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SOCIAL INTERACTIONS OF STUDENTS WITH AUTISM
IN GENERAL PHYSICAL EDUCATION

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SOCIAL INTERACTIONS OF STUDENTS WITH AUTISM IN GENERAL PHYSICAL EDUCATION

By

Mary Martha Douglas

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ABSTRACT

SOCIAL INTERACTIONS OF STUDENTS WITH AUTISM
IN GENERAL PHYSICAL EDUCATION

By

Mary Martha Douglas

The purpose of this study was to examine the nature and frequency of social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides) during various tasks in general physical education (GPE), relative to social interactions in other education settings. A multiple-case study approach was used to investigate the research questions. This study used observational data supplemented by qualitative field notes. Each of two cases were comprised of a student with autism, a comparison classmate without disability, and a shared GPE and academic class. Each case was observed for five class sessions in both GPE and an academic class (i.e., math or social studies). Behavioral observations were coded using the Analysis of Inclusion Practices in Physical Education, Form S-Revised (AIPE-SR, Hodge & Hersman, 2007), the Academic Learning Time form and its specific physical education adaptation (ALT-PE, Siedentop et al., 1982), and the Behaviors of Eating and Activity for Children's Health Evaluation System (BEACHES, McKenzie et al., 1991). Data were analyzed using basic descriptive statistics, chi-square analyses, and visual analyses.

Results of the study revealed that students with autism did not interact with classmates at the same level as the comparison classmates. However, students with autism did interact more with classmates during GPE than during the academic class. Students with autism were observed interacting more with aides than with classmates in all but one setting. Specifically, one participant with autism interacted more with

classmates than with the aide in GPE. The number of interactions of students with autism with their teachers was very low. In fact, in certain class sessions students with autism had no direct interactions with teachers.

Results indicated that the majority of interactions by students with autism were appropriate or positive in nature. The highest number of positive interactions occurred for both students with autism in GPE. Students with autism were observed having lower levels of inappropriate and off-task behaviors than their classmates. The students with autism and the comparison classmates had the highest number of interactions during the ALT-PE activity category.

The individuals in the setting, the tasks in which they engage, and the nature of the physical activity environment, should all be considered when evaluating social interactions among students with autism in GPE and academic settings. When there is a desire to foster social interactions, there must be time allowed for activity in the class. On the basis of this study, it is difficult to say conclusively that GPE is an environment which fosters social interactions for students with autism, but it does support the claim that GPE may be a more social environment than academic classes. GPE was found to be a unique educational setting in which appropriate and positive interactions with classmates were fostered in all students, including students with autism.

DEDICATION

This dissertation is dedicated to my parents for their never-failing love, support, guidance, encouragement, humor, and friendship.

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CHAPTER 1

INTRODUCTION

Individuals with autism typically demonstrate deficits in both social skills and physical activity. Difficulty with social skills is an extremely prominent feature of autism and is most likely exacerbated by difficulties in communication. Due to unique behavioral characteristics, individuals with autism are frequently excluded from physical activity. As a result they may not acquire the physical skills necessary to perform at the same levels as classmates, or peers, without disabilities. This lack of physical skill may translate into isolation in physical activity settings, which could further impede social skill development. Extant research suggests that both social skill problems and physical activity problems can be addressed in general physical education (GPE).

Overview of Problem

McConnell (2002) states that "it is accepted as a logical truism and empirical fact that children and adults with autism demonstrate some delays, deficits, or atypical characteristics in the frequency, types, and quality of social interactions and social relationships with other individuals" (p. 351). In fact, social difficulty is one of the most defining characteristics of autism. Inadequate social skills are an essential feature of the original description of autism (Kanner, 1943). This unique characteristic has been a component of almost all diagnostic classification systems for autism (McConnell, 2002). Obvious social difficulties have led researchers to focus on describing the developmental path of social interactions, and caused considerable attention to be placed on creating interventions to facilitate social skill development (McConnell, 2002; Rogers, 2000).

Individuals with autism present a heterogeneous set of behavioral characteristics, which can cause significant problems in social interactions with others (Coyne & Fullerton, 2004; Howlin, 1986; Reid & Collier, 2002). Often, the behavior of an individual with autism "does not fit into others' perceptions of what is 'normal'" (Coyne & Fullerton, 2004, p. 18). An individual with autism may have trouble initiating or maintaining a conversation, repeat words or phrases, show preference to being alone, throw tantrums, or make little to no eye contact (Autism Society of America, 2008). Howlin (1986) noted that social interactions with an individual with autism may also be limited due to his or her lack of reciprocity, lack of cooperative play, lack of empathy to others' feelings, or even spending a large amount of time engaged in stereotypic behaviors. Social skills such as sharing or turn-taking are generally under-developed as well (Coyne & Fullerton, 2004). It has been shown that the more severe the social skill deficits, the less likely it is for an individual with autism to form peer relationships (Orsmond, Krauss, & Seltzer, 2004).

Language and communication difficulties may limit or influence social interactions among individuals with autism and others (Garfin & Lord, 1986). The production of verbal and nonverbal language can present problems for an individual with autism (Garfin & Lord, 1986). Children with autism are less likely to engage in spontaneous talking, and instead are likely to focus on specific topics of conversation (Garfin & Lord, 1986), such as dinosaurs or cars. They may also be less successful than youths without disabilities in using language to communicate their thoughts, feelings, or needs (Tager-Flusberg, 1981). Approximately 40% of children with autism are completely nonverbal and may communicate through grunts or gestures (Powers, 2000).

However, qualitative differences have even been found in the use of gestures by children with autism (Hermelin & O'Connor, 1985). Children with Down syndrome and children without disabilities have been found to use a far wider range of gestures than children with autism. Children with autism often use gestures as attempts to stop the interaction and convey the message "go away" or "be quiet" (Hermelin & O'Connor, 1985).

Along with language production deficits, comprehension difficulties of both verbal and nonverbal language can impact social interactions for individuals with autism (Garfin & Lord, 1986). Children with autism frequently have difficulty responding appropriately to nonverbal communications, including facial expressions, tone of voice, and gestures (Powers, 2000; Ricks & Wing, 1976). They may have trouble picking up cues about the affect, attitude, and feelings of others. This may lead to difficulty with empathy, which can inhibit social interactions (Garfin & Lord, 1986). Comprehension of verbal language about abstract concepts such as space, time, and emotions are often difficult for individuals with autism. Garfin and Lord (1986) note that, "even higher-functioning verbal children with autism may have a very difficult time interacting with nonhandicapped *[sic]* peers due to subtle but significant comprehension deficits involving the failure to understand colloquial expressions, humor, and more abstract concepts and ideas" (p. 141).

These behavioral and communication characteristics often limit the amount of appropriate social interaction an individual with autism experiences, especially with others without disabilities (Fox, Dunlap, & Buschbacher, 2000). Challenging or problematic social behaviors such as tantrums, standing too close to another when speaking, or saying inappropriate things without knowing (Winnick, 2005), can pose

problems for parents, educators, therapists, and employers (Collier & Reid, 2003). Due to such behaviors, individuals with autism are often excluded from general education settings, community environments, and integrated work environments (Koegel, Koegel, & Dunlap, 1996). This separation and isolation can result in decreased opportunities for social interactions and development of friendships (Fox et al., 2000). Therefore an individual with autism, who may already have social deficits, now has even less opportunity to practice or learn from social interactions with others.

Social exclusion can further limit opportunities for physical activity and recreation, especially outside of school (Collier & Reid, 2003; Coyne & Fullerton, 2004). Most recreation or physical activities have social aspects (Coyne & Fullerton, 2004); thus, special attention to programming may be required to accommodate the social differences of an individual with autism (Coyne & Fullerton, 2004). Collier and Reid (2003) note that "it is a sad reality that significant behavioral problems make it very difficult to include students with ASD [autism spectrum disorder] in community recreation programs" (p. 36). Also, the preference of individuals with autism to be alone or work in isolated settings (Winnick, 2005) is not conducive to most physical activity or team-oriented programs.

Physical activity and recreation provide valuable opportunities for individuals with autism to engage in and learn from social interactions (Groft & Block, 2003). Physical activities are natural settings for promoting positive social interaction (Kitson, 1993; O'Connor, French, & Henderson, 2000; Reid & O'Connor, 2003; Schleien, Heyne, & Berken, 1988). Studies have found that game experiences help individuals with disabilities become more capable of socially interacting (Collard, 1981; Jansma, 1982;

Wehman & Schleien, 1981). Physical activity settings can frequently create game experiences. However, even though physical activities provide opportunities for social interactions, individuals with autism may be excluded from such settings due to behavioral or sensory issues.

Physical education in school may provide the bulk of physical activity for youths with autism (Pan, 2008; Pan & Frey, 2006), and may present a valuable venue for social interactions. In 2006, Pan and Frey conducted a study evaluating physical activity habits of school-age youths with autism, and found only 40% of participants with autism were involved in extra-curricular physical activity programs. Of the 40% of students with autism involved in extra-curricular physical activity, only 10% were high school students and 30% were elementary school students (Pan & Frey, 2006). In comparison, 37% of high school students and 84% of elementary school students without disabilities participate in at least one community-based physical activity (Kann, Warren, & Harris, 1999). Pan and Frey (2006) illustrated the lack of involvement by youths with autism, whether limited by access or preference, in physical activity programs outside of school. Since youths with autism are less involved in physical activity programs which could be an ideal venue for gaining valuable social interactions, they could have less opportunity to foster improved social skills.

As the number of students with autism continues to rise, inclusive physical education will increasingly have students with autism present (Block, 2006). Autism is one of the fastest growing disability groups in the United States of America (Block, 2006). The Autism Society of America (ASA) reports that 1 in 166 babies born today will develop an autism spectrum disorder (ASA, 2008). Statistics from the U.S.

Department of Education show considerable increases in the number of children with autism, ages 6-21, served by the Individuals With Disabilities Education Act (IDEA) between 1992 and 2000. Overall, the 50 states plus Puerto Rico and the District of Columbia, reported a total of 12,222 children with autism in 1992-1993 and 65,396 children in 1999-2000, ages 6-21, served under the Individuals with Disabilities Education Act, a staggering increase of 435% (United States Department of Education, 2001). Block (2006) notes that these prevalence rate increases, along with now commonly practiced inclusion in GPE (Block, 2007; DePauw & Doll-Tepper, 2000), make it possible that physical educators will have many children with autism in their classrooms. Therefore, youths with autism are likely to experience most of their physical activity time alongside peers without disabilities during inclusive physical education classes.

Proponents of the philosophy of inclusion claim that there are several social benefits to be gained from inclusion practices in all aspects of education (Block, 2007; Snell & Eichner, 1989; S. Stainback & Stainback, 1990). Block (2007) compiled a succinct list of benefits of inclusion as originally proposed by Downing (2002), Snell and Eichner (1990) and S. Stainback and Stainback (1990). Social benefits include: (a) the opportunity to learn appropriate social skills in integrated, natural environments, (b) the potential to develop new friendships with peers without disabilities, (c) the potential to interact with age-appropriate role models with disabilities, and (d) the opportunity to practice social skills in an integrated environment, which eliminates need to generalize to other integrated environments. All of these benefits are tied with engaging in social interactions with other students, specifically those without disabilities. Inclusive general

physical education, or GPE, may be an environment in which individuals are encouraged to interact (Kitson, 1993; O'Connor et al., 2000; Reid & O'Connor, 2003; Schleien et al., 1988) and may allow individuals to acquire the aforementioned social benefits. Due to potential exclusion based on challenging behaviors, youths with autism may not have opportunities for such interactions through venues such as extra-curricular physical activities. Therefore, GPE may provide a unique and valuable opportunity to gain important social interactions.

However, research has only just begun to investigate the actual social benefits, effects, or outcomes of inclusion in GPE settings for youths with disabilities (Block, 2007). The extant literature mainly focuses on the social inclusion of youths with physical disabilities (Blinde & McCallister, 1998; Goodwin & Watkinson, 2000; Hutzler, Fliess, Chacham, & van den Auweele, 2002; Place & Hodge, 2001; Vogler, Koranda, & Romance, 2000), and the results are not all positive. Students with physical disabilities have reported negative feelings such as being left out, neglected, or teased in GPE (Blinde & McCallister, 1998; Goodwin & Watkinson, 2000; Hutzler et al., 2002; Place & Hodge, 2001). Only one prior study has investigated the interactions and social acceptance of children with autism in physical education (Lisboa, 1997). Lisboa (1997) found that youths with autism demonstrated interaction levels that "were much higher with classroom aides than with teachers, and very low with peers" (p. 1). Therefore, it appears that students with autism may not be obtaining the valuable social interactions which the physical education environment may provide.

Significance of the Problem

Despite advances in knowledge, "quality of life for children with autism remains poor, with a majority having little or no social support, meaningful relationships, future employment opportunities or self-determination" (Burgess & Gutstein, 2007, p. 83). Individuals with autism have been found to have low levels of peer relationships, friendships, and participation in social and recreational activities (Orsmond et al., 2004). The availability of a supportive social network, which social competence is necessary to create, may have a significant outcome on the quality of life of an individual with autism (Lord & Venter, 1992). Generally found domains of quality of life are interpersonal relationships, social inclusion, personal development, physical well-being, rights, environment, family, recreation and leisure, and safety/security (Verdugo, Schalock, Keith, & Stancliffe, 2005). All of these domains require social skills.

Lacking social skills during childhood has been found to be the best single predictor of significant adjustment problems during adulthood for children with disabilities (Strain & Odom, 1986). Woods and Wetherby (2003) noted that "communication competence may be the primary factor determining the extent to which individuals with ASD develop relationships with others and participate in daily activities and routines at school, at home, and in the community" (p. 180). Without social competence individuals with autism may not be able to communicate their needs and thoughts, or establish appropriate relationships with others. This creates risk that the individual may not be accepted by others, may experience increased difficulties in school, may acquire mental health problems, and perhaps be under or unemployed during adulthood (L. K. Elksnin & Elksnin, 1995; N. Elksnin & Elksnin, 1998, 2001).

Renty and Roeyers (2006) conducted an empirical analysis of disability and support characteristics associated with the quality of life of adults with autism spectrum disorders. Only a minority of adults with high-functioning autism or Asperger syndrome "had received a college or university education, lived semi/independently, had close, spontaneous friendships, were married, or had a paid job" (Renty & Roeyers, 2006, p. 512). Using self-report measure, 58 adults with high-functioning autism or Asperger syndrome reported information about the severity of their autism, perceived information support, received formal and informal support, and demographics. Results indicate that more than 75% of participants lived with parents or other caregivers, and only 50% were employed: "half of them held a mainstreamed job, the others were engaged in sheltered or supported employment or were in a day activity program" (Renty & Roeyers, 2006, p. 519). The findings also showed that perceived informal support was significantly related to quality of life, while actual received informal support was not found significant. This study supported the notion that personal well-being is linked more strongly to the perceptions of available support, rather than to actual support received (Kessler & McLeod, 1985; Renty & Roeyers, 2006).

Social skill deficiencies are one of the main reasons students with disabilities are unsuccessful in the transition from school to employment and independent living (Chadsey-Rusch, Rusch, & O'Reilly, 1991; Edgar, 1987, 1988). Appropriate social skills are critical to overcoming any possible stereotypes held in the workplace (Gaylord-Ross, Stremel-Campbell, & Storey, 1986). For example, supervisors or coworkers may hold negative stereotypes about individuals with autism. They may believe that individuals with autism do not want to be social. If the employee with autism has developed

appropriate social skills, he or she could be able to combat this misconception. Combating stereotypes through social competence may lead to a more successful employment experience (Gaylord-Ross et al., 1986). Quality of life may also be significantly improved if the individual is provided with the skills to share interests and activities with others, and can access resources available in the community, such as recreation programs or public transportation (Rusch, Chadsey-Rusch, & Johnson, 1991).

Social support has been found to be highly predictive of quality of life in individuals without autism (Bramston, Chipuer, & Pretty, 2005; Brown & Brown, 2005; Caron, Lecomte, Stip, & Renaud, 2005; Helgeson, 2003), and recent findings illustrate the importance of perceived support for individuals with autism (Burgess & Gutstein, 2007; Kennedy & Shukla, 1995; Renty & Roeyers, 2006). Bauminger and Kasari (2000) illustrated the importance of investigating both the structural and functional aspects of social support for individuals with autism. It was not the number of friends which mattered, but rather the quality of the friendship which predicted whether or not a child with autism experienced feelings of loneliness (Bauminger & Kasari, 2000). When the children with autism perceived their friendship to be lacking intimacy, emotional enrichment, and reciprocity, there were significant feelings of loneliness. Therefore, Burgess and Gutstein (2007) concluded that "even if a child with autism might have a structural social network at school, the functional friendships – those resulting in invitations to birthday parties, sleep-overs, or games – may impact QoL [quality of life] more profoundly" (p. 82). Kennedy and Shukla (1995) reminded readers that, "social relationships are as important to people with autism as they are to any other member of society" (p. 21).

More mature levels of social competence can allow an individual to become an effective member of the community, become more independent, experience increases in social acceptability, and allow for increased quality of life (Bellack, 1983; Harris, 1998). For example, an active member of the community must be able to greet other individuals, make purchases in stores, use community resources such as buses, or participate acceptably in leisure activities. Harris (1998) states, "countless social skills are necessary to be a competent adult in an industrialized society" (p. 199). It appears that several social skills can be developed and refined through peer interactions (Odom, McConnell, & McEvoy, 1992). Odom and colleagues (1992) express that, "if a child can achieve a level of social competence that allows participation in interactions with mutually preferred playmates, such interactions have the potential for positive ramifications in other areas of development" (p. 23). Social skills are connected with being accepted by others, increases in academic success, and high levels of self-esteem and self-confidence (L. K. Elksnin & Elksnin, 2003). Access to appropriate support provides individuals with autism with more opportunities to develop social relationships (Howlin & Yates, 1999), to find and hold suitable jobs (Hurlbutt & Chalmers, 2004), to live independently (Tantam, 2003), and to decrease psychological distress (Tantam, 2003). When social skills remain underdeveloped, individuals may face social rejection, experience difficulties in school and employment, and suffer mental health problems (L. K. Elksnin & Elksnin, 1995; N. Elksnin & Elksnin, 1998, 2001).

Social interactions, especially with peers, also offer numerous natural learning opportunities for children (Odom et al., 1992). When the interactions are active and positive they may influence the development of cognitive, language, and communication

skills (Odom et al., 1992). Cognitive psychologists have noted the importance of social interaction for the development of more advanced types of cognition (Piaget, 1926; Vygotsky, 1978). Social interactions can provide new ways of comprehending concepts or situations, which may allow the child to develop new, potentially advanced understandings (Piaget, 1926; Vygotsky, 1978). Social interactions can advance communication skills by allowing children to learn to take turns during conversations (Black, 1989), to engage in "salient conversations" with peers (J. G. Parker & Gottman, 1989), and to develop effective communication strategies between each other (Strayer, 1989). Research has shown that when social interactions were increased between children with and without disabilities, significant changes occurred in the language development of the children with disabilities (Jenkins, Odom, & Speltz, 1989).

Purpose of the Study

Social interactions are the building blocks of social competence (Odom et al., 1992), and physical education presents a unique and potentially valuable setting in which individuals with autism may engage in social interactions. Therefore, the purpose of this study was to examine the nature and frequency of social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides), during various tasks in multiple educational settings, including general physical education (GPE). To obtain these data, a multiple-case study approach was used (Yin, 2003). Direct observation and video-camera recordings were employed to allow for multiple sources of data collection. Several observation instruments, the Analysis of Inclusion Practices in Physical Education, Form S-Revised (AIPE-SR, Hodge & Hersman, 2007), the Academic Learning Time-Physical Education (ALT-PE, Siedentop et al., 1982), and the Behaviors

of Eating and Activity for Children's Health Evaluation System (BEACHES) (McKenzie et al., 1991) were used to assess social interactions and tasks. Data analyses included frequency and time spent in various social interactions and tasks during diverse educational settings.

Need for the Study

This descriptive study allowed for further understanding of the occurrence and nature of social interactions between youths with autism and others. Because social competence and skills are often lacking in youths with autism (McConnell, 2002; Rogers, 2000), and physical education provides a possible beneficial environment for gaining social interactions (Groft & Block, 2003), this study assessed any potential interactions between these factors. If physical education does provide a social environment unique from the typical classroom, then it becomes important to understand whether or not it is actually fostering social interactions. Due to the high prevalence rates of youths with autism and the common practice of inclusion in GPE, it is critical to learn what is naturally occurring in the GPE setting. Are youths with autism interacting with other individuals in GPE, and if so, what is the nature of these interactions?

These baseline data on interactions and tasks can be utilized to set the social goals of an intervention or treatment (McGee, Feldman, & Morrier, 1997). Data on the naturally occurring levels of social behavior are critical to setting appropriate intervention goals (McGee et al., 1997). McGee and colleagues (1997) stated that a common occurrence in social skill interventions has been to increase interaction rates to unnaturally high levels, risking temporary and potentially bizarre interaction patterns that

cannot be sustained in natural environments (McConnell, Sisson, Cort, & Strain, 1990; Mirenda, Donnellan, & Yoder, 1983).

