times per week and one-three times per day. Special education resource room teachers had two reports (50%) for three-five times per week and one report (25%) for one-three times per day, while special education self-contained classroom teachers had two reports (67%) for three-five times per week and one report (33%) for more than three times per day. One specials teacher (100%) reported three-five times per week.

Figure 19. Frequency of Engagement in Physical Play Activities by Classroom Type.



By years taught. The highest reports came from teachers with 11-20 years of teaching experience, with four (40%) reporting three-five times per week and five (50%) reporting one-three times per day. The lowest reports came from first-year teachers, with one (100%) reporting three-five times per week.

Figure 20. Frequency of Engagement in Physical Play Activities by Years Taught.



Time Spent Engaging in Physical Play Activities

Questions seven, eight, and nine asked teachers to identify the length of time, in minutes, students engaged in physical play activities available to them at school. For recess, two teachers (7%) reported no recess was available, 15 (56%) reported 1-30 minutes per day, seven (26%) reported 30-60 minutes per day, none reported 60-90 minutes per day, none reported more than 90 minutes per day, and three (11%) did not respond. For physical education class, one teacher (4%) reported no minutes per day, one (4%) reported 1-30 minutes per day, 11 (41%) reported 31-60 minutes per day, none reported 1-30 minutes per week, one (4%) reported 31-60 minutes per week, eight (30%) reported 61-90 minutes per week, four (15%) reported 91-120 minutes per week, none reported more than 120 minutes per week, and one (4%) did not respond. For games that involve active movement, two reported no active games were available, ten (37%) reported 1-30 minutes per day, four (15%) reported 31-60 minutes per day, one (4%) reported 1-30 minutes per week, two (7%) reported 31-60 minutes per week, none reported 61-90 minutes per week, one (4%) reported 91-120 minutes per week, none reported more than 120

minutes per week, and seven (26%) did not respond. Table 5 shows the time spent engaging in physical play activities and the percentage of teachers reporting.

Table 5. Percentage of Teachers Reporting Time Spent Engaging in Physical Play Activities.

	Recess (Question 7)	Physical Education Class (Question 8)	Active Games (Question 9)
0 minutes/day	7 %	4%	7%
1-30 minutes/day	56%	4%	37%
31-60 minutes/day	26%	41%	15%
61-90 minutes/day	0%	0%	0%
91 + minutes/day	0%	0%	0%
1-30 minutes/week	0%	0%	4%
31-60 minutes/week	0%	4%	7%
61-90 minutes/week	0%	30%	0%
91-120 minutes/week	0%	15%	4%
121 + minutes/week	0%	0%	0%
No Response	11%	7%	26%

By grade taught. For recess, teachers in grades Kindergarten through sixth had the highest reports for 1-30 minutes per day and 30-60 minutes per day, with eight (44%) reporting 1-30 minutes and five (28%) reporting 30-60 minutes. One teacher in grades seven and eight (17%) reported no availability for recess. For physical education class, Kindergarten through sixth grade teachers had the highest reports for 60-90 minutes per week, with eight (44%) reporting. Three teachers in grades seven and eight (50%) and three in grades nine through twelve (100%) reported 31-60 minutes per day. For games that involve active movement, eight

Kindergarten through sixth grade teachers (44%) reported 1-30 minutes per day. Three teachers in grades seven and eight (50%) reported 1-30 minutes per day, and one teacher in grades nine through twelve (33%) reported 31-60 minutes per day.

Table 6. Time Spent Engaging in Physical Play Activities by Grade Level.

	0 min	1-30 min/d	31-60 min/d	61-90 min/d	90 + min/d	1-30 min/wk	31-60 min/wk	61-90 min/wk	91-120 min/wk	121 + min/wk	NR
R (K-6)	0%	44%	28%	6%	0%	0%	0%	0%	0%	0%	22%
R (7-8)	17%	50%	33%	0%	0%	0%	0%	0%	0%	0%	0%
R (9-12)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PE (K-6)	0%	11%	22%	0%	0%	0%	17%	28%	22%	0%	0%
PE (7-8)	0%	0%	83%	0%	0%	0%	0%	0%	0%	0%	17%
PE (9-12)	33%	0%	33%	0%	0%	0%	0%	0%	0%	0%	33%
Games (K-6)	0%	44%	17%	0%	0%	6%	11%	0%	0%	0%	22%
Games (7-8)	0%	50%	0%	0%	0%	0%	0%	0%	17%	0%	33%
Games (9-12)	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	67%

By type of classroom. For recess, 12 general education teachers (63%) reported 1-30 minutes per day and four (21%) reported 30-60 minutes per day. One special education resource room teacher (25%) and two special education self-contained classroom teachers (67%) reported 1-30 minutes per day. For physical education class, seven general education teachers (37%) reported 31-60 minutes per day and five (26%) reported 61-90 minutes per week. One teacher in a special education resource room (25%) reported 1-30 minutes per day, one (25%) reported 31-60 minutes per day, and one (25%) reported 61-90 minutes per week. Two special education self-contained classroom teachers (67%) reported 31-60 minutes per week. One special teacher (100%) reported 61-90 minutes per week. For games that involve active movement, eight general

education teachers (42%) reported 1-30 minutes per day, two special education resource room teachers (50%) reported 1-30 minutes per day, one special education self-contained classroom teacher (33%) reported 31-60 minutes per day, and one specials teacher (100%) reported 1-30 minutes per day.

Table 7. Time Spent Engaging in Physical Play Activities by Type of Classroom.

	0 min	1-30 min/d	31-60 min/d	61-90 min/d	90 + min/d	1-30 min/wk	31-60 min/wk	61-90 min/wk	91-120 min/wk	121 + min/wk	NR
R (GE)	5%	63%	21%	5%	0%	0%	0%	0%	0%	0%	5%
R (SE, RR)	0%	25%	50%	0%	0%	0%	0%	0%	0%	0%	25%
R (SE, SC)	0%	67%	0%	0%	0%	0%	0%	0%	0%	0%	33%
R (S)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
PE (GE)	5%	5%	37%	0%	0%	0%	5%	26%	21%	0%	0%
PE (SE, RR)	0%	25%	25%	0%	0%	0%	0%	25%	0%	0%	25%
PE (SE, SC)	0%	0%	67%	0%	0%	0%	0%	0%	0%	0%	33%
PE (S)	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
Games (GE)	0%	42%	16%	0%	0%	5%	11%	0%	0%	0%	26%
Games (SE, RR)	0%	50%	0%	0%	0%	0%	0%	0%	25%	0%	25%
Games (SE, SC)	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	67%
Games (S)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%

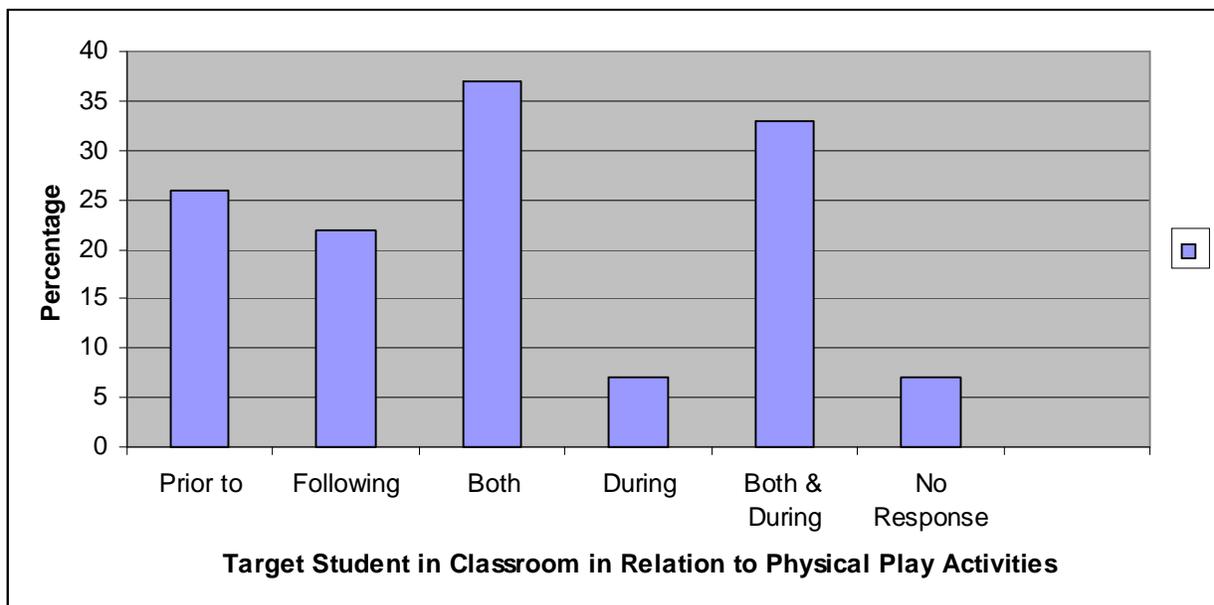
By years taught. For recess, nine teachers with 11-20 years of teaching experience (90%) reported 1-30 minutes per day. Five teachers with 21-30 years of teaching experience (100%) reported 30-60 minutes per day. Four teachers did not respond: one first-year teacher (100%), one with 2-5 years (50%), one with 6-10 years (20%), and one with more than 30 years

Games (21-30)	0%	40%	20%	0%	0%	0%	20%	0%	20%	0%	0%
Games (30 +)	0%	0%	50%	0%	0%	25%	0%	0%	0%	0%	25%

Target Student in Classroom in Relation to Engagement in Physical Play Activities