Understanding the tasks during which social interactions do, or do not, occur may help educators in designing lesson plans and classroom environments. This study could lead to information about best instruction practices to foster social interactions. For example, interactions may be seen when the student with autism is waiting in line with peers. Therefore, teachers may want to ensure that students are not standing in an isolated area while waiting, as it would not allow for interactions. If limited or negative social interactions were found in this study, it might influence how physical educators structure their learning environments. Physical educators may begin to understand the necessary social interactions their classroom could afford a student with autism.

Little is known about the types and amounts of social interactions that occur between students with disabilities and their peers in GPE (Block & Obrusnikova, 2007; Lisboa, 1997; Place & Hodge, 2001). Students with physical disabilities have been found to experience social isolation and limited social interactions while in GPE (Blinde & McCallister, 1998; Goodwin, 2001; Goodwin & Watkinson, 2000; Hutzler et al., 2002; Place & Hodge, 2001). However, this literature has not been fully expanded to include students with autism (Lisboa, 1997). Therefore, this study intended to further expand the knowledge base to include youth with autism.

Research Questions

The following research questions aimed to understand how students with autism socially interact in various ways with other individuals during different tasks in the GPE setting.

1. How frequently do students with autism socially interact with other individuals (e.g., classmates, teachers, aides) in GPE?
2. What is the nature (e.g., positive, appropriate, inappropriate) of the social interactions that occur?
3. During which tasks (e.g., waiting, transition, activity) do the most social interactions occur?
4. Are there associations among the nature of the interactions and the tasks during which social interactions occur?

To further understand any unique contributions of GPE, these data were also collected in one academic class to serve as comparison data.

Definition of Terms

General physical education (GPE). Sherrill (2004) provided direct quotations from Title 34 of the *Code of Federal Regulations* to define physical education as: "the development of: (a) physical and motor fitness; (b) fundamental motor skills and patterns; and (c) skills in aquatics, dance, and individual and group games and sports (including intramural and lifetime sports)" (p. 113). In this project, GPE referred to physical education which includes students both with and without disabilities in the same space, time, and basic curriculum.

Class. A class was defined as the entire group of individuals who make up and are involved in the session.

Classmates. Classmates were defined as any other students involved in class session alongside the participant with autism.

Class session. A class session was defined as a single meeting, which may vary in time duration, of a class with the purpose of engaging in physical education or another academic topic, such as math or social studies.

Social interactions. Social interactions were defined and coded as stated in the Analysis of Inclusion Practices in Physical Education, Form-S Revision (AIPE-SR) (Hodge & Hersman, 2007). Hodge and Hersman (2007) include the following interaction categories; appropriate, positive appropriate, inappropriate, off-task interactions. The categories will be examined in detail in Chapter 3.

Tasks. Although tasks are usually defined as the physical activities, skills, or games of a physical education, because of the emphasis on social interactions, the ALT-PE and BEACHES categories were used to define the tasks. Select categories from ALT-PE, including activity, waiting, transitions, management, and knowledge, were used in this study. All five categories of the BEACHES physical activity scale (i.e., lying down, sitting, standing, walking, very active) were used in this study. The ALT-PE and BEACHES categories will be defined in detail in the method chapter.

Limitations

- This study was limited by the number of participants, which may influence generalizability. However, Yin (2003) states "that case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes" (p. 10). From this viewpoint, the goal of a case study is to expand and generalize theories (analytic generalization), not to add to frequencies (statistical generalization) (Yin, 2003).

- This study may be limited by the potential subjective and fluctuating nature of direct participant observation. When direct observation of behaviors is gathered by human observers, there is always a chance that the observers may not record the behavior consistently (Kazdin, 1982). The observers may have been reactive to reliability assessments, experienced observer drift, had certain behavior expectancies, or had trouble with the complexity of the observations (Kazdin, 1982).

Delimitations

- The researchers analyzed results in order to expand knowledge within a paradigm, rather than attempting to generalize across populations.
- As in Hersman (2007), this study was delimited to measuring the social interactions that occur between students only during physical education classes and one academic class; it was not intended to measure the interactions that occurred between students with and without disabilities outside these settings.
- To combat observer reliability issues, observers were highly trained before and throughout the data collection process, and the observation instruments were kept as simple as possible.
- To further ensure accurate and objective data, sessions in which data were being collected were video-taped and audio-recorded when appropriate for further analyses and reliability checks.

CHAPTER 2

REVIEW OF LITERATURE

This chapter focuses on extant research literature related to the social interaction behaviors of youth with autism in general physical education (GPE) settings. The nature of these social interactions is conceptualized as an interaction of three factors, namely the individuals in the setting, the tasks in which they engage, and the nature of the physical activity environment (see Figure 1). The first four sections of this chapter are devoted to an exploration of those factors, as well as the interaction of those factors as related to social interaction behaviors of students with autism in GPE. The fifth section of the chapter focuses on measurement of (a) social interactions, (b) the task, specifically the level of engagement in physical activity, and (c) the general physical education environment. This chapter concludes with implications of the literature review for this study.

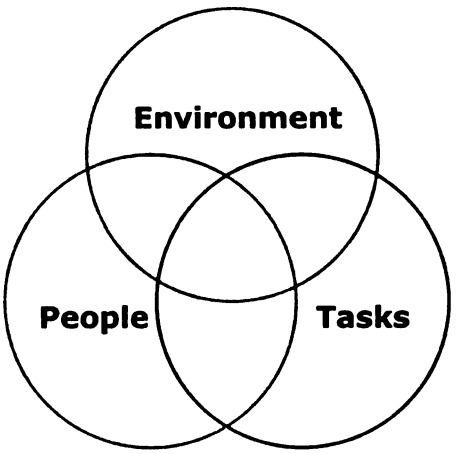

Figure 1. A visual conceptualization of three intertwining factors of social interaction.

People in the Setting

Students with Autism

Autism is one of five Pervasive Developmental Disorders (PDD) according to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* published by the American Psychiatric Association (2000). The DSM-IV-TR manual defines all PDD by severe and pervasive impairment in reciprocal social interaction, communication, and stereotyped behavior, interests, and activities. These impairments are defined in qualitative terms and must be "distinctly deviant relative to the individual's developmental level or mental age" (p. 69). Diagnostic criteria for autism must include six impairments (see Appendix A); at least two impairments in social interaction, one in communication, and one in restricted repetitive or stereotyped behavior. Within these guidelines it is clear that a diagnosis of autism may generate from very different behaviors. Therefore, individuals can share the diagnosis of autism, yet vary greatly (Reid & Collier, 2002). The DSM-IV-TR lists associated characteristics of autism which are frequently but not universally observed. These features include intellectual disability, hyperactivity, impulsivity and aggression, self-injurious behaviors, sleep disturbances, and temper tantrums particularly in young children (American Psychiatric Association, 2000). These features influence the heterogeneity of autism and provide challenges as functional levels may vary greatly between youths (Reid & Collier, 2002).

Social interactions. McConnell (2002) states that "it is accepted as a logical truism and empirical fact that children and adults with autism demonstrate some delays, deficits, or atypical characteristics in the frequency, types, and quality of social interactions and social relationships with other individuals" (p. 351). Social difficulty is

one of the most defining characteristics of autism, and is often the result of a rather heterogeneous set of behavioral characteristics (Coyne & Fullerton, 2004; Howlin, 1986; Reid & Collier, 2002). Often, the behavior of an individual with autism "does not fit into others' perceptions of what is 'normal'" (Coyne & Fullerton, 2004, p. 18). An individual with autism may have trouble initiating or maintaining a conversation, repeat words or phrases, show preference to being alone, throw tantrums, or make little to no eye contact (Autism Society of America, 2008). Howlin (1986) notes that social interactions with an individual with autism may also be socially limited due to his or her lack of reciprocity, lack of cooperative play, lack of empathy to others' feelings, or even spending a large amount of time engaged in stereotypic behaviors. Social skills such as sharing or turn-taking are generally under-developed as well (Coyne & Fullerton, 2004).

Descriptive and basic experimental research has demonstrated that children with autism often score below peers without disabilities, and sometimes below children with other disabilities, on formal social competence assessments (Lord, 1993; McConnell, 2002; Rogers, 2000). McConnell (2002) notes that, "social interaction deficits for young children with autism may reflect deficits in essential social skills" (p. 354). In 1995, Lord and Magill-Evans conducted naturalistic observations at a day camp. The campers were between the ages of 5 and 16 years old. Observations were of children with autism, children with behavior disorders, and children without disabilities. Results showed the children with autism spent less time socially interacting with peers than children without disabilities, and when the campers with autism did interact with peers, they were "lower-quality" interactions. Children with autism also spent more time at greater physical

distances from peers, and they spent more time engaged in meaningless or no activity than peers without disabilities (Lord & Magill-Evans, 1995).

McGee and colleagues (1997) aimed to determine any potential differences in social behavior between children with and without autism in an attempt to help researchers understand appropriate goals of social skill interventions for children with autism. Participants in the study included 64 preschool children, of which half had the diagnosis of autism from at least two independent sources (McGee et al., 1997). Observations were conducted in regular classroom settings of three schools, "during free play, tabletop art and game activities, snack/lunch, circle time, and outdoor recess, as well as during transitions among these activities" (McGee et al., 1997, p. 357). Results indicated that the students with autism did engage in play, social interaction, and social participation. However, in comparison to the students without autism, those with autism spent less time in close physical proximity to peers, produced fewer vocalizations to others, were less focused on other children, and engaged in more atypical behavior (McGee et al., 1997).

Sigman and Ruskin (1999) conducted a longitudinal study, which assessed social competence and language skills of children with autism, Down syndrome, other developmental delays, and children without disabilities. The initial sample included "70 children with autism, 93 children with Down syndrome, 59 children with developmental delays, and 108 typically developing children *[sic]*" (Sigman & Ruskin, 1999, p. v), between the ages of 2 and 6 years old. The follow-up sample included, "51 children with autism, 71 children with Down syndrome, and 33 children with developmental delays" (Sigman & Ruskin, 1999, p. v), between the ages of 10 and 13 years old. The researchers gathered observation data in school settings, including structured classroom time, and unstructured recess play. Overall, children with autism were found to be less socially

engaged with classmates than the other children with developmental disabilities, and were less likely to respond to social initiations from peers (Sigman & Ruskin, 1999). However, when children with autism responded to initiations from peers, they maintained social interactions for as long as peers. Children with autism were also found to spend more time engaged in solitary play, and therefore spent less time in direct social play with other individuals. Sigman and Ruskin (1999) concluded that children with autism seem to be socially isolated due to their personal behaviors, not due to avoidance or lack of initiation from others. It is critical to note that, "for the children with autism, there were links between cognitive and language abilities, social responsiveness, and peer engagement" (Sigman & Ruskin, 1999, p. 100).

Children with autism engage in higher rates of repetitive or stereotypic behaviors, higher rates of self-injurious behavior, and lower rates of proximity to peers compared to children of similar ages without disabilities (Lord, 1993; McConnell, 2002). Engaging in these behaviors may decrease opportunities for social learning, ultimately having the potential to affect development of social skills (McConnell, 2002). Both experimental (Koegel, Koegel, Hurley, & Frea, 1992; Lee & Odom, 1996; Schleien et al., 1988) and descriptive research (Lord & Magill-Evans, 1995; Sigman & Ruskin, 1999) have provided evidence of an inverse relationship between rates of stereotypic and self-injurious behavior and social interaction or participation. It has even been proposed that some children with autism may use stereotypic behaviors because they provide greater reinforcement compared to social interaction, or may even use stereotypic behaviors as a method to end or reduce social interaction (Warren & Reichle, 1992).

Communication skills. Engaging in social interactions requires a certain level of communication between those involved, and individuals with autism present a unique set of communication characteristics. About 40% of children with autism do not speak at all and many others have echolalic speech (Powers, 2000). Many of the nonverbal children may use grunting, pointing or instrumental touching to communicate needs, and a minority may use a few words for similar purposes (Prior & Ozonoff, 1998). Children with autism are "more likely to reverse the pronouns *you* and *I*, engage in echolalic speech, and produce stereotyped or metaphorical language" than children without disabilities (Garfin & Lord, 1986, p. 142). It is rare for a child with autism to gain language skills if he or she has not done so by around six years of age (Prior & Ozonoff, 1998).

When children with autism are verbal, the communicative functions of language are often impaired or limited in significant ways (Prior & Ozonoff, 1998). Tager-Flusberg (1981) notes that these limiting abnormalities in speech have included concreteness, literalness, inability to initiate or sustain a conversation, ritualistic or inflexible language, and insensitivity to the listener's response during a conversation. The most universal deficit in the language of children with autism is associated with pragmatics, mainly language used to communicate socially (Tager-Flusberg & Anderson, 1991). This difficulty seems to transcend all levels of language competence in children with autism, as it can be seen in every child with autism to some degree (Prior & Ozonoff, 1998). Children with autism also have difficulty understanding and responding to complex questions (Prior & Ozonoff, 1998). Research literature that focuses surveys

or interviews towards youths with autism is minimal because of these communication challenges.

Along with language production deficits, comprehension difficulties of both verbal and nonverbal language can greatly impact social interactions for individuals with autism (Garfin & Lord, 1986). Children with autism often have difficulty responding appropriately to nonverbal communications, including facial expressions, tone of voice, and gestures (Powers, 2000; Ricks & Wing, 1976). This leads to further difficulty with social perspective taking, which can inhibit social interactions (Garfin & Lord, 1986; Woods & Wetherby, 2003). Comprehension of verbal language about abstract concepts such as space, time, and emotions are often difficult for individuals with autism. Garfin and Lord (1986) note that, "even higher-functioning verbal children with autism may have a very difficult time interacting with nonhandicapped *[sic]* peers due to subtle but significant comprehension deficits involving the failure to understand colloquial expressions, humor, and more abstract concepts and ideas" (p. 141).

Peer relationships. Peer relationships occur between same- or near-age cohorts, and are characterized by a history of interactions between the individuals who are familiar with each other (Rubin, Bukowski, & Parker, 1998; Smith, 2007). Friendship, a type of peer relationship, is conceptually bilateral in nature, and is dependent on people's perceptions of their relationship with another (Smith, 2007). Hartup (1996) discussed three critical dimensions to be considered when assessing the developmental significance of friendships. These dimensions include reciprocity and how one interacts with friends, the characteristics of one's friends, and the quality of friendships as seen through intimacy, esteem enhancement, and degree of conflict (Hartup, 1996). Peer relationships

and friendships can be fostered through physical activity participation, especially being a member of a team (Smith, 2007).

Without social competence, people cannot establish appropriate relationships with others, and are at risk of being rejected by others (N. Elksnin & Elksnin, 1998, 2001). Some research evidence suggests inclusive environments could increase the risk of social isolation and rejection (Chamberlain, Kasari, & Rotheram-Fuller, 2007). Chamberlain and colleagues (2007) asked 398 children in regular 2nd through 5th grade classes, which included 17 children with autism spectrum disorders (ASD), to report on "friendship qualities, peer acceptance, loneliness, and classroom social networks" (p. 230). The 17 individuals with ASD had fewer reciprocal nominations than students without ASD. Hence, individuals with ASD may have perceived a student without a disability to be their best friend, but the feelings were not mutual. The children without disabilities also reported that the relationships they had with the students with ASD were qualitatively different than those with peers without disabilities (Chamberlain et al., 2007).

Research has indicated that children and adolescents with autism rarely develop typical peer relationships or friendships (Konging & Magill-Evans, 2001; Le Couteur et al., 1989; Marks, Schrader, Longaker, & Levine, 2000). However, longitudinal research demonstrates that individuals with autism may show increased interest in developing social relationships during adolescence (Mesibov, 1983; Mesibov & Handlan, 1997; Rutter, 1970; Volkmar & Klin, 1995). This increase is sometimes accompanied by further development of social skills; however, the majority of people continue to have difficulty in the social aspects of life throughout adolescence and adulthood (Church, Alinsanski, & Amanullah, 2000; DeMyer, Hingtgen, & Jackson, 1981; Seltzer et al.,

2003). Orsmond et al., (2004) found only 8.1% of their sample of adolescents and adults with autism had at least one friend who was same-aged, mutually responsive, and with whom they engaged in reciprocal activities outside of organized settings. Almost half (46.4%) of the individuals with autism reported having no peer relationships that met all of those conditions (Orsmond et al., 2004). Even when friendships are reported by individuals with high-functioning autism, the friendships are often focused on common interests and involve limited social interaction (Bauminger & Kasari, 2000; Church et al., 2000).

Youths with autism have reported increased feelings of loneliness as compared to peers without disabilities (Bauminger & Kasari, 2000). Bauminger and Kasari (2000) evaluated loneliness and quality of friendships in 22 high-functioning children with autism and 19 peers without disabilities, ages 8 to 14, matched on intelligent quotient, chronological age, gender, mother's education and ethnicity. Data were collected individually for each child in a laboratory setting. Results indicated that when "compared to typically developing children, children with autism were both lonelier and had less complete understandings of loneliness" (Bauminger & Kasari, 2000, p. 447). All of the children with autism reported having a least one friend. However, when asked about their best friend, children with autism rated the friend as lower in quality in companionship, security/trust, and helpfulness than children without autism rated their best friends. The findings also suggested that children with autism may have difficulty understanding the emotional aspects of loneliness and friendship (Bauminger & Kasari, 2000).

Links have been found between self-perceptions and social relationships in children with high-functioning autism (Bauminger, Shulman, & Agam, 2004). Perceptions of friendship, along with the link between self-perceptions and social relationships, were investigated in 16 children with high-functioning autism and 16 matched peers without disabilities (Bauminger et al., 2004). Data collection involved a friendship picture recognition task, and three self-report measures about qualities of friendships, loneliness, and self-perception. Results indicated that for children with autism, "friendship correlated positively with cognitive competencies and general self-worth and negatively with loneliness" (Bauminger et al., 2004, p. 193). Children with autism also reported lower scores in perceptions of social competence than their peers without disabilities. These findings further support the importance of positive social interactions and friendships for individuals with autism.

Classmates without Autism

Classmates or peers without autism can be expected to demonstrate a wide range of social and communication skills (Smith, 2007). These skills include, but are not limited to, sharing, taking turns, helping other, listening, cooperation, being respectful, and being a friend (L. K. Elksnin & Elksnin, 1995). Social skills also include problem-solving, self-management, and decision making abilities that allow an individual to initiate and sustain positive social relationships (N. Elksnin & Elksnin, 1998). However, even when classmates without autism have developed these social skills, involving a child with a disability in the interaction could alter the behavior of the classmates without disabilities.

Several factors may influence the attitudes of classmates without disabilities toward the participation of individuals with disabilities in physical activity. Researchers have investigated the influence of gender of students without disabilities on their attitudes towards peers with disabilities (Archie & Sherrill, 1989; Tripp, French, & Sherrill, 1995; Verderber, Rizzo, & Sherrill, 2003). The results of such studies have been inconsistent. Archie and Sherrill (1989) found gender did not relate to attitudes toward their peers with disabilities. However, Tripp, French, and Sherrill (1995) found that females without disabilities had more favorable attitudes toward their peers with disabilities than did males. In 2000, females were again found to have more favorable attitudes than males, but the analysis showed that attitudes of males will improve with structured contact experience of peers with disabilities (Slininger, Sherrill, & Jankowski, 2000).

Other factors, including disability type and having a family member or close friend with a disability, have been shown to affect attitudes of peers without disabilities toward peers with disabilities. Research has indicated that having a family member or a close friend with a disability is related to more favorable attitudes toward peers with disabilities (Block, 1995). Data collected with children ages 9 to 12 years old, using the Peer Attitudes Toward the Handicapped Scale (PATHS) demonstrated that all groups viewed peers with a physical disability more favorably than those with learning or behavioral disabilities (Tripp et al., 1995). Peers with learning disabilities were preferred for interactions second, and peers with behavior disabilities were preferred the least for inclusion in physical education settings (Tripp et al., 1995). Children in inclusive settings have shown significantly more positive attitudes toward peers with behavioral disabilities than those in the segregated settings, but the reverse was true toward peers

with physical disabilities (Tripp et al., 1995). These counter-acting findings were attributed to a student with a behavioral disability possibly being able to demonstrate skills in physical activity settings, while peers with physical disabilities may be seen as a disadvantage in any type of competitive activity of integrated physical education (Tripp et al., 1995). Finally Tripp et al. (1995) noted that it was possible the peers with behavioral disabilities could have been seen as "entertaining in their various classroom disruptions" (p. 330) in the integrated setting.

Physical Education Teachers

It is important to consider the influence of the physical education teacher on the social environment in GPE. The inclusion movement was built upon several assumptions, one of which was that general physical educators would be willing to take on the challenges of working with children with disabilities (Stanton & Colvin, 1996). While some general physical educators are prepared for these challenges, others have shown reluctance (Block, 1999). General physical educators have expressed that they feel untrained to work with and interact with children who have disabilities, or that teaching children who have disabilities is not their job. These attitudes are especially prominent when discussing working with children with more severe disabilities (Block & Rizzo, 1995), and could influence the social environment.

Most attitude research has taken a theory of reasoned action or a theory of planned behavior approach to evaluating physical educators' attributes and attitudes toward teaching students with disabilities, which allowed for analysis from multiple perspectives. Researchers have investigated both student-related variables and teacher-related variables of attitude (Kozub & Lienert, 2003). Student-related variables include

level of disability, type of disability, labels, and grade level (Kozub & Lienert, 2003). There appears to be a general agreement that physical educators have more favorable attitudes toward teaching students with mild disabilities than students with more severe disabilities (Conatser, Block, & Gansneder, 2002; Downs & Williams, 1994; Kowalski & Rizzo, 1996; Rizzo & Vispoel, 1991). A more detailed analysis of general physical educators' attitudes found that favorable attitudes towards teaching students with severe disabilities were associated with improved quality of teaching experiences and more coursework in adapted physical education (Block & Rizzo, 1995).

The attitudes of physical educators appeared to differ based on the student's type of disability or disability label. Attitudes toward teaching students with learning disabilities (LD) have been found to be significantly more receptive than attitudes toward teaching students with mild mental retardation (MR) or behavior disorders (Rizzo & Vispoel, 1991). Even without any coursework in physical education or adapted physical education, physical education undergraduate students have demonstrated significantly more positive attitudes towards teaching students labeled as mild MR and LD than toward teaching students labeled as behavior disordered (Rizzo & Vispoel, 1992). Kozub and Lienert (2003) reviewed research articles which investigated the link between student grade level and attitude of the physical educator. Inclusion is shown to be viewed more favorably with respect to younger learners (Rizzo, 1984).

Teacher-related variables such as age, gender, previous experience, academic preparation, and perceived competence have been shown to influence attitudes of physical educators toward teaching students with disabilities (Kozub & Lienert, 2003). Teacher's age has presented mixed results in attitude research. One study suggested

more advanced pre-service teachers seem to be less favorable toward inclusion than less advanced teachers (DePauw & Goc Karp, 1990, as cited in Kozub & Lienert, 2003). Younger in-service teachers were found to view integration significantly more favorably than older counterparts (Schmidt-Gotz, Doll-Tepper, & Lienert, 1994). Rizzo and Vispoel (1991) were not able to find any correlation between educator age and attitude. Findings have also suggested a negative correlation between age and attitude toward teaching students labeled as behaviorally impaired (Rizzo & Kirkendall, 1995). Younger teachers approaching graduation professed more positive attitudes toward teaching students with behavior disorders (Rizzo & Kirkendall, 1995). Rizzo and Kirkendall (1995) found that age and year in school were the best predictors of favorable attitudes toward teaching individuals with behavioral disorders. Women have been found to have significantly more favorable attitudes toward teaching student with disabilities than men (Downs & Williams, 1994; Schmidt-Gotz et al., 1994), but other studies have revealed no main effect for gender (Kowalski & Rizzo, 1996; Rizzo & Kirkendall, 1995; Rizzo & Vispoel, 1991). Rizzo and Vispoel (1991) noted that female physical educators had more coursework in adapted physical activity than their male counterparts. This is just one possible explanation of the differences in the influence of gender that has been observed in research.

Physical educators more experienced at working with students with disabilities seemed to have significantly more favorable attitudes toward working with these students than teachers with less experience (Block & Rizzo, 1995; Rizzo & Kirkendall, 1995; Schmidt-Gotz et al., 1994). Block and Rizzo (1995) determined that quality of teaching experience and coursework in adapted physical education were most strongly related to

attitudes towards teaching students with severe disabilities. Advanced students have been found to have had more favorable experiences with individuals with disabilities and these favorable experiences were associated with increased perceived teaching competence (Rizzo & Kirkendall, 1995). Rizzo and Vispoel (1991) found a negative correlation between years of teaching experience in general and attitudes toward teaching students with disabilities. However, Schmidt-Gotz et al., (1994) did not find a significant correlation between general teaching experience and attitudes.

Downs and Williams (1994) reported ambiguous findings about the possible connection between experience and attitude. Students with previous experience had less positive attitudes than those without previous experience, which brings the nature of the experiences into question (Downs & Williams, 1994). The somewhat conflicting results noted above demonstrate no single answer to the effects of experience as a predictor of more positive attitudes (Kozub & Lienert, 2003). Tripp (1988) found results which indicated that general and adapted physical education teachers did not differ significantly in their slightly unfavorable attitudes. This raises questions about the role of experience assuming that adapted physical educators have more experience teaching individuals with disabilities (Tripp, 1988). These findings demonstrate the need to take the nature of experiences into consideration, as they are clearly not all producing a positive effect (Kozub & Lienert, 2003).

Research has demonstrated academic preparation to be a significant predictor of positive attitudes toward teaching students with disabilities (Block & Rizzo, 1995; Kowalski & Rizzo, 1996; Rizzo & Kirkendall, 1995). Teachers who received in-service education on inclusion had more favorable attitudes; however, these attitudes may have

been present before the in-service education (Schmidt-Gotz et al., 1994). Academic preparation regarding individuals with disabilities were found to be one of two of the best predictors of favorable attitudes in general, and especially for teaching students with MR and LD (Rizzo & Kirkendall, 1995). However, as with experience, there is research indicating that perhaps academic preparation is not a significant correlate with attitudes toward teaching individuals with disabilities. Tripp's (1988) results question the impact of academic preparation, assuming that adapted physical educators have had more academic preparation concerning teaching students with disabilities, yet their attitudes were found comparable to general physical educators. Also, Schmidt-Gotz et al. (1994) found that students with academic majors other than physical education (e.g., elementary education, special education) presented more positive attitudes than the physical education majors. It has been found that students majoring in adapted physical education had far more favorable attitudes than students majoring in general physical education (Kudlacek, Valkova, Sherrill, Myers, & French, 2002).

The research literature does not currently provide conclusive findings on the impact of academic preparation. However, academic preparation has been found to be correlated with perceived competence (Rizzo & Kirkendall, 1995). Perceived competence is the variable most examined when attempting to explain and predict physical educators' attitudes toward teaching students with disabilities (Kozub & Lienert, 2003). Several studies have indicated that attitudes are more likely to be favorable in teachers who have higher perceived competence (Block & Rizzo, 1995; Kowalski & Rizzo, 1996; Rizzo & Kirkendall, 1995; Rizzo & Vispoel, 1991; Schmidt-Gotz et al., 1994). Schmidt-Gotz et al. (1994) demonstrated positive correlations between perceived

competence in preservice physical educators and teaching students with disabilities, inclusion experience, personal experience with individuals with disabilities, and inclusion inservice education. Block and Rizzo (1995) also noted positive correlations between perceived competence and teaching students with disabilities, coursework in adapted physical education and special education, teacher experience, and quality of teaching experience.

It is unclear at this time why some educators feel competent and others do not (Schmidt-Gotz et al., 1994). Perceived competence along with academic preparation were regarded as most strongly related to attitudes toward teaching students with MR and LD (Rizzo & Kirkendall, 1995). Rizzo and Vispoel (1991) found significant correlations between perceived competence and five other variables: age (negative), gender, number of adaptive physical education courses, number of years of teaching students with disabilities, and attitudes toward teaching students with disabilities. Kozub and Lienert (2003) noted that it is important to consider the limitations in research design before unanimously accepting the notion that perceived competence is the "strongest predictor" of attitudes. More research is needed to explain why Downs and Williams (1994) found that those with previous disability experience feel the most incompetent, or why Rizzo and Vispoel (1991) identified a negative correlation between perceived competence and age (Kozub & Lienert, 2003).

The extant research indicates several influences on physical educators. It is important to find the link between these findings and the potential influence of these teachers on the social interactions of youths with autism. With the inclusion movement in full force, youths with autism are often finding themselves in GPE classrooms (Reid,

O'Connor, & Lloyd, 2003). Physical education settings may have extremely large numbers of students participating at the same time. The high numbers can cause classroom management to become a problem for general physical educators, and they spend much of their time simply organizing the children, and not getting to focus exclusively on teaching (Block, 1999). Placing a child with autism into such an environment may set the child up for failure from the beginning (Block, 1999). This is especially true when the physical educator does not have any other teachers or para-professionals to help, as often they do not.

It is essential to look at the attitudes and competencies of the physical educator in an attempt to understand the possible influences on social interactions of youths with autism. Feelings of competence and attitudes toward students with disabilities can greatly affect the learning environment created by the physical educator. If physical educators do not want to or do not feel competent in teaching youths with autism, several difficulties could occur. Youths with autism are often viewed as presenting extreme behavior difficulties and past research demonstrated that children with behavior disorders are often viewed more negatively than children with other disorders such as learning disabilities (Downs & Williams, 1994; Rizzo & Kirkendall, 1995; Rizzo & Vispoel, 1991). And even more simply, both teachers and physical activity instructors have demonstrated a preference to teach students with mild disabilities over students with severe disabilities (Conatser et al., 2002). Therefore, a physical educator may view a child with autism as moderately to severely disabled and a behavior problem, which could lead to avoidance or feelings of incompetence in the physical educator. If the teacher does not want to interact with or teach youths with autism, it might be logical to

believe that the youths with autism will not engage in positive social interactions with that GPE teacher.

Environment

According to the national School Health Policies and Programs Study (SHPPS) conducted in 2006, 69.3% of elementary, 83.9% of middle, and 95.2% of high schools required physical education for all students (Lee, Burgeson, Fulton, & Spain, 2007). SHPPS reported that 89.6% of states and 98.5% of school districts mainstreamed, or included, students with disabilities into regular physical education. Among the 62.4% of schools that reported having students with long-term physical, medical, or cognitive disabilities, 77.2% of schools had these students in general physical education (Lee et al., 2007). Therefore, it is clear that most students with autism will be placed in GPE classes at some point in their academic careers.

GPE environments often consist of large spaces, varying time requirements, a large number of students, and a high student to teacher ratio. GPE classes are most often held in school gymnasiums; 77.4% of elementary, 90.8% of middle, and 97.0% of all high schools had access to an indoor gymnasium for physical education (Lee et al., 2007). The most frequently available outdoor resource was a "general use field"; with 93.2% of elementary, 89.6% of middle, and 90.0% of all high schools having access (Lee et al., 2007). Other location resources, such as tennis courts and swimming pools, were not as available to physical education classes in all levels of school. There is no specific or consistent time requirement for physical education. For example of the elementary schools that require physical education, the time required was anywhere from 30 to 150 minutes per week (Lee et al., 2007).

The National Association for Sport and Physical Education (NASPE) recommends that the size of physical education class be consistent with those of other subject areas (e.g., maximum 1 teacher:25 students for elementary, 1:30 for middle, 1:35 for high school) for safe and effective instruction (Mosston & Ashworth, 2002). However, many physical education teachers today have class sizes much larger, with over 40 students per class not uncommon. These large class sizes could reduce the amount of individualized instruction, especially for students with disabilities (Mosston & Ashworth, 2002). For this reason, proponents of inclusion have long recognized the need for other support personnel, such as volunteers, teacher assistants or aides, and education specialists (Block, 2007). Altering these challenging environmental conditions is not always an easy option for schools and physical educators.

The major components of physical education include physical and motor fitness, skill-related fitness, fundamental motor skills and patterns, aquatics, rhythm and dance, individual sports, and team sports (Block, 2007). Physical educators have students engage in these components, and attempt to meet the six national physical education course standards developed by NASPE. The standards state that as a result of physical education the student:

1. Demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities
2. Demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities
3. Participates regularly in physical activity
4. Achieves and maintains a health-enhancing level of physical fitness

5. Exhibits responsible personal and social behaviors that respects self and others in physical activity settings
6. Values physical activity for health, enjoyment, challenge, and/or social interaction (Block, 2007, p. 2)

Several GPE curriculums are based upon these standards (Block, 2007). The NASPE (2004) standards recognize that physical education is an environment in which social skills and interactions can be fostered. GPE provides an educational environment in which values such as uniqueness, empowerment, belonging, security, and purpose should be upheld (Sherrill, 2004). Sherrill (2004) stated that a well-developed inclusive physical education program should develop skills for social interactions.

Inclusion reflects the philosophy that all children, regardless of abilities or disabilities, should be educated within the same environment, in which each child's individual needs are met (Block, 2007; Downing, 2002; S. Stainback & Stainback, 1990; W. Stainback, Stainback, & Bunch, 1989). S. Stainback and Stainback (1990) state that, "an inclusive school is a place where everyone belongs, is accepted, supports, and is supported by his/her peers and other members of the school community in the course of having his/her educational needs met" (p. 3). Inclusion is no longer a philosophical concept, but rather it is highly practiced throughout the United States. The U.S. Department of Education reports that approximately 96% of students with disabilities are educated in general education schools. Almost half of these students spend the majority of the school day in general education classrooms. It is important to note that inclusion does not mean placing a student in general education without support or without adapting the curriculum (Block, 2007). Children with disabilities should be the responsibility of

both general and special education staff, not simply restricted to receiving services from special education staff (Downing, 2002; S. Stainback & Stainback, 1990).

Supporters of inclusion have proposed several benefits for merging general and special education, which are not created in segregated educational settings (Block, 2007; Downing, 2002; Snell & Eichner, 1989; S. Stainback & Stainback, 1990). Downing (2002), Snell and Eichner (1989), and Stainback and Stainback (1990) outlined several social benefits of inclusion for students with disabilities, including: (a) opportunities to learn appropriate social skills; (b) opportunities to learn social skills in an integrated, natural environment; (c) potential for new friendships with peers without disabilities; (d) working with parents, special education teachers and other staff, which provides new experiences and relationship; and (e) providing age-appropriate role models. Inclusion in educational programs, "also may provide an important environmental context for the development of social skills, the formation of peer relationships, and engagement in varied social activities" (Orsmond et al., 2004, p. 247). Research in adapted physical activity illustrates that social acceptance and interaction with peers is one of the most frequently cited benefits of inclusion in GPE class for students with disabilities (Block, 2007; Sherrill, 2004).

However, the research literature clearly illustrates that not all interactions in GPE are viewed as positive by individuals with disabilities. This led researchers to investigate how often and what type of social interactions are occurring in GPE. Ellis and colleagues (1996) found very limited social contact between students with and without disabilities during PE. The study used direct observation with ten elementary-aged students with moderate to severe mental retardation. Both activity types and social responses were

coded during observations of integrated physical education, which averaged 6.13 total hours per participant (Ellis, Wright, & Cronis, 1996). Social interactions were analyzed in reference to (a) with whom the interactions occurred and (b) during what type of activity interaction occurred with teachers and students with and without disabilities. The participants interacted most frequently with peers with and without disabilities in small group or free play situations, while teacher interactions occurred most frequently during independent activities (Ellis et al., 1996). The authors note several limitations and state that it "should be viewed only as a first attempt to describe physical education settings in which students with moderate to profound mental retardation are served" (p. 241). They suggest more specific definitions of social interactions as well as a more precise measurement system for future investigations.

Place and Hodge (2001) reported their participants with physical disabilities had very low percentages of GPE time spent in social interactions. Regardless of what was occurring in the GPE, social contact almost never occurred between students with and without disabilities. Using the Analysis of Inclusion Practices in Physical Education, Form S, the mean percentage of time the participants spent interacting with peers without disabilities was calculated at 4.0% (Place & Hodge, 2001). The limited interactions of the participants seemed to occur amongst themselves. These findings suggest that even when physically present in GPE, students with disabilities are rarely interacting with their classmates without disabilities.

Researchers have also attempted to determine different factors which could have positive or negative influences on the social experiences of students with disabilities in GPE (Suomi, Collier, & Brown, 2003). Suomi et al., (2003) purposefully sampled from

kindergarten and fourth grade classes, due to the inclusion of students with intellectual disabilities and students with learning disabilities. From each grade, six students were chosen and placed into one of three categories based on their performance in physical education: (a) thriving – including the students who tended to be more popular and successful in physical education; (b) struggling – including students who were less skilled and had a hard time with social skills; and (c) students with disabilities. Data collection methods included observations, student interviews, focus group interviews, and interviews with the physical education teacher.

Four major factors which affected the social experiences were identified, including (a) teachers, (b) social nature of the tasks, (c) classroom cultures, and (d) social skills of the students (Suomi et al., 2003). Teachers influenced social experiences through the way activities were structured, modifications made to activities, and through the caring nature of the classroom. The social nature of the task ranged from positive (e.g., when positive interactions occurred because the teacher praised students for positive social interaction) to negative (e.g., when students with disabilities were excluded from games and the teacher did not notice). The classroom cultures had a significant influence on the social influences of the students. Students with disabilities tended to work within their own comfort zones, and they typically did not have partners (Suomi et al., 2003). On occasion, no other students wanted to work with the students with disabilities. Finally, social skills of the students were evident when students without disabilities assisted students with disabilities (Suomi et al., 2003). However, there were times when the social skills of students without disabilities were not as well-developed, and they were mean spirited towards or excluded students with disabilities.

Only one researcher has investigated the social interactions of students with autism in physical education settings (Lisboa, 1997). Lisboa (1997) conducted a pilot study with three male students diagnosed with autism, ages 11, 13, and 17 years. All participants were observed during five consecutive physical education classes. During observations, the researcher used a modified version of the Interaction Checklist Form (Graham, Holt/Hale, & Parker, 2007), which recorded four interaction patterns: (a) smile at, (b) talk to, (c) touch, and (d) assistance (Lisboa, 1997). Results indicated "that interaction levels were much higher with classroom aides than with teachers, and very low with peers" (Lisboa, 1997, p. 1). The author also reported that despite low levels of interaction, both teachers and students without disabilities appeared open to having the students with disabilities in GPE.

Tasks

Though tasks are usually defined as the physical activities, skills, or games of physical education, because of the emphasis on social interactions, the ALT-PE and BEACHES categories will be used to define the tasks. The purpose of the Academic Learning Time-Physical Education (ALT-PE) instrument is "to measure the portion of time in a physical education lesson that a student is involved in motor activity at an appropriate success rate" (M. Parker, 1989, p. 195). The type of motor activity and the context, or task, of the entire class can be measured by ALT-PE (M. Parker, 1989). The ALT-PE instrument has been used to assess teaching effectiveness in physical education for several years (see Block & Vogler, 1994 for review).

ALT-PE ranges of time spent in motor activity at an appropriate success rate, for youths without disabilities, have been found to vary from setting to setting and activity to

activity (M. Parker, 1989). ALT-PE levels, including several categories along with the motor appropriate category, has been found to range from 14% to 22% (Godbout, Brunelle, & Tousignant, 1983; Metzler, 1979). When all categories except motor appropriate have been removed, ALT-PE percentages have ranged from 2 to 30% in public school environments (Placek & Randall, 1986; Shute, Dodds, Placek, Rife, & Silverman, 1982). However, research has also found time spent engaged in appropriate motor activity to be as high as 50% of time (Vogler et al., 2000). The average ALT-PE percentage for public school classes seems to fall between 15% and 25% (M. Parker, 1989). Reliability has been kept in check through high required levels of inter-observer agreement (Godbout et al., 1983; Placek & Randall, 1986; Shute et al., 1982; Vogler et al., 2000). Overall, the ALT-PE is a valid and reliable data collection system (Metzler, 1989), which has been well documented in physical education research for two decades (see reviews by Block & Vogler, 1994; Metzler, 1989).

Past research is conflicting on the potentially varying levels of ALT-PE between students with and without disabilities. Vogler (2000) used a case study approach, and found a student with severe cerebral palsy did not experience different levels of ALT-PE compared to classmates without disabilities. However, it is important to note that this study was conducted from a human or people resources model. Therefore during all physical education classes, both a general physical educator and an adapted physical educator were present. This particular arrangement could easily have influenced the time spent in the various ALT-PE categories by the student with cerebral palsy. Qualitative interview data revealed several opinions on the situation by the students, GPE teacher, and the adapted physical educator (Vogler et al., 2000). Both the GPE teacher and

adapted physical educator recognized the great need for accommodations, recognizing the child may not have been able to participate without the extra assistance (Vogler et al., 2000). So, even though ALT-PE was found similar, this particular case included extra assistance which may not be available to all GPE instructors and their students with disabilities.

Place and Hodge (2001) sought to gather information about the tasks using ALT-PE in an attempt to better understand the social behaviors that occurred. The ALT-PE was utilized by researchers to determine that the students with disabilities spent 36% of their time in motor activity, "29% of their time waiting; 12% in transitions; 10% in knowledge content (i.e., listening to information about technique, rules of game, strategy, or background); 8% in management; and 2% off-task" (Place & Hodge, 2001, p. 401). Students without disabilities spent 31% of their time in motor activity; 13% waiting; 24% in transitions; 21% in knowledge content; 6% in management; and 5% off-task (Place & Hodge, 2001). The authors noted that students without disabilities were more likely to engage in off-task behavior and took longer with transitions. Place and Hodge (2001) found that the GPE teacher provided more instruction to the students without disabilities than to the student with disabilities. The students with disabilities spent more time waiting in line for activities than students without disabilities (Place & Hodge, 2001).