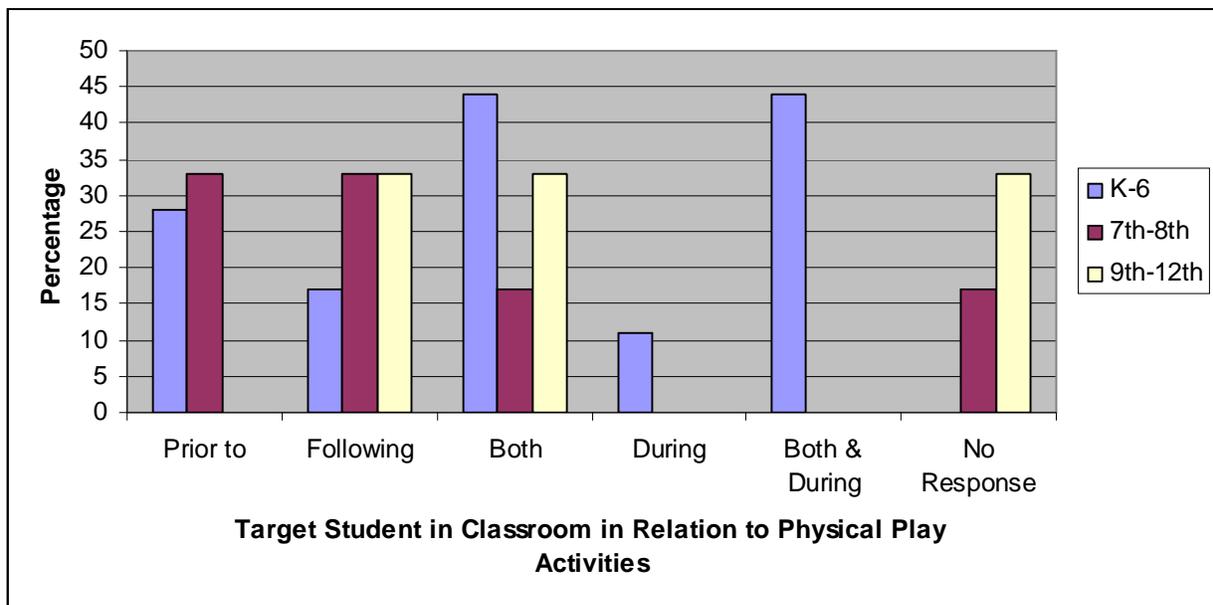
When asked when they generally worked with the target student in their classroom, seven teachers (26%) reported working with the target student prior to engaging in physical play activities, six (22%) reported following physical play activities, ten (37%) reported both prior to and following physical play activities, two (7%) reported during physical play activities, nine (33%) reported working with the target student prior to, following and during physical play activities, and two (7%) did not respond. Participants were asked to select all applicable options, resulting in multiple options selected. Figure 21 shows the times the teacher works with the target student in relation to engagement in physical play activities and the percentage of teachers reporting.

Figure 21. Percentage of Teachers Reporting Times Target Student Worked with in Classroom in Relation to Engagement in Physical Play Activities.



By grade taught. Eight teachers in grades Kindergarten through sixth (44%) reported working with the target student prior to and following physical play activities (both) and eight (44%) reported working with the target student at all three times (prior to, during, and following). Two teachers in grades seven and eight (33%) reported working with the target student prior to and two (33%) reported working with the target student following. One teacher in grades nine through twelve (33%) reported working with the target student following and one reported working with the target student for both.

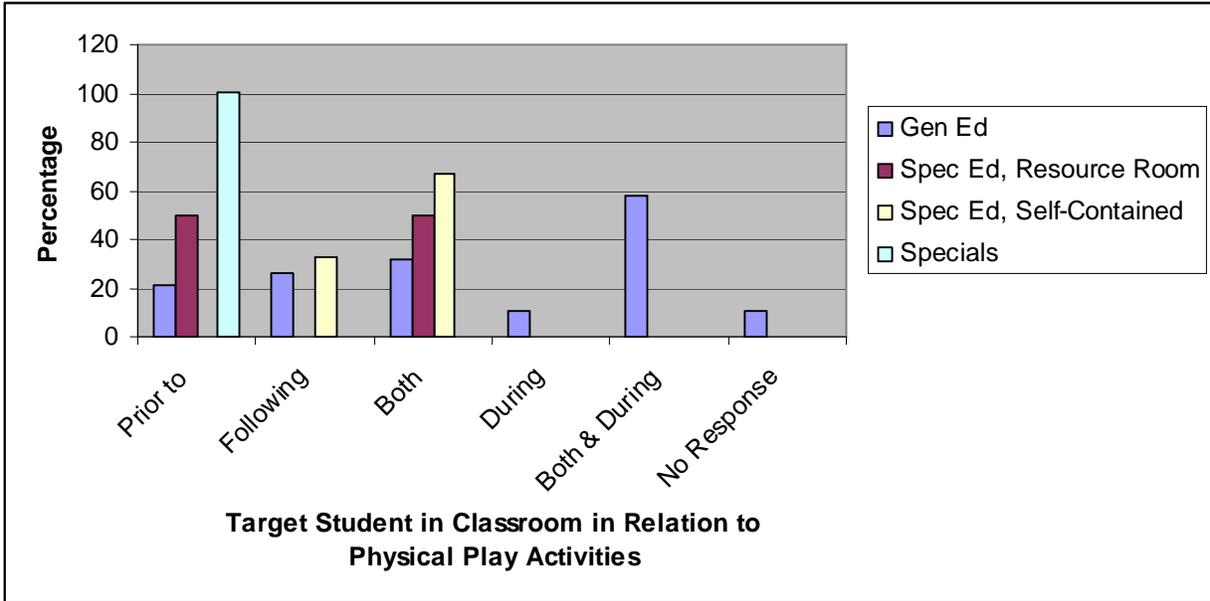
Figure 22. Times Target Student Worked with in Classroom in Relation to Engagement in Physical Play Activities by Grade Level.