Temple and Walkley (1999) found contrasting data which demonstrated that youths with mild intellectual disabilities (MID) may experience limited ALT-PE. The participants included 24 students with MID, 48 students without disabilities, and 24 teachers who were the participants' regular physical education teachers. The researchers modified the ALT-PE coding system slightly and gathered data that demonstrated how

the students spent their physical education time, "specifically, measuring the amount of time students spent successfully engaged in motor activity related to lesson objectives" (p. 67). Even though students with and without disabilities spent similar amounts of time in the context of motor or knowledge activity, students with MID spent considerably less time appropriately motor engaged (Temple & Walkley, 1999). The authors reported that students with MID were often asked to engage in motor tasks which were too difficult, thereby demonstrating a lack of accommodation for the abilities of the students with MID.

However, it is important to consider that all ALT-PE categories may not lend to, or be appropriate for social interactions. For example, the knowledge category has a primary focus on teaching and learning knowledge related to physical education content. If a physical education teacher is lecturing to his or her class about proper execution of a skill, social interactions should not be occurring. Interactions during this time would most likely be considered inappropriate, unless the student is responding to a question or prompt from the teacher.

To further define the GPE tasks, the Behaviors of Eating and Activity for Children's Health Evaluation System (BEACHES) (McKenzie et al., 1991) was used to code physical activity levels. BEACHES is a comprehensive direct observation system which was designed to gather data on children's physical activity, eating behaviors, and related environmental events (McKenzie et al., 1991). For the purpose of this study, only the physical activity portion of the observation instrument was utilized. The physical activity portion of BEACHES measures the amount of time a participant spends in various levels of physical activity, which are linked to various levels of energy

expenditure. BEACHES has not been used in previous research on social interactions in GPE; however, it may help to further illustrate "what happens" in GPE that either fosters or discourages social interaction (Place & Hodge, 2001).

Interaction of People, Environment, and Tasks

Individuals with autism face a number of challenges in GPE that can affect social interactions, learning, and performance of physical activities. This section will illustrate several of the factors that may influence socialization by students with autism in GPE.

Environmental Considerations

Youths with autism often present unique behaviors in the physical activity environments. New settings present a variety of challenging auditory, visual, and tactile stimuli in large open spaces (O'Connor et al., 2000). Initially these youths may experience difficulties due to a limited ability to cope with new surroundings. This inability to cope comes from a difficulty in screening out irrelevant information within the environment (Winnick, 2005). Various behaviors may demonstrate this inability to cope, such as outbursts, pacing, hand flapping, or toe walking (O'Connor et al., 2000). All of these behaviors could be disruptive, especially in an inclusive physical education setting. These coping skills could also be made worse if the physical education programs are not adequately designed to include youths with autism. It is difficult to engage in social interaction if the child is having an outburst or is hand flapping.

Due to unique sensory needs (Reid et al., 2003), the environment may be more influential on physical activity behavior of children with autism than it is on children without disabilities. Some youths with autism overreact to sensory stimuli, but others under-react to, or apparently do not register sensory stimuli (Fisher, Murray, & Bundy,

1991). Some youths with autism may even present vacillating sensitivity to certain stimuli. A child with autism may be deterred from engaging in physical activity in settings that are too loud or too visually chaotic (Reid et al., 2003). When a youth with autism is avoiding physical activity, it may not be a result of attitudes about the activity, but rather sensory issues within the environment. This may not be a typical response for youths without disabilities. This withdrawal could easily influence the amount of social interaction the child gains during a physical education class.

Physical Activity Preferences

According to O'Connor et al. (2000) individuals with autism also tend to demonstrate lower levels of interest in participation in games, which are often the main components of physical education and physical activity programs. Team sports, such as soccer or basketball, can present a complexity or environment of overwhelming sensory input for youths with autism. With respect to specific sports, one study concluded that children with autism enjoy swimming and water activities (Can et al., 2004). Pan and Frey (2006) found "most participants [with autism] indicated a lack of enjoyment for team sports and preferred individual activities such as martial arts and swimming" (p. 604). Logic dictates that children with autism are likely to be more successful with "closed" motor skills which emphasize similar tasks, equipment, and environments on every occasion, than with "open" motor skills where these characteristics change frequently. This may be due to the fact that children with autism frequently have strong desires to avoid change in routines and have a "need for sameness" (O'Connor et al., 2000; Ozonoff, Dawson, & McPartland, 2002). "Closed" skills are usually more solitary in nature, therefore potentially limiting social interactions with others.

Orsmond and colleagues (2004) evaluated the frequencies of participation in social and recreational activities by adolescents and adults with autism. A sub-sample of 235 adolescents and adults with autism were included in the study, and mothers of the individuals with autism were asked to report on how often their child engaged in certain social and recreational activities. Answers were divided into activities which the individual with autism did at least once a week, once or twice a month, several times a year, and less than yearly. The most common activity in the at least once a week category (74.5%) was going for a walk or getting exercise, and the second most common activity (41.3%) was engaging in a hobby. Interestingly, both of these activities can be pursued independently, without friends or companions (Orsmond et al., 2004).

Physical Fitness

Individuals with disabilities have been found to participate in physical activities less frequently than persons without disabilities (Kosma, Cardinal, & Rintala, 2002); however, statistics specific to persons with autism are not available. Pan and Frey (2006) noted that elementary school children with autism are more active than middle and high school aged students. Other researchers (Auxter, Pyfer, & Huettig, 1997; Ho, Eaves, & Peabody, 1997) have concluded that children with autism often possess low levels of physical fitness, which tend to include excess body fat. If a child with autism has low physical fitness, he or she may be deterred from participating during GPE, which in turn could limit opportunities for social interactions.

Physical Activity Skills

Early research supported the views that motor development and movement skills followed a typical developmental pattern; however, more recent research has revealed

possible motor delays and difficulties (Reid & Collier, 2002). Six children and six adolescents with autism were compared to the norms of typically developing individuals and those with intellectual disabilities on several movement tasks (Reid, Collier, & Morin, 1983). Both children and adolescents with autism had scores that were below those of their peers without disabilities and their peers with intellectual disabilities. Morin and Reid (1985) gathered quantitative and qualitative data on balance, throwing, catching, jumping, and running tests for eight youths with autism and eight youths with intellectual disabilities. While there was a trend toward lower qualitative scores by the youths with autism, no significant quantitative differences were found between the groups (Morin & Reid, 1985). The authors concluded "that the selected test items generally represented reliable indices of the motor performance of autistic persons *[sic]* and that performance during formal testing essentially mirrored that of guided play" (Morin & Ried, 1985, p. 43). However, the authors also note that some of the difficulties may have been a factor of the participants mental retardation, rather than a factor of the autism alone. It is interesting to note that youths with high-functioning autism have self-reported lower perceptions of athletic competencies than peers without disabilities (Bauminger et al., 2004).

More recently, data have suggested that there is a difference of motor skills and development in youths with autism. Berkeley and colleagues (2001) assessed 15 children with autism, ages 6-8 years old, on the locomotor and object control tasks of the Test of Gross Motor Development (TGMD). Seventy-three percent of the children fell into the poor or very poor TGMD categories, and all were below average to very poor in locomotor skills. Only three boys scored average or above average in object control

(Berkeley, Zittel, Pitney, & Nichols, 2001). Jansiewicz et al. (2006) found significant impairment on several motor control measures in a group of 40 boys with autism, ages 6 to 17. The boys with autism demonstrated increased difficulty with balance and gait, slower speed and more dysrhythmia with timed movements of hands and feet (Jansiewicz et al., 2006). Reid and Collier (2002) recognize that there are children with autism who possess very refined motor skills and agility. However, based on the available empirical data, they concluded "that movement skills are often poorly developed and/or delayed in autism, individual exceptions notwithstanding" (Reid & Collier, 2002, p. 26).

Movement skill delays and unique sensory needs may possibly lead youths with autism to avoid more complex, team sport situations (O'Connor et al., 2000). If youths with autism do not want to engage in team sports, which are a major component in physical education settings, then it is not logical to believe they will develop the physical skills associated with that sport. This fact, in turn, would place the child at a disadvantage if the child ever wanted to attempt to join the group or inclusion was forced (Reid & Collier, 2002). For example, a youth with autism may prefer to shoot baskets alone on the playground. This solitary activity will not develop or foster any of the skills, other than shooting, that would be involved in the game of basketball, such as passing or defending. And, as with physical fitness, this motor skill deficit may limit social interactions by way of exclusion from the activity.

Measurement Issues

As data on social interactions of youths with autism in GPE are very limited, some of the research considered in this review was conducted with individuals having other disabilities besides autism.

Social Interactions

Social interactions among students with disabilities in GPE have been examined mostly through case study research design (Lisboa, 1997; Place & Hodge, 2001; Vogler et al., 2000). This has been attributed to small sample sizes, as well as a way in which to gather in-depth data about the situation (Place & Hodge, 2001; Vogler et al., 2000). Instrumentation for measuring social interactions has not been consistent throughout the extant literature. Vogler and colleagues (2000) used interviews to gain insight into the social inclusion of a child with cerebral palsy. However, interviews are not thought to be prudent for this study, due to the communication challenges presented by youths with autism. Lisboa (1997) used a modified version of the Interaction Checklist Form (Graham et al., 2007), which recorded four interaction patterns: (a) smile at, (b) talk to, (c) touch, and (d) assistance (Lisboa, 1997). These categories fail to include whether or not the interactions were appropriate, inappropriate, positive, or negative in nature. The AIPE-S and AIPE-SR have been validated and re-validated, and have been used in two studies measuring social interactions of individuals with disabilities (Hersman, 2007; Hodge, Ammah, Casebolt, LaMaster, & O'Sullivan, 2000; Hodge & Hersman, 2007; Place & Hodge, 2001). It allows researchers to code when interactions occur, whether or not the interaction was appropriate, and whether or not the interaction was positive.

Level of Engagement in Activity

ALT-PE was utilized by both Place and Hodge (2001) and Vogler et al. (2000) to further understand what was occurring in the GPE class sessions. Both studies required a high level of inter-observer agreement (IOA), at least 90%, when using ALT-PE. The ALT-PE possesses some limitations including: (a) it is limited by the nature of interval-

recording techniques (Siedentop, 1983), (b) it is not sensitive to differences among types of motor performances, (c) it may provide a picture of a small portion of what occurs in physical education, (d) it is not sensitive to the goals of a given lesson, and (e) it does not indicate the quality of the practice of skills (M. Parker, 1989). However, the ALT-PE has also been found to be a valid and reliable data collection system (Metzler, 1989). It is frequently used to analyze videotape data (e.g., Vogler et al., 2000) for the categories of student behaviors of students with and without disabilities, including activity, waiting, transition, off-task, management, and knowledge (Place & Hodge, 2001). Therefore, ALT-PE should provide a valid and reliable picture of what is occurring for students with autism, when a high level of inter-observer agreement is maintained.

Although the BEACHES system has never been employed in research on social interactions among students with disabilities in GPE, it may provide a more detailed understanding of the situation than the ALT-PE alone. GPE is a physical activity environment, and therefore the levels of physical activity occurring are a large component of the situation. The BEACHES activity coding levels have been validated through heart rate monitoring (McKenzie et al., 1991; Rowe, Schuldheisz, & van der Mars, 1997) and CALTRAC accelerometers (McKenzie, Sallis, & Armstrong, 1994). As "direct observation is the most practical and appropriate criterion measure of physical activity and patterns of physical activity" (Sirard & Pate, 2001, p. 441) in children and adolescents, the BEACHES scale should provide another valid and reliable instrument for investigating the tasks in GPE.

Summary

This review of literature illustrates the importance of people, environment, and tasks, and the possible interactions of the three, in the social interactions of students with autism in GPE. Students with autism bring unique social and communication skills to the situation. In addition, classmates and teachers may hold preconceived attitudes and/or biases towards interacting with youths with disabilities. The typical GPE environment has a large number of students and often a high student to teacher ratio, which can further impact social interactions among individuals. The tasks, as defined by ALT-PE, have been found to be both similar and different between students with and without disabilities. These differences often appeared to be the result of different environments, namely the student who had additional resources (e.g., teacher aide) experienced ALT-PE similar to the classmates without disabilities (Vogler et al., 2000). Other interactions may be seen for students with autism, as they may present unique environmental considerations, physical activity preferences, and physical fitness and skill levels.

As in past research on social interactions among students with disabilities in GPE, a case study approach with direct observations may allow this study to add to the relatively sparse research literature. As in Place and Hodge (2001), this study benefited from the use of video-camera recordings. These recordings not only allowed for multiple observers, and therefore assessment of inter-observer agreement, but also allowed researchers to evaluate the data with different data collection instruments. The AIPE-SR and ALT-PE instruments provided valid and reliable data regarding social interactions and GPE tasks. This range of data allowed for multiple results and conclusions.

CHAPTER 3

METHOD

The purpose of this study was to examine the nature and frequency of social interactions among students with autism and other individuals during various tasks in GPE, relative to social interactions in other education settings. A descriptive multiple-case study design was employed. To achieve the purpose, social interactions were observed for two cases in both GPE and an academic class environment. Each case consisted of a student with autism, a comparison classmate without disability, other classmates with and without disabilities, and the teachers and aides who worked in those classes. Social interactions were analyzed as a function of the individuals involved in the interactions, nature, and context of the interactions.

Research Design

The research method used a multiple-case study design (Berg, 2007; Patton, 1997; Yin, 2003). Patton (1997) states that, "case studies...become particularly useful when intended users need to understand a problem, situation, or program in great depth, and they can identify cases rich in needed information-rich in the sense that a great deal can be learned from a few exemplars of the phenomenon of interest" (p. 288). Yin (2003) notes that a case study approach provides an advantage when "a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control" (p. 9). Being comprehensive strategies, case studies may use a mix of quantitative and qualitative data (Yin, 2003). Also, case study design is appropriate when there is a limited number of participants (Yin, 2003).

Data were gathered on one participant with autism and one classmate without disability (hereinafter referred to as the comparison classmate), per case, who had returned signed parental consent and child assent forms. Observation data were obtained on each of the students with autism and comparison classmate in the same GPE and academic class. This made two pairs (one student with autism, one comparison classmate) who were observed for at least five class sessions in each of two educational settings (GPE and a shared academic class). The comparison classmates provided a comparison group for data analyses.

Participants

Case Definition and Criteria

In case study research, a case can either be defined as an individual or as some event or entity that is less well defined than a single individual (Yin, 2003). Yin (2003) recommends basing the definition of a case on the primary research questions. As this study focused on social interactions among multiple individuals in a setting, a case was defined more broadly than a single individual.

Case criteria. A case was defined as a physical education and academic (i.e., math, social studies) class which meets the following criteria: (a) an upper elementary or middle school (i.e., 5th, 6th grade) level class; (b) under the guidance of a teacher who is certified to teach students at the given educational level; and (c) is an inclusive class having both students without disabilities and one or more students diagnosed with autism. The study involved two such cases; therefore, it included two participants with autism currently enrolled in 5th and 6th grade, participating in an inclusive GPE and academic class setting, and their classmates. The 5th grade classes occurred at an elementary

school, while the 6th grade classes occurred at a middle school in the same school district. This study utilized data gathered in an inclusive academic class (i.e., math, social studies) on the participants with autism and their comparison classmates in order to determine any unique attributes of GPE in fostering social interactions.

Participant selection methods and criteria. Informational flyers were sent out using a university listserv which included parents of students with special needs. From this flyer, a total of three parents of students with autism contacted the student researcher with interest in participation. One child did not meet inclusion criteria. The student researcher met with the other two sets of parents to discuss the requirements of participation and to review the protocol. Parents were asked to report diagnosis information at this meeting. Diagnosis information was requested using the Diagnostic and Statistical Manual of Mental Disorders-IV-TR definition of autism (APA, 2000, see Appendix A). The student researcher also asked parents for permission to view the school documents on record, pending principal approval to observe in the school, namely the child's Individualized Education Plan (IEP) which included diagnosis information.

After confirmation of diagnosis and completion of written parental consent and child assent for the student with autism, the student researcher contacted the principals of each school. Meetings occurred with each principal in which all details of the study were discussed. After principal approval was granted, the student researcher met with the specific teachers designated by the principal to discuss the project. Teachers were asked for permission to observe in their classrooms, and to complete informed consent documents for themselves as participants. Following teacher consent, a date and time

was set for the researcher to discuss the project with the students and distribute consent and assent documents to them.

At the set date and time, the student researcher attended class and discussed the project with all of the classmates. Classmates were given as much time as needed to ask questions and were then provided parental consent and child assent forms to discuss with their parents. In the first school where consent and assent documents were distributed, adequate numbers of consent and assent documents were not returned. During the 3 weeks following distribution, only three parental consent and child assent forms were returned. Due to time constraints, this participant and school were dropped from this project. In the second school, all parental consent and child assent documents were returned within 2 weeks. As 100% of the forms were returned, this class was selected as the first case for this study.

The principal of the first case school offered to distribute project information to the parents of past students with autism. From this flyer distribution, only one other parent contacted the student researcher with interest in participation. The same protocol was followed in a third school. The student researcher met with the parents of the students with autism, principal, teachers, and students and explained the project and distributed consent and assent documents. In the third school, 66.67% of the consent and assent documents were returned in the academic class and 64.29% were returned in GPE. With the relatively high return rate of parental consent and child assent forms, this third school was selected as the second case for this study.

The specific comparison classmates were selected based on gender and age matching. The researcher first sorted the returned parental consent and child assent forms

by gender. Then the gender-matched or male forms were searched for students who were the same age as the participant with autism. From these gender and age matched potential students, one form was randomly selected to serve as the comparison classmate.

Consent and assent procedures. Institutional review board (IRB) approval was obtained from Michigan State University (MSU) prior to the start of the study (see Appendix B). IRB approval was also obtained from the school of each participant, according to the school's particular procedures. The researchers fulfilled any needed requirements prior to entering the classroom. Approval was acquired from the principals of the elementary and middle schools in which data were collected.

First, parents of the students with autism gave written consent and the students with autism gave written assent. Next permission was granted from school principals and teachers and aides gave written consent to participate in the study. Finally, the classmates gave written assent to participate in the study, and their parents provided written informed consent.. Parental consent, child assent, and teacher consent documents are located in Appendix C. Pseudonyms were used to protect the privacy of the participating students, teachers, and aides.

Case 1 – Kevin and Adam

School and class characteristics. Case 1 occurred in a suburban elementary school. The school housed Grades 3 through 5 and had 412 students enrolled. The ratio of students per full-time equivalent teachers was 18:1. The student body was predominately Caucasian (94%), with the next highest ethnicity being Hispanic (3%).

GPE was offered two times per week for 35 minutes per session. The GPE curriculum during the time of the observations included learning about the muscles and

motor skills related to rollerblading, tee-ball, kick-ball, golf putting, and track and field. The GPE class structure was the same each session. First, the students walked around the gym and stretched. Next the teacher reviewed the muscles and motor skill components of the day's activity. Lastly the students participated in the physical activity of the day. Math occurred each day of the week, but was observed twice a week when it followed GPE. Math sessions lasted 35 minutes each. During the time of the observations, the students were predominately working on fractions. Students learned fractions by completing several worksheets and doing problems together with the teacher on the whiteboard.

Table 1

Individuals in Case 1

Pseudonym	Role	Age	Gender
Kevin	Student with autism	11	Male
Adam	Comparison classmate	11	Male
Classmates	Classmates without disabilities	M=10.44(0.58) Range=10-12	Female (n=15) Male (n=10)
Mrs. Davis	Math teacher	36	Female
Mr. Patton	GPE teacher	35	Male
Ms. Elliot	Aide	28	Female

Kevin. At the time of data collection, Kevin was an 11 year old male in the 5th grade at elementary school. Kevin was diagnosed as having autism by a medical professional at a major state university. The diagnosis of autism was confirmed on Kevin's school IEP. To further confirm diagnosis, his parents were asked to answer

questions related to the DSM-IV-TR definition of autism. His mother reported that he had difficulty with social interactions. She reported that Kevin had difficulties with noise tolerance and "too many people overwhelms him." Kevin was predominately non-verbal and used an electronic communication board to interact during school hours. When asked about repetitive or stereotyped behaviors, Kevin's mother reported that he "rewinds and fast forwards movies; day dreams; lines things up." These behaviors were not seen from Kevin before 3 years old. Kevin did not have any physical disabilities.

Adam. At the time of data collection, Adam was an 11 year old male in 5th grade at elementary school. Adam was a classmate of Kevin in both GPE and math. Adam provided consent and assent, and did not have any reported disabilities. Adam was observed as the comparison student to Kevin.

Classmates. The 5th grade class (both math and GPE) of Kevin and Adam had 26 students, 15 females and 11 males including Kevin and Adam. IRB parental consent and child assent forms were returned by all 26 students, with 1 parent of a male not granting parental consent. The age range of assenting students was 10 to 12 years old (M=10.44, SD=0.58). To the knowledge of the researcher, there were no other classmates besides Kevin with a disability.

Mrs. Davis. Mrs. Davis was Kevin and Adam's math teacher. She was 36 years old and had been a certified teacher for 13.0 years. Mrs. Davis had been at the current school for 10 years and was Kevin's general education teacher for the current school year. The only training she had received regarding teaching students with disabilities and autism came from college coursework. No other training or conferences were reported.