By classroom type. General education teachers reported working with the target student the most at all three times, with 11 (58%) reporting. Special education resource room teachers worked with the target student either prior to or both, with two (50%) reporting for each. Special education self-contained classroom teachers worked with the target student either following or both, with one (33%) reporting following and two (67%) reporting both. One specials teacher (100%) reported working with the target student prior to engagement in physical

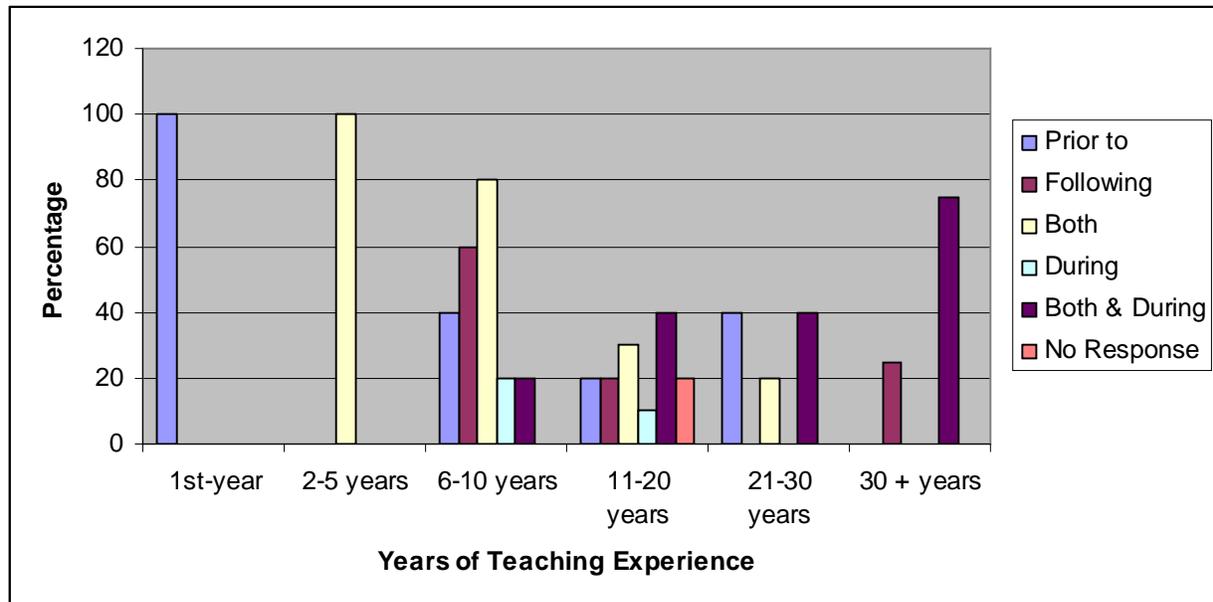
play activities.

Figure 23. Times Target Student Worked with in Classroom in Relation to Engagement in Physical Play Activities by Classroom Type.



By years taught. Teachers with 6-10 years of teaching experience worked with the target student the most for both, with four (80%) reporting, and teachers with 11-20 years of teaching experience worked with the target student the most for all three times, with four (40%) reporting. One first-year teacher (100%) worked with the target student prior to and one teacher with more than 30 years (25%) worked with the target student following physical play activities.

Figure 24. Times Target Student Worked with in Classroom in Relation to Engagement in Physical Play Activities by Years Taught.



Changes in Behavior Following Physical Play Activities

As an open-ended response question, teachers were asked to share their perceptions regarding noticeable changes in the target student's behavior following physical play activities. To guide their responses, the following behavior change examples were given: student requires fewer or more prompts to remain on task, student remains seated quietly for longer periods of time or student fidgets more in seat, student is able to complete more work or completes less work). Of the 27 participants, 13 (48%) reported a change in the target student's behavior following physical play activities. Of those 13, ten (77%) reported a positive change in behavior, two (15%) reported a negative change in behavior, and one (8%) reported both positive and negative changes in behavior. Three participants (11%) reported no changes in the target student's behavior following physical play activities. Eleven participants (41%) did not respond to this question.

Examples of positive changes in the target student's behavior include:

Yes, he is calmer.

Yes, I have noticed a calmer student on days when they are doing an activity in gym that is very active.

Fewer prompts after play.

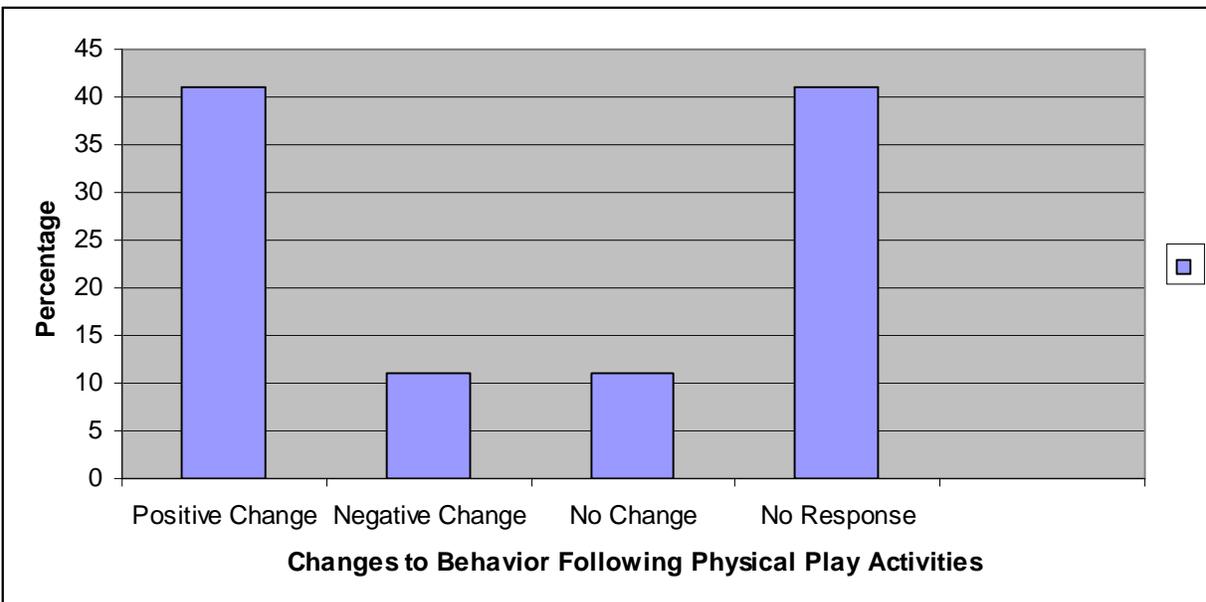
Examples of negative changes in the target student's behavior include:

It usually takes such a child longer to 'calm down' and get back into the academic work after such activity. They have a harder time letting go of the physical activity.

Typically it takes the student additional time to wind down.

Figure 25 shows the types of changes in the target student's behavior following physical play activities and the percentage of teachers reporting.

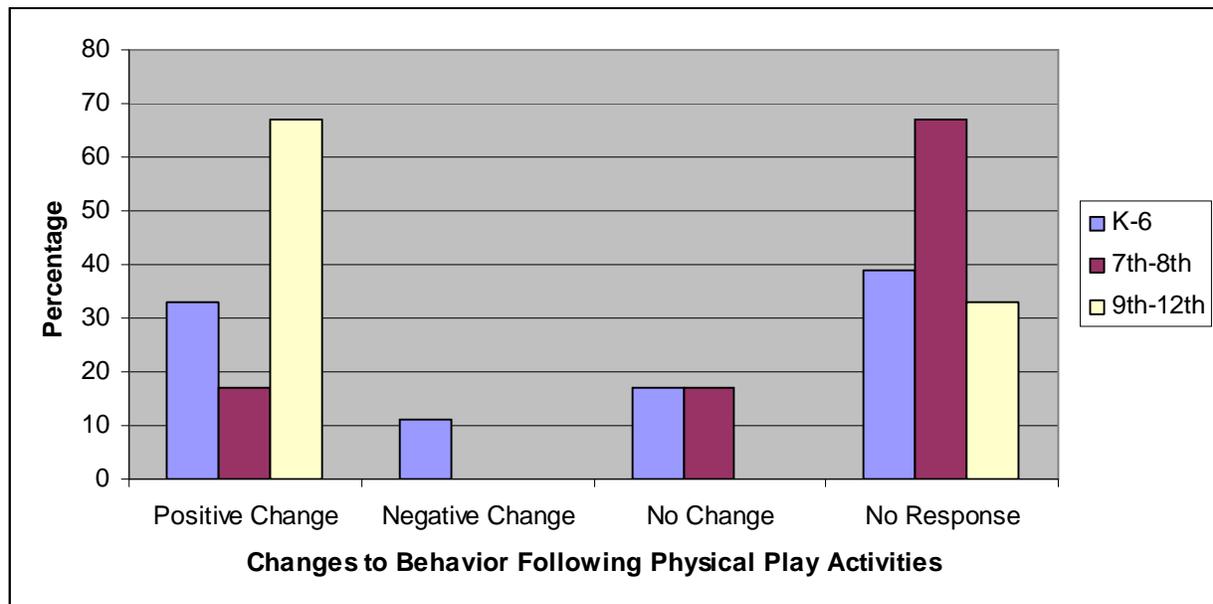
Figure 25. Percentage of Teachers Reporting Changes in Target Student's Behavior following Physical Play Activities.



By grade taught. Teachers in grades Kindergarten through sixth reported the most positive changes in the target student's behavior, with seven (39%) reporting, the most negative changes, with two (11%) reporting, and the most absences of change, with three (17%) reporting.

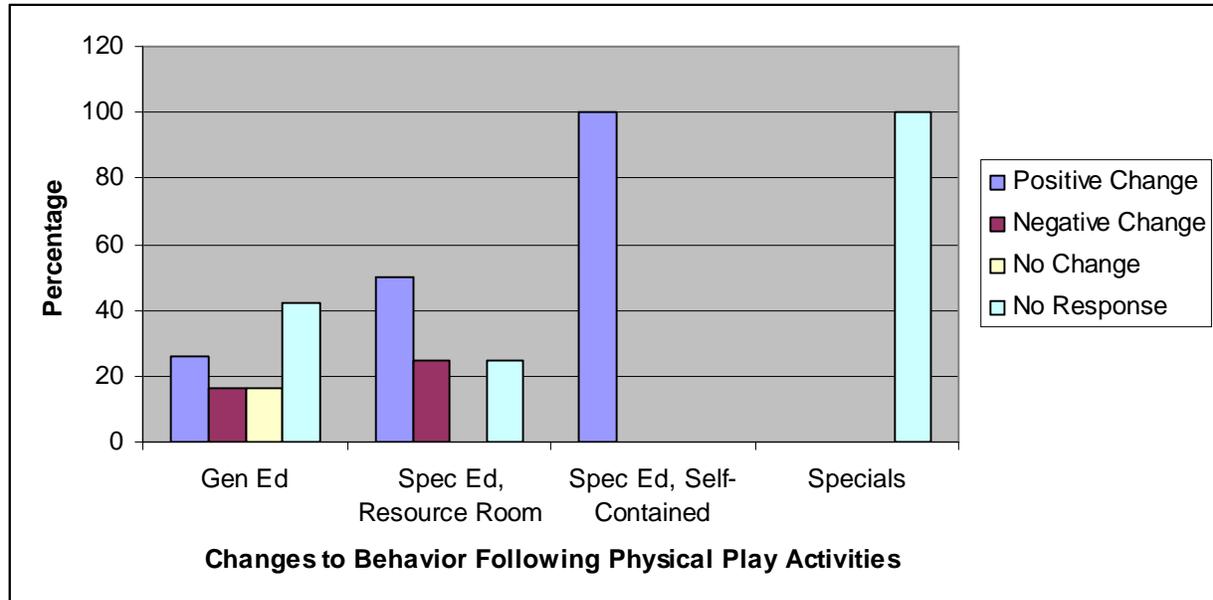
Teachers in grades seven and eight reported one (17%) each for positive change and no change. Two teachers in grades nine through twelve (67%) reported positive changes.