Mr. Patton. Mr. Patton was Kevin and Adam's GPE teacher. He was 35 years old and had been a certified GPE teacher for 11.5 years. Mr. Patton had been at the current school for 10.5 years and has been Kevin's GPE teacher for 2 years. Mr. Patton reported training to teach students with disabilities through multiple college courses, conference sessions, and past hands-on instruction. Mr. Patton also reported receiving training from the school district autism professionals.

Ms. Elliot. Ms. Elliot was Kevin's paraprofessional aide, hereinafter referred to as an aide. Ms. Elliot was 28 years old and she was not a certified teacher. She had been working at the current school for four months and had been aiding Kevin for four months. Ms. Elliot had a Crisis Prevention Intervention (CPI) training certification, and had several past hands-on teaching experiences with students with autism.

Case 2 – Lee and Zack

School and class characteristics. Case 2 occurred in a suburban middle school in the same school district as Case 1. The school housed Grades 6 through 8 and had 457 students enrolled. The ratio of students per full-time equivalent teachers was 16:1. The student body was predominately Caucasian (94%), with the next highest ethnic groups being Hispanic (2%) and African American (2%).

At the time of observations GPE was offered every day of the week for 60 minutes per session. The GPE curriculum during the time of the observations included learning about the sports skills related to floor hockey, basketball, and tennis. The GPE class structure was the same each session. First, the students jogged around the gym for approximately 5 minutes and stretched. Next the teacher reviewed sports skill components of the day's activity. Lastly the students participated in the physical activity

of the day. Social studies occurred each day of the week for 60 minutes per session. During the time of the observations, the students were predominately learning about Asia, specifically China and the Silk Road. Students learned through teacher lecture, completing textbook readings, several workbook pages, and through activities such as making posters.

Table 2

Individuals in Case 2

Pseudonym	Role	Age	Gender
Lee	Student with autism	12	Male
Zack	Comparison classmate	12	Male
GPE Classmates	Classmates without disabilities	M=12.64(0.50) Range=12-13	Female (n=8) Male (n=7)
Social Studies Classmates	Classmates without disabilities	M=11.80(0.58) Range=11-13	Female (n=11) Male (n=3)
Mrs. Simon	Social studies teacher	56	Female
Mr. Carlson	GPE teacher	35	Male
Mrs. Shepard	Aide	35	Female

Lee. At the time of data collection, Lee was a 12 year old male in the 6th grade at middle school. Lee was diagnosed as having autism by medical professionals at two separate major state universities. The diagnosis of autism was confirmed on Lee's school IEP. To further confirm diagnosis, his parents were asked to answer questions related to the DSM-IV-TR definition of autism. When asked about social interactions, Lee's mother stated that Lee "does not make eye contact with people he does not know, and

must be repeatedly prompted to talk to them." In reference to communication, Lee's mother reported his receptive language skills are much better than his expressive language skills. When asked about repetitive or stereotyped behaviors, his mother said "when [Lee] becomes excited he flaps his arms and jumps." His mother reported that he "developed normally until 18 months of age when he began to lose his communication skills slowly and not want *[sic]* to gaze into my eyes anymore." Lee did not have any physical disabilities.

Zack. Zack was a 12 year old male in 6th grade at middle school. Zack was a classmate of Lee in both GPE and social studies. Zack provided consent and assent, and did not have any reported disabilities. Zack was observed as the comparison student to Lee.

Classmates. The GPE and social studies classes were not comprised entirely of the same students. The social studies class was a 6th grade class of 24 students. Sixteen of the students returned parental consent and child assent documents, with two returned forms not granting consent. The age range of assenting students was 11 to 13 years old (M=11.79, SD=0.58). Of the classmates granting assent there were 11 females and 3 males. To the knowledge of the researcher, there was only one other classmate with a disability besides Lee who submitted signed parental consent and child assent in social studies. This student was Lee's twin brother. The parents informed the researcher that Lee's brother was diagnosed as having Asperger's syndrome.

The GPE class of Lee and Zack was comprised of 28 students who were a combination of 6th and 7th graders. Eighteen students returned consent and assent documents, with three returned forms not granting consent. The age range of consenting

students was 12 to 13 years old (M=12.64, SD=0.50). Of the classmates granting consent there were 8 females and 7 males. To the knowledge of the researcher, Lee's brother was the only other classmate with a disability in GPE besides Lee who submitted a signed parental consent and child assent form.

Mrs. Simon. Mrs. Simon was Lee and Zack's social studies teacher. She was 56 years old and had been a certified teacher for 30 years. Mrs. Simon had been at the current school for 22 years and had been Lee's social studies and language arts teacher for the current school year. Mrs. Simon had her K-12 special education certification and had taught special education in the past. She reported participation in workshops on the topic of teaching students with autism.

Mr. Carlson. Mr. Carlson was Lee and Zack's GPE teacher. He was 35 years old and had been a certified teacher for 4 years. Mr. Carlson had been at the current school for 2 years and had been Lee's GPE teacher for the current school year. The only training he had received regarding teaching students with disabilities and autism came from "classes that were mandatory for a teacher certificate." No other training or conferences were reported.

Mrs. Shepard. Mrs. Shepard was Lee's paraprofessional aide. She was 35 years old and was not a certified teacher. Mrs. Shepard had been an aide for 16.5 years and had been working with Lee for 4 years. Mrs. Shepard had a Crisis Prevention Intervention (CPI) training certification, and had several past trainings, hands-on teaching experiences, and conference sessions about students with autism.

Instrumentation

Instrumentation included written demographic surveys, field notes, and three observation forms, the AIPE-SR, ALT-PE, and BEACHES. The field notes and observation instruments aimed to provide data on social interactions and the tasks engaged in during GPE and academic classes.

Demographic Survey

The independent variables of this study included the participants' diagnosis of autism, age, and grade level. The diagnosis of autism was determined based on the definition in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* published by the American Psychiatric Association (2000). Diagnosis information was requested from parents or guardians in a written survey prior to the start of the study. In order to further validate the diagnosis, the researchers asked the parents for permission to view documentation of the child's permanent school record, which would include the participant's Individual Education Plan (IEP). Parents were also asked to report age, and grade level of their child on a demographic survey (see Appendix D).

Due to the possible influences of teachers on the social environment of the classroom, teachers were also asked to provide background information in a written survey. Teachers completed a survey containing age, gender, years of teaching experience, years in current position, amount of time which teacher has taught the participant with autism, and previous in-service education about disability.

Field Notes

Field notes were used to gather supplemental qualitative data, and assisted in providing a detailed explanation of what occurred in each class session (see Appendix E).

Observation notes were focused on the participant and paired classmate in the class. These notes detailed the setting, activities, and behaviors of the participants including social interactions. Teacher and peer actions and behaviors were recorded, as well as any other comments deemed necessary by the observers.

AIPE-SR

Social interactions were defined and coded based on the Analysis of Inclusion Practices in Physical Education, Form-S Revision (AIPE-SR) (Hodge & Hersman, 2007). The APIE-S instrument was originally "designed to determine occurrence and duration of specific student interaction behaviors during physical education classes" (Place & Hodge, 2001, p. 393). It allowed for occurrence to be determined through frequency counts of eight different student behaviors (Hodge et al., 2000). However, in 2007 AIPE-S was modified slightly to strengthen the instrument (Hodge & Hersman, 2007).

The AIPE-SR uses an interval recording system to record the occurrence of four social interaction categories appropriate, positive appropriate, inappropriate, and off task interactions (Hodge & Hersman, 2007). Hodge and Hersman (2007) provide basic definitions for each interaction type, and Hersman (2007) expands to give examples, which are summarized below.

- *Appropriate interactions.* "These behaviors can be verbal or non-verbal in nature and include behaviors that are not positive in nature, but are neutral in affect" (Hodge & Hersman, 2007, p. 3). Hersman (2007) stated that verbal examples of appropriate interactions occur when the student with or without a disability initiates an exchange with a peer with or without a disability, such as giving specific feedback, asking something politely of the student, using peer's first name, asking a

peer to model or demonstrate for her/him (Hodge et al., 2000), or talking with the student in normal conversation. Non-verbal examples of appropriate interactions occur when the student models or demonstrates an activity for a peer (Hodge et al., 2000) or initiates hands on contact to guide a peer through an activity. (p. 126)

- *Positive appropriate interactions.* "These behaviors can be verbal or non-verbal in nature, and are positive in affect" (Hodge & Hersman, 2007, p. 3). Verbal examples include students with or without a disability offering positive praise or encouragement, such as "Good job!". Non-verbal examples include actions such as high-fives, clapping for others, thumbs up, pats on the back, or hugs between students with and without disabilities (Hersman, 2007). Hereinafter, these behaviors will be referred to as positive interactions.
- *Inappropriate interactions.* "Inappropriate behaviors consist of verbal or non-verbal incidents where a student with or without a disability exhibits negative behavior toward a peer" (Hodge & Hersman, 2007, p. 3). Verbal examples include when a student uses "a put-down toward or unjustly criticizes a peer" (Hersman, 2007, p. 127). Other examples include sarcasm toward or mocking other students. Non-verbal examples include mimicking, pushing, hitting, or making rude gestures toward peers (Hersman, 2007).
- *Off task interactions.* Off task interactions consist of "any verbal or non-verbal interactions that occur between students when the students are not supposed to be interacting [e.g., when the teacher is talking], or when the interactions are not related to the activity" (Hodge & Hersman, 2007, p. 3). Verbal examples include talking when the teaching is speaking or talking when the student is supposed to be

engaged in another activity. Non-verbal examples include making gestures or pointing while the teacher is speaking, when students should be listening (Hersman, 2007).

The AIPE-S utilized a straight frequency count of each type of interaction. This study used this frequency count procedure, as the research questions focused on the number of interactions which occurred. The lead researcher and second observer recorded social interaction behaviors real-time and from video-recordings. From these data, researchers were able to assess how frequently a student with autism and classmate engaged in the multiple types of social interaction with others in the environment.

Content validity for the original AIPE-S was established by "a panel of four nationally prominent teacher educators in adapted and general physical education" (Place & Hodge, 2001, p. 393). The panel members were selected based on their reputations as experts on inclusion and/or behavioral research in physical education (Place & Hodge, 2001). The panelists were asked to rank the scale on representativeness, completeness and accuracy, appropriateness and suitability, and utility. The AIPE-S was determined to have content validity and was then utilized by Place and Hodge (2001) to investigate social inclusion of three participants with physical disabilities.

The AIPE-S was later modified in two ways to strengthen the instrument (Hodge & Hersman, 2007). The length of the observation periods was decreased, and a frequency within interval recording system was applied for calculating inter-observer agreement (IOA). Also, to decrease the complexity of coding, a simpler coding system was developed. The revisions were pilot tested by Hersman (2007) in an investigation of social interactions and adventure education. Following the pilot study, the revised

instrument was evaluated by the lead author of the original AIPE-S to establish face validity. Then the revised instrument was sent to two university faculty members, with expertise in adapted physical education, for feedback and to reassess the content validity (Yun & Ulrich, 2002).

Observer reliability of the AIPE-S has been calculated by both intra-observer agreement (Place & Hodge, 2001), and by inter-observer agreement (Hersman, 2007) in past research. When observing three students with physical disabilities, intra-observer agreement was determined to be 98% (Place & Hodge, 2001). Hersman (2007) trained observers until at least 90% inter-observer agreement was obtained, while observing approximately 21 students, some of whom had learning and/or emotional disabilities. For reliability, this study will uphold at least an 85% inter-observer agreement, which is considered acceptable (Kazdin, 1982).

ALT-PE

The tasks of the GPE and academic class were assessed using the Academic Learning Time for Physical Education (ALT-PE) instrument (Siedentop, Tousignant, & Parker, 1982). Academic learning time (ALT) is the portion of time when a student is engaged in activity appropriate to his or her abilities, which results in high success and low error rates (Block & Vogler, 1994; M. Parker, 1989; Siedentop et al., 1982). The purpose of the Academic Learning Time-Physical Education (ALT-PE) instrument is "to measure the portion of time in a physical education lesson that a student is involved in motor activity at an appropriate success rate" (M. Parker, 1989, p. 195). The type of motor activity and the context of the entire class can be measured by ALT-PE (M. Parker, 1989). The ALT-PE instrument uses an interval-recording procedure, and has been used

to assess teaching effectiveness in physical education for several years (see review by Block & Vogler, 1994).

As in Place and Hodge (2001), it is important to assess "what happened" contextually at times of various social interactions. Therefore, the instructional context was based on several classroom context categories (Place & Hodge, 2001). Classroom context categories included: activity, waiting, transitions, management, and knowledge.

- *Activity.* Activity was defined as any time in which the students are appropriately motor engaged, whether it be individual or group tasks (Place & Hodge, 2001). For this study, activity will include any time when students are engaged in class activities or assignments in which the teacher instructed them. In an academic class this could include working independently or with a partner on a worksheet, creating a poster or project, reading as instructed, completing a workbook page, etc. In GPE this could include running laps, playing a game, completing physical activity stations, etc.
- *Waiting.* Waiting was defined as when "the student has completed a task and is waiting for the next instructions or opportunity to respond" (M. Parker, 1989, p. 198). This is anytime a student is waiting between other events. This could include waiting to be assigned partners or teams, waiting to begin class, waiting in line, etc.
- *Transitions.* Transitions were defined as time during which managerial or organizational activities related to instruction are occurring (M. Parker, 1989). This includes transitioning from one activity to the next, transitioning to groups after the teacher has made assignments, walking from one piece of exercise

equipment to another, moving to another station as the teacher sets up the materials, etc.

- *Management.* Management was defined as class time in which class business is occurring unrelated to the instructional activities (Parker, 1989). Management in class includes taking attendance, giving grades, organizing paperwork, reading school announcements, etc.
- *Knowledge.* Knowledge was defined as "class time when the primary focus is intended to be on knowledge related to physical education content" (Parker, 1989, p.197). This includes lecture time in which the teacher is presenting knowledge to the students. This also includes any review of knowledge material presented in the past and any questions or answers related to the cognitive material.

The GPE and academic classes were analyzed using the ALT-PE instrument to obtain a more complete view of "what occurred" in each class (Place & Hodge, 2001). The original ALT-PE utilized an interval recoding system with a 5 s observe, 5 s record period. However, as this study was concerned with the context in which social interactions occur, ALT-PE was coded as a frequency count corresponding with the occurrence of social interactions. For example, when an interaction occurred the observer recorded the classroom context at the moment of interaction.

BEACHES

The Behaviors of Eating and Activity for Children's Health Evaluation System (BEACHES) (McKenzie et al., 1991) was used to code physical activity levels in order to add information about the tasks in GPE and the academic class. BEACHES is a comprehensive direct observation system that was designed to gather data on children's

physical activity, eating behaviors, and related environmental events (McKenzie et al., 1991; Sirard & Pate, 2001). For the purpose of this study, only the physical activity portion of the observation instrument was used. The activity level scale was designed to provide "an estimate of the intensity of the child's physical activity" (McKenzie et al., 1991, p. 144). McKenzie and colleagues (1991) provided the following explanation of the activity coding levels:

- *Lying down.* Refers to the body position of the participant, lying down with little to no movement (McKenzie et al., 1991). A participant must have his or her entire back, stomach, or side in full contact with the floor, with legs and arms resting quietly on the body or floor. The head must also be in contact with the floor.
- *Sitting.* Refers to the body position of the participant, sitting with little to no movement (McKenzie et al., 1991). This includes when a participant is seated on his or her bottom or knees. Arms and legs must be resting quietly and no extraneous head movements.
- *Standing.* Refers to the body position of the participant, standing with little to no movement (McKenzie et al., 1991). A participant must have one or two feet in contact with the floor, with arms not in contact with the floor. During standing, no extraneous leg, arm, or head movements can be occurring.
- *Walking.* Refers to the body position of the participant, walking at a normal pace without excessive movement such as jumping or skipping (McKenzie et al., 1991). A participant must move alternating the foot that is in contact with the ground, moving at a normal pace for the individual. During walking, both of the participant's feet are never off of the ground at the same time.

- *Very active.* Very active "describes when the child is expending more energy than he or she would during ordinary walking. For example, Code 5 (very active) would be used to indicate the child is wrestling with a peer (even though he is lying on his back) or pedaling a moving tricycle or stationary bike (even though sitting)" (McKenzie et al., 1991, p. 144). Very active includes jogging, running, using exercise equipment at a brisk pace, rollerblading at a brisk pace, riding a bike or trike, or swimming laps in a pool.

The entire BEACHES system employs an interval recording procedure with a 25 s observe and 35 s record rate (McKenzie et al., 1991). This study employed an interval procedure as well. However, as the data were video taped in Case 1 making reviews possible, the intervals were shortened to a 15 s observe, 15 s record rate. BEACHES levels were also coded as a frequency count corresponding with the occurrence of social interactions in Case 1. Video tape was not used in Case 2 because only 66.67% (GPE) and 64.29% (social studies) of the parental consent and child assent forms were returned. Real-time data collection was used in place of video taping. Due to this real-time data collection, the observers were unable to collect BEACHES data in Case 2. The BEACHES results provided a frequency of occurrence for each activity category, and provided information about which activity levels had interactions. These procedures provided specific information on how active students were during GPE time and during which activity levels interactions occurred.

Extensive field testing has illustrated the feasibility of the BEACHES system and the reliability of the coding categories (McKenzie et al., 1991). The activity coding levels have been validated through heart rate monitoring (McKenzie et al., 1991; Rowe et

al., 1997) and CALTRAC accelerometers (McKenzie et al., 1994). McKenzie and colleagues (1991) found that heart rates in 19 children, ages 4 to 9 years, increased with each activity code increment. The mean heart rate of the Code 1 (lying down) was 99 beats per minute, and 153 beats per minutes for Code 5 (very active), with increases occurring at each coding level (McKenzie et al., 1991). These data were collected with 94% to 99% agreement among observers (McKenzie et al., 1991).

Combining data collection instruments. In order to increase ease and feasibility of data collection, all instrumentation was combined into a comprehensive observation instrument (see Appendix F).

Procedures

Logistics

Data were collected during the spring term of 2009. Initially, observers were present during at least two class sessions to acclimate the students, teacher, and aide to the presence of the observer. Two initial acclimation classes is comparable to past research protocols (Lisboa, 1997; Odom & Ogawa, 1992; Place & Hodge, 2001). During this initial period all equipment was prepared as if collecting data, however, no data were gathered. After the initial observation period, each participant was observed during GPE and an academic class (math in Case 1, social studies in Case 2) sessions each week until at least five class sessions of data were collected in each setting.

Data Collection

Case 1. During each GPE and math class sessions a trained observer was present and used video- and audio-recording equipment. The observer arrived prior to the start of class and left after its completion so there was no disruption to the class. Prior to the start

of class, the observer set up a video camera in the gymnasium or classroom in an unobtrusive location which provided a full view of the area. The observer stood next to the camera and took field notes, while minimally operating the camera to make sure the participants stayed in view. Entire class sessions were video-recorded to allow for data coding and inter-observer reliability checks. Data collection for Case 1 took 5 weeks due to class scheduling and participant absences.

After video-taping was complete, the observers coded the video-taped behavior data using the combined data collection sheet. The student whose parents did not provide consent and who did not provide assent was avoided during video-taping as much as possible and was ignored when the student did appear in the tape. Social interaction behavior was coded using a frequency count. For example, when an interaction occurred it was immediately recorded using the AIPE-SR and ALT-PE instrument categories. The observers recorded the nature of the interactions, with whom the interaction occurred, and the classroom context during the interaction. Physical activity level data was coded using the BEACHES scale and an interval recording system.

Case 2. In Case 2, video-taping did not occur because 41.67% of the social studies and 35.71% of the GPE classmates did not return parental consent and child assent documents. Therefore, data in Case 2 were collected during class real-time. Both the primary student researcher and a trained second observer attended social studies and GPE class sessions. (For information on observer training see the key personnel section below). During each class session, one observer recorded data on the student with autism, while the other recorded data on the comparison classmate. Therefore each

observer could give full attention to one student. The observers alternated who they observed each day of data collection.

Exactly as in Case 1, social interaction behaviors were coded using a frequency count. Immediately following an interaction, the observers entered the data on the combined data sheet. Due to the real-time frequency count collection of AIPE-SR and ALT-PE data, observers were unable to gather interval BEACHES physical activity level data in Case 2. During initial practice, it was found to be too complex to record both frequency count and interval data concurrently. And due to the unique behaviors of the student with autism, it was impossible to bring more observers into the setting without causing significant distraction. As the focus of the study is social interaction, it was deemed critical to gather accurate interaction data which meant that collection of BEACHES data were not plausible. Data collection for Case 2 took 4 weeks due to class scheduling and participant absences.

Key Personnel

Key personnel for this project were the student researcher, a second observer, the dissertation committee, and the dissertation director. The dissertation committee assisted in developing and approving the protocol and mentoring the student researcher about data analyses and interpretation. The dissertation director advised the student investigator on a frequent basis on all issues relating to the study and assisted in editing manuscripts produced from this study.