Figure 26. Changes in Target Student’s Behavior following Physical Play Activities by Grade Level.



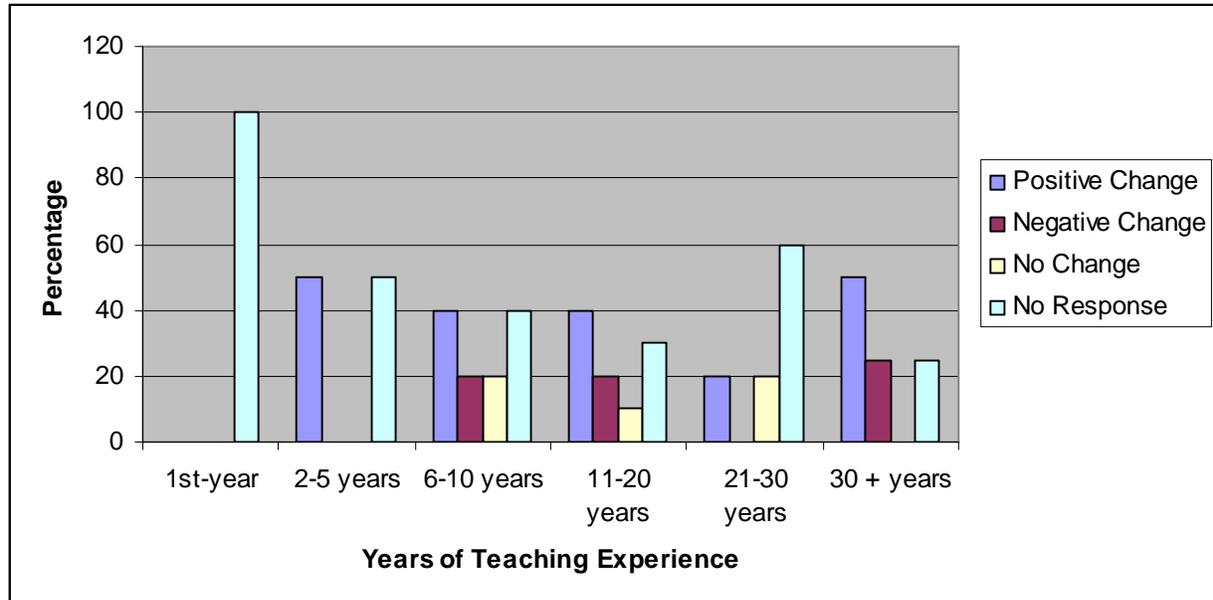
By type of classroom. General education teachers reported the most positive changes, with five (26%) reporting, the most negative changes, with three (16%) reporting, and the most absences of change, with three (16%) reporting. Two teachers in special education resource rooms (50%) reported positive changes and one (25%) reported a negative change. Three teachers in special education self-contained classrooms (100%) reported positive changes. No teachers from specials responded.

Figure 27. Changes to Target Student's Behavior following Physical Play Activities by Classroom Type.



By years taught. Teachers with 11-20 years of teaching experience reported the most positive changes, with four (40%) reporting. Teachers with 6-10 and more than 30 years each had two reporting positive changes (40%; 50%). Teachers with 2-5 and 21-30 years each had one reporting positive change (50%; 20%). Negative changes were reported by one teacher with 6-10 years (20%), two teachers with 11-20 years (20%), and one teacher with more than 30 years (25%). No changes were reported by one teacher with 6-10 years (20%), one teacher with 11-20 years (10%), and one teacher with 21-30 years (20%). No first-year teachers responded.

Figure 28. Changes to Target Student's Behavior following Physical Play Activities by Years Taught.



Discussion, Recommendations and Conclusion

Discussion

This study was designed to examine teacher perceptions of the impact of physical play on hyperactive behavior in school-age children. The findings demonstrate that the majority of Kindergarten through twelfth grade teachers in one school district in rural southeastern Ohio perceive positive behavior changes in student with hyperactivity following engagement in physical play activities. Most teachers reported the target student as calmer, more focused, quieter in his/her seat, and requiring fewer prompts to remain on task following physical play activities. Strenuous activities, especially in gym/physical education classes, were more likely reported to have positive effects on hyperactive behavior following participation in these activities by the target student.

While positive behavior changes were reported following physical activity, negative behavior changes were also reported. Teachers that reported negative changes noted the

increased amount of time it took the target student to calm down immediately following a physical play activity. Teachers reported the difficulty the target student experienced transitioning back into seatwork activities in the classroom after engagement in physical play.

Below is a comprehensive examination of the differences among grade level taught, type of classroom, and number of years taught in teacher perceptions of the impact of physical play on hyperactivity in school-age children.

By grade level. Kindergarten through sixth grade teachers and seventh and eighth grade teachers reported more characteristics of hyperactive behavior describing their target student than teachers in grades nine through twelve, with teachers in grades Kindergarten through sixth grade reporting the most. This trend in reporting is not unexpected, given what is known about child development in relation to motor activity. Younger children have a greater need to move than do older children, regardless of the presence of hyperactivity. The data showed that younger children were reported as having more hyperactive behaviors relating to motor activities, such as being out of their seats or engaging in physical activities at inappropriate times in inappropriate settings. Older children's hyperactive behavior tended to be verbal or contained to one location in nature, such as talking out of turn or fidgeting in seat.

Kindergarten through sixth grade teachers also spent more time addressing hyperactive behavior during the school day. While the majority of seventh and eighth grade teachers spent ten minutes or less, the majority of Kindergarten through sixth grade teachers spent 15-30 minutes addressing the behavior. The majority of teachers in grades nine through twelve spent ten minutes or less per day. Given that students spend a greater amount of time with their teacher in Kindergarten through sixth grade classrooms, teachers in these grades would have more time to spend addressing hyperactive behavior.

Verbal prompts were used in the majority of all grade levels to deal with hyperactive behavior. Another popular method of dealing with hyperactive behavior was “other,” though, without a specification, this method remains unknown. What should be noted is that only one teacher in all grades chose the method of sending the student to the principal’s office and only one teacher in all grades chose the method of isolating the student outside of the classroom.

Teachers in grades Kindergarten through sixth reported more types of physical activities offered during the school day and more time for students to engage in these activities. Students in grades nine through twelve had only physical education class as a type of physical activity during the school day. All but one teacher in grades seven and eight reported access to both recess and physical education class. The increased time for and availability to physical activities for the younger students is not unexpected because they typically have an increased amount of energy as they’re developing. These students would need more breaks throughout the school day to release their energy.

More positive behavior changes were reported for students in grades Kindergarten through sixth than either grades seven and eight and nine through twelve. Teachers in grades Kindergarten through sixth also worked with the target student more throughout the day in relation to engagement in physical play activities, which makes it easier for teachers in these grades to perceive behavior changes following physical play activities.

By type of classroom. General education teachers (n=19), as a majority, had the highest reports of using verbal prompts (74%) to deal with hyperactive behavior. More special education teachers (50% for resource rooms and 33% for self-contained classrooms), particularly reported using “other” more frequently.

Special education teachers reported students spending more time in recess than

general education teachers (30-60 minutes versus 15-30 minutes), but general education teachers reported students spending more time in physical education classes than special education teachers (seven general education teachers reported 31-60 minutes per day, while only three special education teachers reported the same amount of time). Results were variable for times spent in games that involve active movement.

Both general education and special education teachers in self-contained classrooms reported seeing the target student more throughout the day in relation to engagement in physical play activities than did special education resource room teachers or specials teachers. Given the lower frequency with which students visit either special education resource rooms or specials classrooms, this finding is not unexpected.

By years taught. Teachers with 11-20 years of teaching experience perceived the target student as having several of the characteristics of hyperactive behavior. Talking out behavior was reported more frequently for this group than any of the others. Teachers with 6-10 years of experience, 21-30 years of experience, and more than 30 years of experience most closely matched one another on perceptions of hyperactive behavior. Both the first-year teachers and teachers with 2-5 years of experience reported fewer characteristics.

Teachers with 11-20 years of teaching experience perceived the most positive changes in behavior following physical play activities than any of the other groups. Results for behavior changes were similar between teachers with 6-10 years of experience and more than 30 years of experience. The least amount of responses came from first-year teachers and teachers with 2-5 years of experience. The additional years of teaching experience for teachers with 11-20 years may have contributed to the increase in perceived positive changes for this group. Having worked in a classroom for longer, these teachers would have a better understanding of all types

of behavior in the classroom and would be more aware of changes in behavior. Teachers with less teaching experience may not have witnessed certain types of behavior and would not perceive changes in behavior as easily.

While results showed that positive changes were perceived by a majority of teachers with several years of teaching experience, there are limitations to the ability of these results to generalize to the entire population of teachers. The following section discusses the limitations of the current study, as well as offers recommendations for future research on the impact physical activity has on hyperactive behavior in school-age children.

Limitations and Recommendations for Future Research

The findings of this study demonstrate that teachers in grades Kindergarten through sixth generally perceive more positive changes in hyperactive behavior following engagement in physical play activities. However, the limitations of this study must be taken into consideration before the results can be generalized to other populations. The first, and perhaps most significant limitation, is the very small sample size. It is possible the study findings would not generalize to the larger population. Only three teachers in grades nine through twelve participated in this study, along with only one special teacher. Results from these participants would not necessarily generalize to the larger population of teachers in grades nine through twelve or teachers of specials.