The student researcher served as one of the observers. There was also one other observer who coded behavior data of the class sessions. The second observer was selected on a volunteer basis, had research experience, and knowledge about individuals

with disabilities. The second observer attended class sessions in Case 2 to assist the lead researcher with real-time data collection.

Inter-observer agreement (IOA). The observers took part in two primary training sessions. First, the observers read and became familiar with the coding procedures of the observation systems. Observers trained by watching and coding three separate 15-minute video segments of individuals engaged in physical activity. The target IOA measure was 85% or greater in all IOA calculations; however, many researchers use 80% IOA as an acceptable level of agreement (Cooper, Heron, & Heward, 1987). A frequency ratio was used to calculate IOA for social interaction (AIPE-SR, ALT-PE) data (Kazdin, 1982). A frequency ratio is often used for frequency count data and is calculated by dividing the smaller total by the larger total and multiplying by 100 (Kazdin, 1982). By the completion of training, the mean percentage of agreement across the two observers for three different 15-minute video segments was 93.35% (*SD*=1.48).

To calculate IOA for physical activity level (BEACHES) data, a point-by-point agreement was used (Kazdin, 1982). Kazdin (1982) states that in a point-by-point agreement calculation, "agreements of the observers on the specific trials are divided by the number of agreement plus disagreement and multiplied by 100 to form a percentage" (p. 54). By the completion of training, the mean percentage of agreement on three different 15-minute video segments was 91.11% (*SD*=5.09).

To minimize observer drift, after three weeks of data collection, re-training occurred, and IOA was reassessed between the observers. The observers reviewed the behavior categories and clarified any questions. Then the observers watched videotapes of the participants and discussed the codes together. Finally, the observers independently

coded random 15-minute segments of videotape. The mean percentage of agreement on social interaction frequency data during this training was 94.74% (*SD*=0.98). The mean percentage of agreement on physical activity level interval data was 90.00% (*SD*=3.33).

Data Management

Data management included several procedures to ensure the security of all data collected. The various procedures included:

- *Lab notebook.* The lead student researcher maintained an electronic lab notebook which included information about all significant decisions made throughout the study, including planning, data collection, data analyses, participant information, and unforeseen challenges. The lab notebook was updated, at a minimum, each day of data collection or data analysis. It was saved on a password protected computer, and any electronic backups were stored in a locked file cabinet in a locked office during the project. The student emailed the lab notebook to the dissertation director on a regular basis during planning, data collection, and data analyses.
- *Data access.* All parental consent, child assent, and teacher consent documents were stored per the IRB protocol. The data, including all observation instrument score sheets and videos, were maintained by the student investigator. Data sheets were collected and placed in a binder, which was placed in a locked file cabinet in a locked office. The video recordings were downloaded onto a password protected computer. The research team, which includes the student researcher, second observer, dissertation director, and dissertation committee, were the only individuals with access to the protected data. Video- and audio-recorded data will

be destroyed pending the completion of data analysis to protect the rights and anonymity of the participants. However, all other data will be stored for three years under locked and secure conditions. After this time all data will be confidentially recycled by the university at which the research was conducted. All documents will remain property of the university at which the research was conducted.

Data Analyses

Descriptive statistics (e.g., frequencies, central tendency, variation) were used to summarize demographic data. These data were used to create profiles of each of the participants when reporting results.

Frequency of Social Interactions

To evaluate the frequency of social interactions, AIPE-SR data was used. It was analyzed using a frequency count of social interactions. The data were analyzed by calculating frequency and percentages based on sub-groups (e.g., interactions with teachers, with classmates, with aides). For instance, students with autism may socially interact more frequently with GPE teachers than with classmates. No current decision rule exists for this instrument, but the use of comparison classmates was used to illustrate similarities and differences in social behaviors. Chi-square analyses were conducted to investigate the group differences in total interactions and interactions with classmates.

Nature of Social Interactions

The AIPE-SR also provided data from which information about the nature of social interactions was obtained. Each type of social interaction (e.g., appropriate, positive appropriate) can be categorized by frequency during class sessions. The various

natures of social interactions were further analyzed by determining which types of interactions occurred with which individuals. Cross-case comparisons were made using chi-square analysis of the nature of the interactions.

Tasks and Social Interactions

The coding categories of the ALT-PE and BEACHES were tallied into frequency counts. The ALT-PE and BEACHES data combined with the interaction frequency counts provided information about during which tasks social interactions occurred in Case 1. No BEACHES data were available for Case 2. The task data were further investigated through chi-square analysis to understand any cross-case comparisons.

Interaction of Nature and Context of Social Interactions

The AIPE-SR, ALT-PE, and BEACHES were combined to examine the correspondence of the nature of social interactions and the tasks. To determine connections, the data from these instruments were evaluated simultaneously. For example, time coded as transitional time may have corresponded with codes of appropriate interactions, therefore illustrating a possible connection. All observation data were charted and graphed in order to detect trends or patterns in the results. Field notes were used as qualitative supplementation to gain insight into the research questions.

All data were compared across: (a) participants with autism and classmates without disabilities; (b) educational settings (i.e., GPE versus academic classes); and (c) cases. These comparisons allowed for understanding any unique characteristics of the students with autism and of GPE.

CHAPTER 4

RESULTS

In this study, students with autism had fewer social interactions in GPE and academic classes than did the comparison students who do not have disabilities. However, students with autism were more likely to interact with classmates during GPE than during an academic class. The majority of all interactions of the students with autism were appropriate or positive in nature. The ALT-PE activity category not only accounted for the most interactions for both students with autism and the comparison classmates, but also had the highest number of appropriate and positive interactions for all students. Further detail is provided in the remaining sections of this chapter. In the narrative of this section the term 'classmate' refers to all classmates without disabilities of the student with autism, and the term 'comparison classmate' refers to the classmate without disability on which specific data were collected, namely Adam and Zack.

Frequency of Social Interactions

In response to the first research question regarding frequency of interactions, the students with autism had fewer total interactions in GPE and academic classes than the comparison classmates (see Table 3). Kevin consistently interacted about half as frequently in GPE and math as Adam; however, both students interacted at least 59% more in GPE than in math class session. Lee and Zack were similar in total interactions in social studies, but Zack interacted 119% more than Lee in GPE.

Table 3

Frequency of Social Interactions
Across Five GPE and Academic Sessions

	Kevin (autism)	Adam (comparison)	Lee (autism)	Zack (comparison)
GPE				
Frequency across 5 sessions[1]	86	174	118	259
Average (*SD*) per session	17.20(2.68)	34.80(5.89)	23.60(8.99)	51.80(11.48)
Math (Kevin/Adam) or Social Studies (Lee/Zack)				
Frequency across 5 sessions[2]	54	93	179	189
Average (*SD*) per session	10.80(1.79)	18.60(3.21)	35.80(14.69)	37.80(8.61)

[1] The duration of GPE classes was 35 minutes for Kevin and Adam and 60 minutes for Lee and Zack.
[2] The duration of math classes was 35 minutes for Kevin and Adam and the duration of social studies classes was 60 minutes for Lee and Zack.

Case 1 – Kevin and Adam

GPE. In GPE the majority, or 56%, of Kevin's interactions occurred with his aide, while 86% of Adam's interactions occurred with classmates (refer to Table 4 and Figure 2). Field notes revealed that in GPE classmates were willing to help direct Kevin through stations or activities. Ms. Elliot remained on the side of the gym, away from Kevin, as much as possible during GPE class. Classmates would often help Kevin stretch and do the class warm-up routine. Adam was mostly quiet during the warm-up routine as instructed by Mr. Patton. Adam would also raise his hand to answer questions posed by Mr. Patton during warm-up. Kevin never attempted to participate in the teacher led discussions during warm-up. Kevin interacted about half as much with Mr. Patton as Adam.

Table 4

Case 1 – Frequency of Social Interactions in GPE as a Function of the Other Individual in the Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Classmate w/o disability	5	3	5	7	8	5.60	1.95
Teacher	1	3	1	2	3	2.00	1.00
Aide	7	11	11	11	8	9.60	1.95
Other	0	0	0	0	0	0.00	0.00
Total	13	17	17	20	19	17.20	2.68
Adam (comparison)							
Classmate w/o disability	21	34	30	37	27	29.80	6.22
Classmate w/ disability	0	0	0	0	1	0.20	0.45
Teacher	5	4	4	5	4	4.40	0.55
Aide	0	0	0	0	0	0.00	0.00
Other	1	1	0	0	0	0.40	0.55
Total	27	39	34	42	32	34.80	5.89

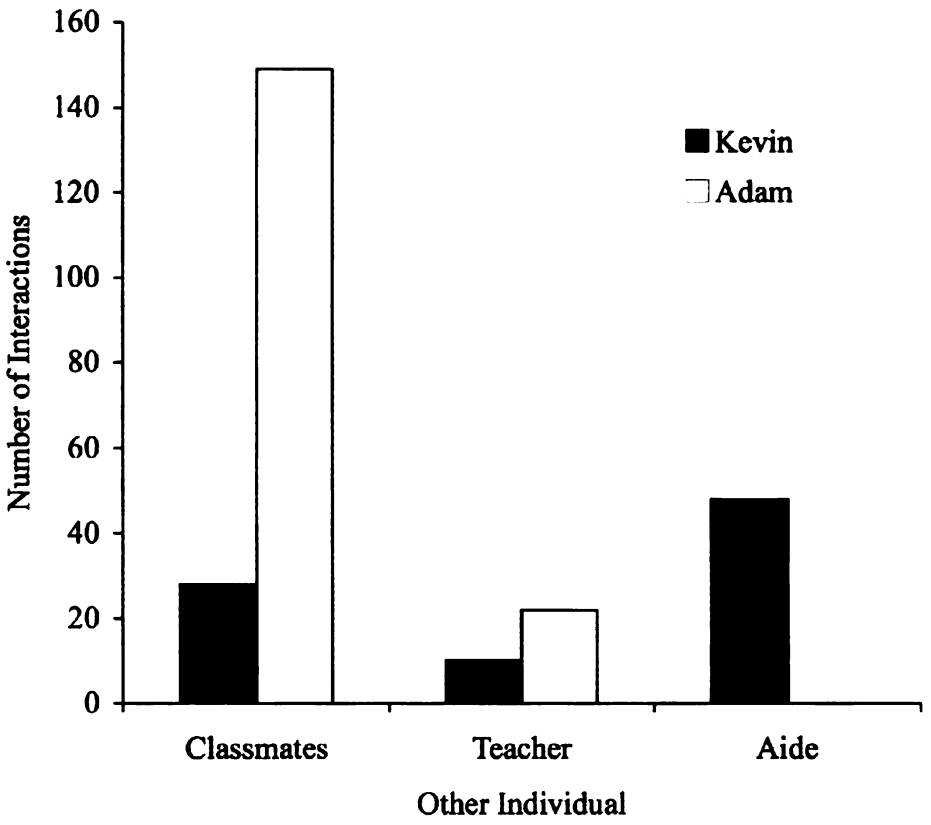

Figure 2. Case 1 – Total frequency of interactions with various individuals across the five GPE class sessions.

Math. In math Kevin overwhelmingly interacted with his aide, with 74% of all his interactions occurring with Ms. Elliot, while 81% of Adam's interactions occurred with his classmates (refer to Table 5 and Figure 3). Most of Kevin's activities in math were directed by Ms. Elliot. Kevin was working on the same general math topic (e.g., fractions, story problems, etc.) as the class, but on some days was completing a different task or worksheet than his classmates. Even when Kevin's work was the same, Ms. Elliot sat next to him to help guide and keep him on task. With Ms. Elliot's presence the teacher, Mrs. Davis, rarely needed to guide Kevin in his work. Adam interacted with

Mrs. Davis 17 times over the five class sessions, while Kevin had only 1 interaction with her.

Table 5

Case 1 – Frequency of Social Interactions in Math as a Function of the Other Individual in the Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Classmate w/o disability	2	3	2	4	2	2.60	0.89
Teacher	0	0	0	1	0	0.20	0.45
Aide	6	8	9	8	9	8.00	1.22
Other	0	0	0	0	0	0.00	0.00
Total	8	11	11	13	11	10.80	1.79
Adam (comparison)							
Classmate w/o disability	15	13	18	16	13	15.00	2.12
Classmate w/ disability	0	0	0	0	0	0.00	0.00
Teacher	2	3	4	5	3	3.40	1.14
Aide	0	0	0	0	0	0.00	0.00
Other	0	0	1	0	0	0.20	0.45
Total	17	16	23	21	16	18.60	3.21

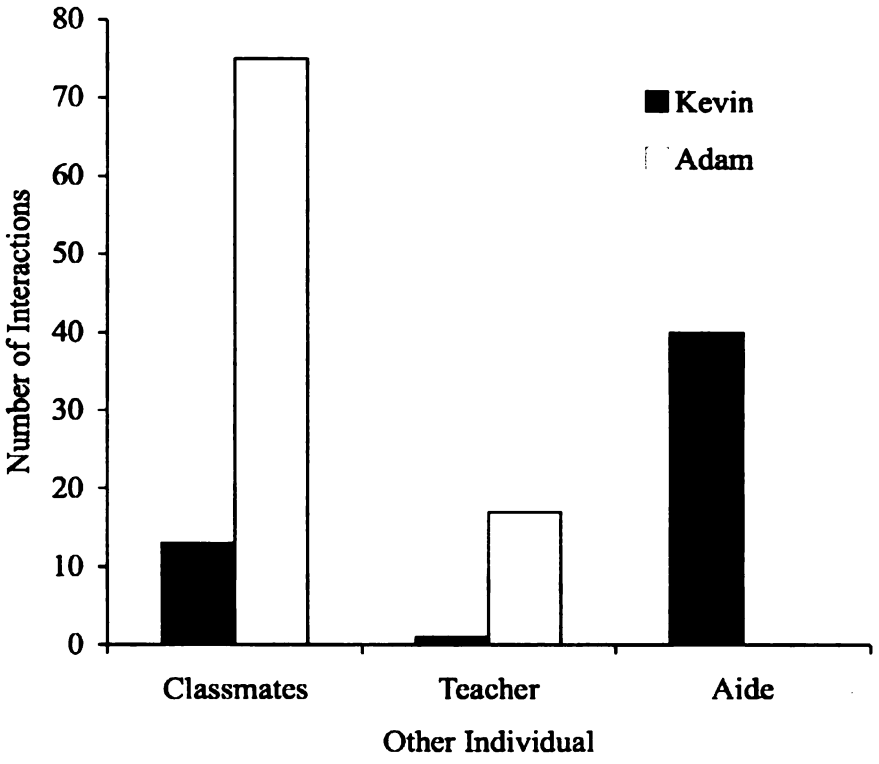

Figure 3. Case 1 – Total frequency of interactions with various individuals across the five math class sessions.

Case 2 – Lee and Zack

GPE. In GPE, 82% of Lee's interactions occurred with his classmates and only 14% of the interactions occurred with his aide, Mrs. Shepard (see Table 6 and Figure 4). Mrs. Shepard spent almost all GPE class time sitting off to the side. She rarely directed Lee through the activity. Lee's overall percentage of interactions with classmates was comparable to Zack who had 87% of all interactions with classmates. Although these numbers are similar, Zack still had 145% more interactions with classmates in GPE than Lee. Classmates were often observed giving Lee 'high fives' and other forms of praise during GPE. These interactions increased on the day the class played basketball. During basketball Lee had 36 interactions with classmates, with the next highest number of interactions with classmates during a session being 18.

In GPE Zack interacted with several different classmates. He also interacted with Lee predominately during warm-up. Zack had 16 total interactions with classmates with disabilities over the five sessions. All 16 of these interactions were with Lee. Without being assigned to do so, Zack often volunteered to have Lee in his group or helped make sure Lee was in the right place during class. Though Zack was not constantly interacting with Lee, he was observed helping Lee on multiple occasions.

Both Lee and Zack had low numbers of interactions with their GPE teacher, Mr. Carlson. Lee had 3% of his total interactions with Mr. Carlson, while only 7% of Zack's interactions were with Mr. Carlson. Mr. Carlson had a large number of students in half of a large gym. The other half of the gym was occupied by another GPE class at the same time. For this reason, space was often limited and students were sometimes divided between the gym and the fitness room. The fitness room had four stationary bikes, three

stair climbers, two pull-up machines, and multiple jump ropes. When students were in the fitness room they were not in contact with Mr. Carlson. Even when in the gym with Mr. Carlson, he was working to direct a large group and was not able to give large amounts of individual attention.

Table 6

Case 2 – Frequency of Social Interactions in GPE as a Function of the Other Individual in the Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Classmate w/o disability	12	36	8	18	18	17.00	11.22
Classmate w/ disability	0	0	1	1	0	0.40	0.55
Teacher	0	1	0	1	2	0.80	0.84
Aide	2	1	7	3	4	3.40	2.30
Other	2	0	0	1	0	0.60	0.89
Total	16	38	16	24	24	23.60	8.99
Zack (comparison)							
Classmate w/o disability	50	60	52	34	29	45.00	13.00
Classmate w/ disability	3	5	0	4	4	3.20	1.92
Teacher	4	1	4	3	5	3.40	1.52
Aide	0	0	0	0	1	0.20	0.45
Other	0	0	0	0	0	0.00	0.00
Total	57	66	56	41	39	51.80	11.48

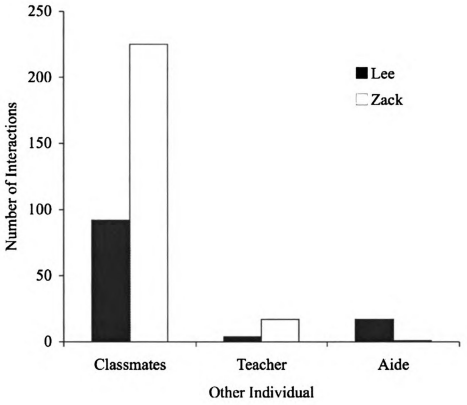

Figure 4. Case 2 – Total frequency of interactions with various individuals across the five GPE class sessions.

Social studies. In social studies Lee had 108 of the total 179 (60%) interactions with his aide across the five sessions, while Zack had 139 of the total 189 (74%) of his interactions with classmates (see Table 7 and Figure 5). In the first two social studies class sessions, Lee had no interactions with classmates. On the third observation session, the students were allowed to pick new seats in the classroom. Lee voluntarily moved from his seat alone in the front of the classroom to a seat between classmates in the third row of tables. After this move, more interactions with classmates were observed for Lee. Students who now sat around Lee often volunteered to help him with assignments at the request of the teacher, Mrs. Simon.

Mrs. Simon had several interactions with both Lee and Zack during social studies. Of Lee's total interactions in social studies, 17% occurred with Mrs. Simon, and 25% of Zack's interactions were with Mrs. Simon. Mrs. Simon often walked throughout the classroom checking on each of the students and their work. Mrs. Simon and the aide, Mrs. Shepard, worked together to keep Lee's assignments as similar to his classmates' as possible. This allowed Lee to interact with Mrs. Simon when she was asking questions of the entire class.

Cross-case Comparisons

Students with autism interacted less frequently than their comparison classmates in both GPE and academic class. Data were combined across cases to conduct a chi-square analysis of total interactions across settings (refer to Table 8). The comparison classmates had more total interactions in GPE than the students with autism. The students with autism had more total interactions in academic classes than in GPE. Students with autism had 47% of their interactions in GPE and 53% in academic classes.

Table 7

Case 2 – Frequency of Social Interactions in Social Studies as a Function of the Other Individual in the Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Classmate w/o disability	0	0	8	15	2	4.80	6.10
Classmate w/ disability	1	9	1	1	0	2.40	3.71
Teacher	11	8	7	4	1	6.20	3.83
Aide	9	35	25	23	16	22.00	9.17
Other	1	1	0	1	0	0.60	0.55
Total	22	53	41	44	19	35.80	14.69
Zack (comparison)							
Classmate w/o disability	22	34	26	30	27	27.60	4.83
Classmate w/ disability	0	0	0	0	0	0.00	0.00
Teacher	16	16	5	7	3	9.20	5.93
Aide	0	2	1	0	0	0.60	0.89
Other	0	0	0	0	0	0.00	0.00
Total	38	52	32	37	30	37.80	8.61

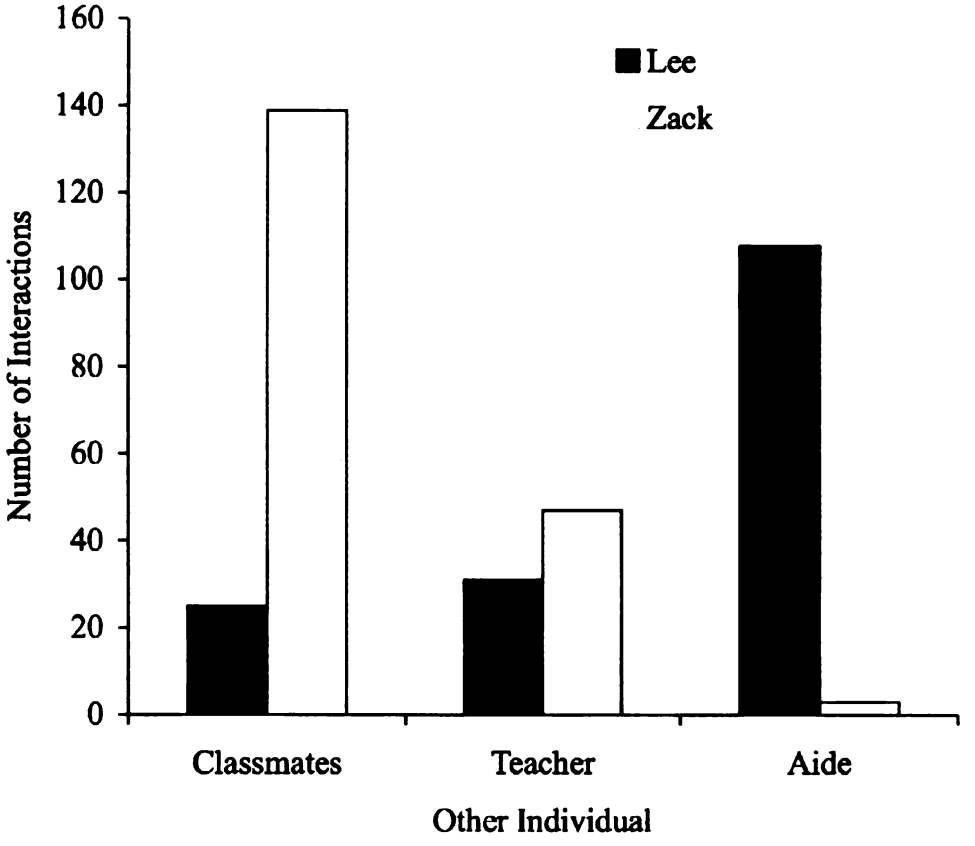

Figure 5. Case 2 – Total frequency of interactions with various individuals across the five social studies class sessions.