Second, problems presented themselves in questions seven, eight, and nine of the survey, which asked for length of time, in minutes, the target student engaged in each of the physical play activities mentioned (e.g., recess, physical education class, games that involve active movement). Since the context within which the minutes took place (e.g., during the day or during the week) was not specified within the question, teachers answered with both minutes per

day and minutes per week. This became a problem when teachers simply entered a number and did not specify if the number referred to minutes per day or minutes per week. In this case, some responses had to be eliminated, thus skewing the results.

Third, several teachers did not respond to the open-ended question that asked them to note changes to behavior perceived following the target student's engagement in physical play activities. Those who chose not to fill out this question may have felt having to answer the question too time-consuming. Some teachers provided responses that showed both positive and negative results, and some teachers provided responses that did not accurately address the question. All of these factors combined contributed to an incomplete data set.

A final limitation of this study to be noted is the method of data collection as teacher-report. No data was collected from students or confirmed through observation. Perhaps future research in this area could include an observation component to compare teacher perceptions to the observations of an unbiased party. This kind of research could offer the fresh perspective of an individual not familiar with the target student and would have no preconceived notions about his/her behavior. Also, it would be interesting to compare teacher perceptions of hyperactive behavior to the target student's perceptions of hyperactive behavior to see how students perceive changes to their behavior following engagement in physical play activities.

Conclusion

Findings from this study add to the research on the impact of physical play on hyperactive behavior, as noted in a school setting. While the majority of behavior change was found to be positive following engagement in physical play activities, there were reports of negative behavior changes following such activities. These findings relate to previous research findings that promote exercise, games, and physical activity to help alleviate

hyperactive behavior in school-age children (Brandau & Pretis, 2004). This research also suggests that offering more opportunities for vigorous physical activity during the school day may have a calming effect on students with hyperactivity. Though perspectives from administrators, who have the authority to implement permanent schedule changes that would allow for increased physical activity during the school day were not included in this study, this research shows that teachers value physical activity as a healthy intervention strategy for students with hyperactivity.

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Appendix A

Teacher's Perceptions on the Impact of Physical Activity on Hyperactive Behavior Survey

1. Keeping in mind a student in your class whom you would perceive as “hyperactive,” which of the following characteristics of hyperactivity best describes this student? (Check all that apply)
 - a. Talks out of turn or blurts out answers
 - b. Fidgets or moves around in seat; appears restless
 - c. Is out of seat constantly, often at inappropriate times (e.g., during instruction)
 - d. Engages in physical activities (e.g., running, climbing) in inappropriate settings (e.g., classroom, lunchroom) or at inappropriate times (e.g., during instruction, in transition from subjects or places)
 - e. Is bored or loses focus easily; seems to need constant stimulation
 - f. Talks to classmates at inappropriate times (e.g., during instruction, during independent seatwork)
 - g. Has trouble finishing things; likes to move from task to task or tries to multi-task
 - h. Has trouble waiting in line or waiting for turn during activities
 - i. Seems to have energy all the time, even with less sleep
 - j. Is noticeably loud or noisy during unstructured play times (e.g., recess, free time within the classroom)

2. On average, how often does the target student engage in hyperactive behavior during the school day?
 - a. Rarely
 - b. Seldom
 - c. Often
 - d. Very often
 - e. Constantly

3. Approximately how much time do you spend addressing the target student's perceived hyperactive behavior during the school day?
 - a. 10 minutes or less
 - b. 15-30 minutes
 - c. 31-45 minutes
 - d. 46-60 minutes
 - e. More than 60 minutes

4. What is your primary method of dealing with the perceived hyperactive behavior?
 - a. Verbal prompts
 - b. Isolating the student in the classroom
 - c. Isolating the student outside of the classroom (e.g., “time-out” in hallway, “time-out” in another teacher's classroom)
 - d. Sending the student to the principal's office
 - e. Other

5. What types of the following physical play activities are available at your school? (Check all that apply)
- Recess
 - Physical education class
 - Games that involve active movement (e.g., musical chairs, “Simon Says,” tag, “Follow the Leader”)
6. How often does the target student engage in any of the aforementioned activities?
- 3-5 times per WEEK
 - 1-2 times per WEEK
 - More than 3 times per DAY
 - 1-3 times per DAY
 - Other
7. Approximately how long, in minutes, does the target student engage in recess?
8. Approximately how long, in minutes, does the target student engage in physical education class?
9. Approximately how long, in minutes, does the target student engage in games that involve active movement?
10. When do you generally see the target student in your classroom? (Check all that apply)
- Prior to physical play activities
 - Following physical play activities
 - Both prior to and following physical play activities
 - During physical play activities
 - Both c and d
11. Do you notice any changes in the target student’s behavior following any physical play activities (e.g., student requires fewer or more prompts to remain on task, student remains seated quietly for longer periods of time or student fidgets more in seat, student is able to complete more work or completes less work)? If yes, please explain:
12. What grade level do you teach?
- Preschool
 - Kindergarten-6th grade
 - 7th-8th grade
 - 9th-12th grade
13. In what type of classroom do you teach?
- General education class; lead teacher of single subject or several subjects

- b. General education class; intervention specialist or co-teacher
- c. Special education class; resource room
- d. Special education class; self-contained classroom
- e. Specials (e.g., music, art, physical education)
- f. Other

14. How many years have you been teaching?

- a. 1st-year teacher
- b. 2-5 years
- c. 6-10 years
- d. 11-20 years
- e. 21-30 years
- f. More than 30 years

Thank you for taking the time to complete this survey!