Table 8

Chi-square Analysis of the Total Frequency of Interactions

	GPE	Academic Classes	Total
Students with Autism (Kevin and Lee)	204	233	437
Comparison Classmates (Adam and Zack)	433	282	715
Total	637	515	1152

$\chi^2(1, N=1152) = 21.13, p < .001$

Kevin interacted approximately half as frequently in both settings than Adam, and Lee interacted about half as frequently as Zack in GPE. The only situation in which interaction frequencies were comparable between the students with autism and the comparison classmate was in Lee and Zack's social studies classroom. In the five social studies sessions combined Lee had 179 total interactions while Zack had a comparable 189 interactions. However, the data were also compared based upon the other individual involved in the interaction.

The students with autism interacted more frequently with classmates in GPE (76%) than in academic settings (24%). Students with autism were also more likely (76%) than comparison classmates (64%) to interact with classmates in GPE ($\chi^2(1, N=746) = 8.45, p < .01$; refer to Table 9). Kevin interacted with classmates 115% more in GPE than math, and Lee interacted with classmates 268% more in GPE than social studies. In Kevin's GPE, classmates had more opportunity to help Kevin with activities than in math. In GPE Kevin was always participating in exactly the same activity as

classmates, therefore they were able to assist and interact with him about the activity. In math class Kevin was sometimes completing different assignments than his classmates and as a result they were unable to help him. Lee's classmates in social studies were willing to help and interact with him upon the teacher's request and when talking was allowed during an activity. However, in GPE the students were often allowed to talk during the game or activity, so classmates were able to interact with Lee. Classmates who were on teams with Lee during GPE were also likely to interact with Lee as part of the game.

Table 9

Chi-square Analysis of the Total Frequency of Interactions with Classmates

	GPE	Academic Classes	Total
Students with Autism (Kevin and Lee)	120	38	158
Comparison Classmates (Adam and Zack)	374	214	588
Total	494	252	746

$\chi^2(1, N=746) = 8.45, p < .01$

Interactions among students with autism and their aides were observed at high rates for both Kevin and Lee in all but one setting. Kevin had 56% of all interactions in GPE and 74% of all interactions in math with his aide. Lee had 61% of all interactions in social studies with his aide, however, only 14% with his aide in GPE. Lee was able to participate in GPE without constant guidance from his aide. Kevin, however, needed almost continuous guidance from his aide to participate. Kevin's aide would stand to the

side during warm-up, which had been the same for the students all year, but had to direct him through the new activities of the sessions.

In all but one setting, the students with autism interacted less than half as often with teachers than the comparison classmates. In GPE Kevin had 10 interactions and Adam had 22 interactions with Mr. Patton during the five sessions. Mr. Patton worked to help include Kevin with his classmates. Mr. Patton would make sure he got a turn to bat in kickball and helped him move through activity stations. However, Kevin's math teacher was often occupied helping classmates with their assignment, while Kevin's aide helped him with his assignment. With the aide present, the teacher did not help Kevin; therefore, Kevin only had one interaction with his math teacher during all five sessions. Lee's physical education teacher, Mr. Carlson, had very few interactions with Lee, while his social studies teacher, Mrs. Simon had 31 interactions with Lee. In comparison, Zack had 325% more interactions with Mr. Carlson and 52% more interactions with Mrs. Simon.

Nature of Social Interactions

The second research question focused on the nature of social interactions, and results indicated that the students with autism predominately engaged in appropriate or positive interactions. The students with autism also engaged in lower numbers of inappropriate and off-task interactions than the comparison classmates. Students with autism had more positive interactions than the comparison classmates in all settings. Even though students with autism often engaged in fewer interactions than comparison classmates, results indicated that these interactions were generally appropriate in nature.

Case 1 – Kevin and Adam

GPE. In GPE both Kevin and Adam had several appropriate interactions, with 62% of Kevin's and 73% of Adam's interactions being appropriate in nature (refer to Table 10). However, Kevin had 50% more positive interactions than Adam. These positive interactions included 'high fives' and praise from the teacher, aide, and classmates. When Kevin completed a task or followed directions, he was almost immediately offered praise. Adam also received praise but not for smaller accomplishments such as completing the warm-up, for which Kevin often received praise. Adam engaged in 5 total inappropriate and 20 off-task interactions combined during all five GPE sessions. Kevin did not engage in any inappropriate or off-task behaviors. In GPE Kevin never initiated any interactions. All interactions occurred because another individual approached Kevin to help or involve him in the task.

Math. During all five math sessions, 100% of Kevin's interactions and 73% of Adam's interactions were appropriate or positive in nature (refer to Table 11). However, Kevin engaged in three times as many positive interactions than Adam. These positive interactions were usually praise for accomplishment of math problems or worksheets, and came from the classmates, teacher, and aide. Kevin often received a 'high five' after each set of math problems were completed. Upon seeing this praise given by the aide, classmates at the table which Kevin sat often would join in and praise Kevin as well.

In math, Kevin did not have any inappropriate or off-task interactions, and Adam had no inappropriate and 25 off-task interactions. Adam's off-task interactions were frequently the result of the classmates sitting at his table. If the surrounding classmates would begin an off-task discussion, Adam would often join in. Adam also initiated some

of the off-task interactions after Mrs. Davis had asked them to work quietly on math worksheets. The majority of math class time was spent completing worksheets or doing math problems together on the whiteboard.

Table 10

Case 1 – Frequency of Social Interactions in GPE as a Function of Type of Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Appropriate	10	11	12	10	10	10.60	0.89
Positive	3	6	5	10	9	6.60	2.88
Inappropriate	0	0	0	0	0	0.00	0.00
Off-task	0	0	0	0	0	0.00	0.00
Total	13	17	17	20	19	17.20	2.68
Adam (comparison)							
Appropriate	21	33	25	29	19	25.40	5.73
Positive	1	3	5	7	6	4.40	2.41
Inappropriate	2	1	0	1	1	1.00	0.71
Off-task	3	2	4	5	6	4.00	1.58
Total	27	39	34	42	32	34.80	5.89

Table 11

Case 1 – Frequency of Social Interactions in Math as a Function of Type of Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Appropriate	5	9	7	9	6	7.20	1.79
Positive	3	2	4	4	5	3.60	1.14
Inappropriate	0	0	0	0	0	0.00	0.00
Off-task	0	0	0	0	0	0.00	0.00
Total	8	11	11	13	11	10.80	1.79
Adam (comparison)							
Appropriate	12	11	14	14	11	12.40	1.52
Positive	1	2	1	1	1	1.20	0.45
Inappropriate	0	0	0	0	0	0.00	0.00
Off-task	4	3	8	6	4	5.00	2.00
Total	17	16	23	21	16	18.60	3.21

Case 2 – Lee and Zack

GPE. In GPE, 58% of Lee's and 68% of Zack's total interactions across the five class sessions were appropriate in nature (refer to Table 12). Both Lee and Zack responded appropriately to teacher questions and individual instructions. Lee engaged in 147% more positive interactions than Zack. These interactions were predominately praise given from the classmates, teacher, and aide. On the second observation day, the

class played basketball and 39% of Lee's interactions were positive because he received praise each time he made a basket or successful pass to a teammate.

Zack clearly had more inappropriate and off-task interactions than Lee during GPE. Zack engaged in 133% more inappropriate interactions than Lee. The majority of inappropriate interactions included negative talk and insults to classmates. However, Lee did have some inappropriate interactions in which classmates were teasing him or encouraging him to continue inappropriate behaviors. Zack also had a total of 46 off-task interactions and Lee had total of 4 off-task interactions during GPE.

Table 12

Case 2 – Frequency of Social Interactions in GPE as a Function of Type of Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Appropriate	10	18	11	12	17	13.60	3.65
Positive	4	14	5	8	6	7.40	3.97
Inappropriate	1	5	0	2	1	1.80	1.92
Off-task	1	1	0	2	0	0.80	0.84
Total	16	38	16	24	24	23.60	8.99
Zack (comparison)							
Appropriate	34	34	44	28	37	35.40	5.81
Positive	2	5	1	5	2	2.80	2.05
Inappropriate	4	10	5	2	0	4.20	3.77
Off-task	17	17	6	6	0	9.20	7.53
Total	57	66	56	41	39	51.80	11.48

Social studies. In all five social studies sessions combined, at least 68% of all interactions for both Lee and Zack were appropriate in nature (refer to Table 13). For Lee, another 16% of the interactions were positive in nature. Each time Lee completed a task given by his aide he was praised, not only by the aide but also by the classmates around him. Lee was praised so often he would sometimes shout out "I did it!" at the completion of a task. Lee's teacher was effective at praising Lee when he was on-task and completing assigned materials. Zack only experienced three positive interactions throughout social studies. Zack kept up with the assigned work and often read quietly after completing the assigned task and did not draw any attention to himself. Zack did not seem to need constant praise to continue completing the class assignments. Classmates did not outwardly praise Zack, but were often asking for his help or asking what he wrote for particular assignment answers.

The second most prevalent type of interaction for Zack was off-task, which was 22% of all interactions. In social studies students were given assignments on which they were allowed to work in pairs or small groups. Zack always worked with the classmate seated next to him, but often Lee would work independently on a related project. Working with a classmate allowed Zack more opportunity to engage in off-task interactions. Lee engaged in a total 22 off-task interactions during the observation sessions. Most often Lee would have off-task interactions about extra personal reading materials. For example, Lee enjoyed looking at magazines and often went to the basket of magazines at the front of the class to read when he should have been doing a task related to social studies.

Table 13

Case 2 – Frequency of Social Interactions in Social Studies as a Function of Type of Interaction

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Appropriate	13	35	30	30	14	24.40	10.16
Positive	7	3	4	11	3	5.60	3.44
Inappropriate	0	5	1	1	0	1.40	2.07
Off-task	2	10	6	2	2	4.40	3.58
Total	22	53	41	44	19	35.80	14.69
Zack (comparison)							
Appropriate	29	35	29	28	20	28.20	5.36
Positive	0	2	0	1	0	0.60	0.89
Inappropriate	2	0	0	0	2	0.80	1.10
Off-task	7	15	3	8	8	8.20	4.32
Total	38	52	32	37	30	37.80	8.61

Cross-case Comparisons

The majority of interactions of the students with autism (90%) were appropriate or positive in nature. Students with autism were more likely (90%) than comparison classmates (77%) to have appropriate and positive interactions across all settings ($\chi^2(1, N=1152) = 31.68, p < .001$; refer to Table 14). However, both students with autism (10%) and comparison classmates (23%) had low percentages of total inappropriate and off-task interactions across settings.

Table 14

Chi-square Analysis of the Nature of Interactions

	Appropriate and Positive	Inappropriate and Off-task	Total
Students with Autism (Kevin and Lee)	395	42	437
Comparison Classmates (Adam and Zack)	553	162	715
Total	948	204	1152

$\chi^2(1, N=1152) = 31.68, p < .001$

Both Kevin and Lee had more positive interactions than Adam and Zack, respectively. The students with autism were engaged in at least 50% more positive interactions than comparison classmates in all settings. Total positive interactions throughout the observations were as low as three interactions for comparison classmates. Classmates, teachers, and aides were observed praising the students with autism more frequently and for smaller accomplishments than comparison classmates. For example, Lee was praised after every basket he made during the basketball game even when he had committed a foul, such as traveling. When Zack would commit a foul, several classmates would begin to yell and take the ball away.

Both of the comparison classmates had more inappropriate and off-task interactions than the students with autism. In fact, it was rare that a student with autism had an inappropriate interaction. Kevin had no inappropriate interactions and Lee had only 9 inappropriate interactions in GPE, and 7 inappropriate interactions in social studies. Kevin had no off-task interactions, while Lee had 4 off-task interactions in GPE and 22 off-task interactions in social studies. Kevin did not initiate any interactions with

others, therefore did not initiate any inappropriate or off-task interactions. Lee was more likely to initiate interactions than Kevin and engaged in some inappropriate and off-task interactions.

Tasks and Social Interactions

The third research question focused on the tasks during which social interactions occurred, and the results indicated that the majority of interactions for all students happened during the ALT-PE activity category. In both GPE and the academic classes, the comparison students had more interactions during the ALT-PE knowledge category than the students with autism. The ALT-PE waiting category also contained interactions for all students in GPE, especially Lee and Zack. These results indicate that during certain tasks more interactions occurred for all students, including those with autism.

Case 1 – Kevin and Adam

GPE. In the five GPE class sessions combined, 94% of Kevin's interactions and 84% of Adam's interactions happened during the ALT-PE activity category (refer to Table 15). Activities in GPE included rollerblading, kickball, tee-ball, track and field, and athletic video games such as Nintendo Wii and Dance Dance Revolution. The students began each session by walking around the gym then taking a seat at their designated spot on the floor. At this time Mr. Patton gave announcements to the class and reviewed the knowledge content of the day (e.g., muscle location, kidney facts, etc.). After announcements the students had a stretching and warm-up routine, which was the same each day. At that point the activities of the day were explained and the students participated in these activities.

The classroom and content was very well organized and therefore students did not spend much time in the ALT-PE waiting or management categories. In fact, Kevin only had one interaction during waiting and three interactions during management over all five sessions. Adam had five interactions during waiting and two interactions during management. Field notes revealed that talking was not allowed during warm-up and announcements in Mr.Patton's class. Therefore high numbers of interactions were not expected throughout the entire class. Students were allowed to interact during all activities, but were asked to leave the gym if too many inappropriate interactions occurred. For example, the entire class had to sit down quietly during a game of kickball because too many negative comments were occurring amongst teammates.

BEACHES physical activity level data were collected for Case 1. These data indicated that the majority of interactions for both students occurred while standing or walking (refer to Table 16). Kevin had 42% and Adam had 37% of the total interactions during walking. This included walking as an activity as well as walking between activities or stations. Only 26% of Kevin's and 13% of Adam's total interactions occurring during the BEACHES very active category. Students were not regularly engaged in the very active category, and when engaged in the very active category they were often unable to converse. For example, when sprinting over small hurdles in the track and field stations, students were unable to speak with each other due to high physical exertion.

Table 15

Case 1 – Frequency of Interactions in GPE as a Function of ALT-PE Task Categories

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Activity	12	16	16	19	18	16.20	2.68
Waiting	0	0	0	1	0	0.20	0.45
Transition	0	0	0	0	1	0.20	0.45
Management	1	1	1	0	0	0.60	0.55
Knowledge	0	0	0	0	0	0.00	0.00
Total	13	17	17	20	19	17.20	2.68
Adam (comparison)							
Activity	19	34	26	37	29	29.00	7.04
Waiting	1	1	2	1	0	1.00	0.71
Transition	3	1	4	2	3	2.40	1.14
Management	1	1	0	0	0	0.40	0.55
Knowledge	3	2	2	2	0	1.80	1.10
Total	27	39	34	42	32	34.80	5.89

Table 16

Case 1 – Frequency of Interactions in GPE as a Function of BEACHES Physical Activity Levels

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Lying Down	0	0	0	0	0	0.00	0.00
Sitting	0	1	0	2	0	0.60	0.89
Standing	5	4	7	3	6	5.00	1.58
Walking	4	7	6	9	10	7.20	2.39
Very Active	4	5	4	6	3	4.40	1.14
Adam (comparison)							
Lying Down	0	0	0	0	0	0.00	0.00
Sitting	4	6	3	7	3	4.60	1.82
Standing	9	17	12	13	12	12.60	2.88
Walking	11	10	11	17	16	13.00	3.24
Very Active	3	6	8	5	1	4.60	2.70

Math. During the ALT-PE activity category, 93% of Kevin's and 80% of Adam's total interactions occurred during the five math class sessions (refer to Table 17). Activity in math class predominately involved the student's completing math worksheets or working as a class to solve a problem on the whiteboard. Though Kevin was always working on the same math topic, he was not always doing the exact same assignment as the classmates. For example, when working on fractions the classmates did worksheets with fractions represented by numbers while Kevin did sheet using pictorial representations of fractions. Kevin was guided through his math work by his aide and rarely by classmates who were trying to help.

No interactions were observed during the ALT-PE waiting or management categories for either student. Mrs. Davis always had work ready for the students to complete, so there was rarely any waiting or management time in the class. Also, Kevin did not interact during the knowledge category. Most interactions during knowledge for Adam occurred when he answered a question posed by Mrs. Davis. Kevin never attempted to engage in full class conversations or knowledge discussions.

During all observed math class sessions, both students spent the largest amount of time in the BEACHES sitting category. Students were expected to remain in their seats while working on the math assignments. Therefore, 94% of Kevin's and 88% of Adam's total interactions occurred in the BEACHES sitting category (refer to Table 18). Kevin had a total of three interactions while standing, all of which occurred just before sitting in his chair. Adam had seven interactions while standing and four interactions while walking. Adam sometimes left his seat and walked around the room to sharpen his pencil, get paper, or get a drink of water.

Table 17

Case 1 – Frequency of Interactions in Math as a Function of ALT-PE Task Categories

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Activity	8	11	10	10	11	10.00	1.22
Waiting	0	0	0	0	0	0.00	0.00
Transition	0	0	1	3	0	0.80	1.30
Management	0	0	0	0	0	0.00	0.00
Knowledge	0	0	0	0	0	0.00	0.00
Total	8	11	11	13	11	10.80	1.79
Adam (comparison)							
Activity	16	15	17	12	14	14.80	1.92
Waiting	0	0	0	0	0	0.00	0.00
Transition	1	0	2	2	2	1.40	0.89
Management	0	0	0	0	0	0.00	0.00
Knowledge	0	1	4	7	0	2.40	3.05
Total	17	16	23	21	16	18.60	3.21

Table 18

Case 1 – Frequency of Interactions in Math as a Function of BEACHES Physical Activity Levels

	Class Session						
	1	2	3	4	5	*M*	*SD*
Kevin (autism)							
Lying Down	0	0	0	0	0	0.00	0.00
Sitting	8	11	10	12	10	10.40	1.52
Standing	0	0	1	2	0	0.60	0.89
Walking	0	0	0	0	0	0.00	0.00
Very Active	0	0	0	0	0	0.00	0.00
Adam (comparison)							
Lying Down	0	0	0	0	0	0.00	0.00
Sitting	12	14	23	18	15	16.40	4.28
Standing	2	2	0	1	2	1.20	0.84
Walking	2	0	0	2	0	0.80	1.10
Very Active	0	0	0	0	0	0.00	0.00

Case 2 – Lee and Zack

GPE. More than 60% of all interactions for both Lee and Zack occurred during the ALT-PE activity category in GPE (refer to Table 19). Activities in GPE included floor hockey, basketball, kickball, tennis, and the fitness room. All classes began with the same stretching and warm-up routine, which included sit-ups and push-ups followed by a three to five minute jog. After warm-up Mr. Carlson divided the class into teams if needed, or jogged with the students to the tennis courts. Due to the large class size,

certain activities involved waiting. For example, when the class went to the tennis courts, students had to wait in line to hit the ball during drills. This time in the ALT-PE waiting category fostered 18 total interactions for Lee and 55 total interactions for Zack. Interactions also occurred during transition for both students as they rotated among spaces and activities.

Table 19

Case 2 – Frequency of Interactions in GPE as a Function of ALT-PE Task Categories

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Activity	8	30	12	7	20	15.40	9.63
Waiting	2	0	1	13	2	3.60	5.32
Transition	6	5	1	3	2	3.80	2.59
Management	0	3	0	0	0	0.60	1.34
Knowledge	0	0	2	1	0	0.60	0.89
Total	16	38	16	24	24	23.60	8.99
Zack (comparison)							
Activity	40	52	27	9	32	32.00	15.95
Waiting	11	0	15	26	3	11.00	10.44
Transition	6	7	12	5	4	6.80	3.11
Management	0	7	1	0	0	1.60	3.05
Knowledge	0	0	1	1	0	0.40	0.55
Total	56	66	57	41	39	51.80	11.48

Social studies. In social studies, 81% of Lee's and 79% of Zack's total interactions occurred during the ALT-PE activity category (refer to Table 20). Mrs. Simon had the students engaged in several activities including poster making, completing workbook pages, writing letters, and reading the textbook in groups. Field notes revealed that these activities were almost entirely partner or small group tasks. Rarely were students required to complete tasks alone except when taking quizzes. Mrs. Simon encouraged students to help each other learn the information and complete assignments. For example, once students completed their own posters they were asked to help a classmate finish his or her poster.

Both Lee and Zack had the second highest number of interactions during the ALT-PE management category. These interactions mostly occurred during morning announcements and organization. Though students were supposed to be quietly listening to the announcements, they often talked quietly right through them. Mrs. Simon did not explicitly forbid talking, but did state that if a student was not listening he or she would not hear the announcements.

Cross-case Comparisons

Students with autism (81%) and the comparison classmates (74%) engaged in the most interactions during the ALT-PE activity category in all educational settings ($\chi^2(1, N=1152) = 7.24, p < .01$; refer to Table 21). Students with autism interacted at similar rates in each ALT-PE category as comparison classmates. Students with autism did not require any different task settings than the comparison classmates to engage in social interactions.

Table 20

Case 2 – Frequency of Interactions in Social Studies as a Function of ALT-PE Task Categories

	Class Session						
	1	2	3	4	5	*M*	*SD*
Lee (autism)							
Activity	20	44	29	36	16	28.80	11.30
Waiting	1	0	1	0	0	0.40	0.55
Transition	1	6	0	2	1	2.00	2.35
Management	0	2	7	6	2	3.80	2.49
Knowledge	0	1	4	0	0	1.00	1.73
Total	22	53	41	44	19	35.80	14.69
Zack (comparison)							
Activity	32	42	24	26	25	29.80	7.50
Waiting	2	0	0	0	1	0.60	0.89
Transition	0	4	1	4	3	2.40	1.82
Management	0	4	6	7	1	3.60	3.05
Knowledge	4	2	1	0	0	1.40	1.67
Total	38	52	32	37	30	37.80	8.61

Table 21

Chi-square Analysis of the ALT-PE Tasks

	Activity	Other ALT-PE Categories Combined	Total
Students with Autism (Kevin and Lee)	353	84	437
Comparison Classmates (Adam and Zack)	528	187	715
Total	948	204	1152

$\chi^2(1, N=1152) = 7.24, p < .01$

For both students with autism and comparison classmates, more interactions during the ALT-PE knowledge category occurred in the academic classes than during GPE. Kevin and Adam only had GPE for 35 minutes per session, thereby limiting the amount of time Mr. Patton had to spend on the ALT-PE knowledge category if the students were to have time to engage in any physical activity. Also, field notes revealed that in Lee's GPE class the students sat on the same place around the gym floor at the start of each session. While on these spots, the students were several feet apart. This distance made it difficult for Mr. Carlson to have knowledge discussions. Therefore it was seen that more knowledge interactions occurred during academic classes. The math and social studies classes were physically and content designed to include knowledge time.

In GPE, interactions for students with autism and comparison classmates occurred in the ALT-PE waiting category, especially in Case 2. Certain activities in GPE caused more waiting time for students (e.g., standing in line to bat, standing in line to hit a tennis ball, etc.). During one day of tennis, Zack had 26 interactions while waiting and only 9

during activity, because a large portion of time was spent in line waiting to hit the ball. On the same day Lee had 13 interactions while waiting and only 7 interactions during activity. Mr. Carlson hit tennis balls to one student at a time so waiting in lines occurred. Case 1 had fewer students; therefore, waiting for activities was minimized. The majority of waiting occurred when Kevin and Adam were in line to bat in tee-ball or kickball. Therefore, Kevin only had 1 interaction and Adam only had 5 interactions while waiting.

Interactions of Nature and Tasks

The fourth research question focused on the interactions between the nature and context of social interactions. The results indicated that students with autism have the highest number of appropriate interactions during the ALT-PE activity category. The comparison students also had the highest number of appropriate interactions during activity. In Case 1, all types of interactions were rarely observed during the waiting and management categories in both GPE and math. In Case 2, multiple types of interactions were observed during waiting in GPE. Overall, the results indicate that activity was associated with the most appropriate and positive interactions for students with autism.

Case 1 – Kevin and Adam

GPE. In GPE the majority of all Kevin's interactions occurred in the ALT-PE activity category, this included the highest number of appropriate and positive interactions (refer to Table 22). During activity Kevin had a total of 50 appropriate and 31 positive interactions when all 5 sessions were combined. Adam, during activity, had 107 appropriate, 21 positive, 5 inappropriate, 12 off-task interactions. The high number of appropriate and positive interactions during activity are logical as the highest total number of interactions occurred in activity for both students. For Kevin, the next highest

ALT-PE category was management with 2 appropriate and 1 positive interaction. For Adam, the next highest ALT-PE category was transition with 10 appropriate and 3 off-task interactions.

Table 22

Case 1 - Frequency of Interactions in ALT-PE Categories in GPE as a Factor of Nature of Interactions

	ALT-PE Category				
	Activity	Waiting	Transition	Management	Knowledge
Kevin (autism)					
Appropriate	50	1	0	2	0
Positive	31	0	1	1	0
Inappropriate	0	0	0	0	0
Off-task	0	0	0	0	0
Adam (comparison)					
Appropriate	107	1	10	2	7
Positive	21	0	0	0	1
Inappropriate	5	0	0	0	0
Off-task	12	4	3	0	1

Math. In math, Kevin had 35 out of 36 of his total appropriate interactions during the ALT-PE activity category (refer to Table 23). Also during activity, Kevin had a total of 15 positive interactions. Therefore, 93% of all types of Kevin's interactions occurred during activity. Positive interactions for Kevin were also seen during the ALT-PE transition category. These interactions were praise that occurred for Kevin while transitioning into the start of the math activity. The aide and classmates praised Kevin for getting his math materials ready on his desk.

During the ALT-PE activity category, Adam had 51 appropriate, 5 positive, and 18 off-task total interactions during all five math class sessions. The ALT-PE knowledge category included 7 appropriate and 1 positive interaction for Adam. Adam was generally attentive in math class and frequently answered or asked questions. However, Adam did have 4 off-task interactions during knowledge tasks. These interactions often included off-task conversations by the students who shared a table with Adam.

Table 23

Case 1 - Frequency of Interactions in ALT-PE Categories in Math as a Factor of Nature of Interactions

	ALT-PE Category				
	Activity	Waiting	Transition	Management	Knowledge
Kevin (autism)					
Appropriate	35	0	1	0	0
Positive	15	0	3	0	0
Inappropriate	0	0	0	0	0
Off-task	0	0	0	0	0
Adam (comparison)					
Appropriate	51	0	4	0	7
Positive	5	0	0	0	1
Inappropriate	0	0	0	0	0
Off-task	18	0	3	0	4

Case 2 – Lee and Zack

GPE. In GPE both Lee and Zack had the highest percentage of appropriate interactions during the ALT-PE activity category. Lee had 60% and Zack had 63% of their total appropriate interactions in the activity category (refer to Table 24). The ALT-PE categories of activity and waiting both contained all four types of interactions from Lee and Zack. Lee had 18% of all total appropriate interactions during the transition category, while Zack's next highest percentage of appropriate interactions occurred in the waiting category. For Zack, the activity category not only had the most appropriate interactions but also the most inappropriate and off-task behaviors. This could be a function of the fact that the overall majority of all types of interactions occurred during activity.

Table 24

Case 2 - Frequency of Interactions in ALT-PE Categories in GPE as a Factor of Nature of Interactions

	ALT-PE Category				
	Activity	Waiting	Transition	Management	Knowledge
Lee (autism)					
Appropriate	41	9	12	3	3
Positive	28	5	4	0	0
Inappropriate	6	2	1	0	0
Off-task	2	2	0	0	0
Zack (comparison)					
Appropriate	112	36	25	4	0
Positive	10	4	1	0	0
Inappropriate	14	3	4	0	0
Off-task	24	12	4	4	2

Social studies. Both Lee and Zack had the highest total frequency of appropriate interactions during the ALT-PE activity category in the five social studies class sessions (refer to Table 25). Lee had 99 of his 122 appropriate interactions during the activity category, and Zack had 114 of his 141 appropriate interactions during activity. Transition included all four types of interactions for Lee while Zack only had appropriate and off-task interactions. Both Lee and Zack had the fewest number of all types of interactions during the waiting category. Lee had one appropriate and one off-task and Zack had two appropriate and one off-task interaction during waiting. Mrs. Simon kept the students busy with assignments and therefore may have limited the time students spent in the waiting category.

Table 25

Case 2 - Frequency of Interactions in ALT-PE Categories in Social Studies as a Factor of Nature of Interactions

	ALT-PE Category				
	Activity	Waiting	Transition	Management	Knowledge
Lee (autism)					
Appropriate	99	1	5	15	2
Positive	25	0	1	2	0
Inappropriate	4	0	2	0	1
Off-task	17	1	2	0	2
Zack (comparison)					
Appropriate	114	2	8	11	6
Positive	2	0	0	1	0
Inappropriate	4	0	0	0	0
Off-task	29	1	4	6	1

Cross-case Comparisons

Students with autism and comparison classmates consistently had the highest frequencies of appropriate and positive social interactions during the ALT-PE activity category. Overall, students with autism did not vary greatly from comparison classmates in the way the various types of interactions were distributed among the ALT-PE categories. Also, differences were not observed in this distribution for all students between GPE and academic classes. GPE had more types of interactions within more ALT-PE categories, however, the numbers were often small when compared to the number of interactions in the activity category. For example, Lee had 9 appropriate, 5 positive, 2 inappropriate, and 2 off-task interactions during waiting in GPE, but these numbers are smaller compared to the 41 appropriate, 28 positive, 6 inappropriate, and 2 off-task interactions in the activity category.

The fewest numbers of all types of interactions for all students occurred in the ALT-PE management category. The highest number of types of interactions occurred during management for Zack in social studies; he had 11 appropriate, 1 positive, and 6 off-task interactions. Management activities were often times in which students were not allowed to talk. Though this did not discourage all interactions, it certainly did not foster them as activity did. Interactions were not permitted by teachers during all class contexts and perhaps management was a time in which interactions should not have been occurring.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

The purpose of this study was to examine the nature and frequency of social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides) during various tasks in general physical education (GPE), relative to social interactions in other education settings. Results are discussed relative to contributions to the research literature and methodological limitations. This chapter concludes with a summary of this research and recommendations for further study.

Contributions to the Literature

In this study all three factors identified in the review of literature, namely the nature of the educational environment, the individuals in the setting, and the tasks in which students engage, influenced social interactions for the students with autism.

Environment

Physical activities have been proposed as natural settings for promoting positive social interactions for individuals with autism (Kitson, 1993; O'Connor et al., 2000; Reid & O'Connor, 2003; Schleien et al., 1988). Physical education in school may provide the bulk of physical activity for youths with autism (Pan, 2008; Pan & Frey, 2006); therefore, GPE may provide a good educational environment for social interactions. The results of this study found that students with autism had more interactions with classmates in GPE than in academic classes. Students with autism interacted more frequently with classmates in GPE than in academic classes (refer to Tables 4, 5, 6, 7).

In past research, students with physical disabilities have reported negative feelings such as being left out, neglected, or teased in GPE (Blinde & McCallister, 1998;

Goodwin & Watkinson, 2000; Hutzler et al., 2002; Place & Hodge, 2001). However, in the current study, students with autism engaged in social interactions in GPE and generally did not appear socially isolated. Kevin engaged in more social interactions in GPE than in math, thereby indicating the possibility that GPE may provide an environment conducive to facilitating interactions. Kevin did not interact as often as Adam, but Kevin did interact more in GPE than in math. It may not be imperative that a student with autism engages in equal numbers of interactions as his classmates, but it would seem to be important to understand which environments foster increased interactions.

Ellis and colleagues (1996) found that students with disabilities (i.e., mental retardation) interacted most frequently with peers in small group or free play situations, while teacher interactions occurred most frequently during independent activities. Lee and Kevin were both more engaged with classmates when the activities were small or large group in nature. For example, Lee engaged with classmates while playing floor hockey, but kept to himself when in the fitness room with a group. Kevin interacted with his partners when playing active video games, but completed golf putts with assistance from only his aide and teacher. This may have occurred because the partner or group activities forced interactions, while the individual activities may have required more effort from the students with autism to interact with others.

Individuals with autism may have difficulties with certain environmental stimuli (O'Connor et al., 2000; Reid et al., 2003). Kevin did have difficulties interacting during loud, chaotic GPE activities. For example, his lowest levels of interactions were observed on the day the class played kickball. While waiting to bat, Kevin stood in line

next to his aide with his fingers in his ears, and when in the field he stood near the corner and gazed about the room. During the game, classmates appeared too engaged to make extra effort to include Kevin.

Frequency of Interactions

In the only past study about social interactions of students with autism in GPE, results have indicated "that interaction levels were much higher with classroom aides than with teachers, and very low with peers" (Lisboa, 1997, p. 1). Kevin's results are fairly consistent with these findings. Although Kevin interacted more in GPE, these interactions occurred more frequently with his aide than with his classmates. Contrary to the findings of Lisboa (1997), Lee did not interact more with his aide than his classmates in GPE. However, in social studies Lee did interact far more with his aide than with classmates. These findings indicate that interactions may be influenced not only by the student with autism, but by the environment as well.

Even though Lee did not engage in more total interactions in GPE than social studies, there was a large difference in the individuals with whom he interacted. In social studies, the majority of interactions occurred with his aide, but in GPE he was more likely to interact with classmates. Lee was as physically skilled as most of his classmates, and therefore was able to play and interact well with his classmates. This is contrary to past research which has concluded that children with autism often possess low levels of physical fitness (Auxter et al., 1997; Ho et al., 1997). In this case, Lee's physical fitness and skills in certain activities generated more interactions with his classmates. Specifically, there was one GPE class session in which Lee had several more

interactions with classmates than he did in the other four sessions. During this session the class was playing basketball which was a sport Lee was skilled at and enjoyed.

Lee may have also had more interactions with peers than Kevin due to his age and the middle school setting. Children and adolescents with autism rarely develop typical peer friendships (Konging & Magill-Evans, 2001; Le Couteur et al., 1989; Marks, Schrader, Longaker, & Levine, 2000). However, there is an increase of interest in developing social relationships during adolescence (Mesibov, 1983; Mesibov & Handlan, 1997; Rutter, 1970; Volkmar & Klin, 1995). Therefore, Lee may have had more interest in developing friendship which influence interaction levels. In attempt to gain acceptance and friendships with his peers, Lee could have been interacting more than Kevin.

Varying numbers of interactions were observed between the four teachers and the two students with autism during the study. In past studies, physical educators who had more experience working with students with disabilities had significantly more favorable attitudes toward working with these students than teachers who had less experience (Block & Rizzo, 1995; Rizzo & Kirkendall, 1995; Schmidt-Gotz et al., 1994). Physical educators often feel untrained to teach children with disabilities (Block & Rizzo, 1995), the less experienced teachers in this study may have been more hesitant to interact with Lee and Kevin. The highest number of interactions in this study occurred between Mrs. Simon (social studies) and Lee. Mrs. Simon had the most overall experience teaching and she also had more experience working with students with disabilities than the other teachers in this study. Whether it was the added experience on a general basis or the

knowledge of characteristics of autism, it appeared that teacher experience affected the social interactions in this study.

Gender is another consideration when evaluating social interactions among students with autism and their classmates. Past research has been inconsistent on the influence of gender in the attitudes of students without disabilities toward peers with disabilities; however, females have been found to have more favorable attitudes toward peers with disabilities (Slininger et al., 2000; Tripp et al., 1995). This was consistent with the current study for Kevin in math and GPE and for Lee in social studies. In GPE Lee interacted almost entirely with males in the class. This may have been due to the characteristics of the specific male classmates or perhaps due to Lee's desires to seek out males as friends or teammates. Lee was a fan of several professional sports and was aware that these sports are gender segregated. This knowledge may have influenced his interactions in GPE.

Nature of Interactions

There is little information in the research literature about the nature of social interactions of students with autism in educational settings. This study was one of the first to investigate the nature of interactions and found the majority of the interactions of the students with autism were appropriate or positive in nature. Students with autism are often perceived as presenting behavior problems, especially in physical activity settings (Coyne & Fullerton, 2004). However, this study found that students with autism do not present more inappropriate or off-task interactions than comparison classmates (refer to Tables 8, 9, 10, 11). Though students with autism may not present behavior problems when interacting, they may have other challenging behaviors that require consideration.

The nature of Kevin's social interactions appeared to be greatly influenced by his communication skills. Past research has shown that about 40% of children with autism do not speak at all (Powers, 2000). Kevin mostly fit this description. He used an electronic communication board for most of his interactions. This different mode of communication greatly impaired Kevin's ability to interact. Kevin was not observed initiating an interaction, though he would interact when a classmate or his aide approached him to help or praise him. This may be why Kevin was not observed engaging in any inappropriate or off-task interactions. When he was interacting, it was because another had approached him to help or praise. No one approached him to engage in an inappropriate or off-task interactions. Classmates have known Kevin for multiple years and during observation did not tease, taunt, or make fun of him in any way. This was apparent when Kevin would have loud vocal outbursts, to which the classmates did not react. Classmates appeared to only want positive interactions with Kevin.

Lee was sometimes encouraged in his inappropriate or off-task interactions by classmates. At times when Lee would say or do something inappropriate other boys in the class would encourage him to do it again and again. They appeared to think it was funny to see if they could get Lee to continue. Students with autism have been shown to have increased interest in developing social relationships during adolescence (Mesibov, 1983; Mesibov & Handlan, 1997; Rutter, 1970; Volkmar & Klin, 1995). Therefore, Lee may have continued these inappropriate behaviors because the laughter of classmates served as positive reinforcement. Although the classmates may have been teasing Lee, it appeared his behavior was intended to impress his classmates. The researcher believes

that Lee's behaviors may have been due in part to the middle school setting which is a challenging social time for all students.

Also, both Kevin and Lee engaged in more positive interactions than Adam and Zack, respectively (refer to Tables 8, 9, 10, 11). This indicates the possibility that students with autism are being praised at higher levels than classmates. For example, in social studies class Lee and two classmates took turns reading parts of the textbook chapter aloud to each other. When the classmates finished their sections, there was no praise; however, each time Lee finished a section both students praised him. The praise appeared to be the result of good intentions though the praise for Lee was more enthusiastic than the classmates were observed giving to others. This extra praise was not deemed to be good or bad, but was clearly observed. Perhaps Kevin and Lee were students who needed high amounts of praise to stay on task, therefore making praise a valuable educational tool.

Tasks and Social Interactions

Past research has not investigated the types of tasks during which social interactions occur for students with autism. Often researchers have compared the total amount of time spent in different tasks by students with and without disabilities (Lisboa, Butterfield, Reif, & McIntire, 1995; Temple & Walkley, 1999). However, this study used the ALT-PE categories as a way to understand classroom tasks during which social interactions occurred.

The highest number of interactions for all students observed occurred during the ALT-PE activity category. This is logical due to the fact that often during the other ALT-PE categories interactions are discouraged or forbidden. For example, in Kevin's GPE

class the students were expected to sit quietly as the teacher organized the space and took attendance. It is obvious that if the expectation is to sit quietly no interactions will or should occur. Therefore, it should be remembered that at certain times in a class of any type, interactions may not be occurring. For example, during knowledge tasks a teacher may be lecturing to a class and they are expected to quietly listen. Some interactions may occur if a student asks or answers a question, but in general knowledge time is not conducive to large numbers of interactions.

Also certain task settings may not have occurred as often in each class or for each student. Place and Hodge (2001) determined that the students with disabilities spent 36% of their time in motor activity, "29% of their time waiting; 12% in transitions; 10% in knowledge content (i.e., listening to information about technique, rules of game, strategy, or background); 8% in management; and 2% off-task" (Place & Hodge, 2001, p. 401). Students without disabilities spent 31% of their time in motor activity; 13% waiting; 24% in transitions; 21% in knowledge content; 6% in management; and 5% off-task (Place & Hodge, 2001). In this study, both the students with autism and comparison classmates demonstrated limited numbers of interactions in the transitions, management, and knowledge ALT-PE categories. This may be consistent with past research because of different time spent in each category. If Kevin and Lee only spent approximately 10% of their time in knowledge activities, as in Place and Hodge (2001), then it is logical that there may not have been as many opportunities to interact during that category.

Lee and Zack had different numbers of interactions while waiting in various GPE class sessions. The content of two GPE sessions was tennis. Students often spent time in line waiting to hit the ball. This waiting time allowed for several interactions, as talking

in line was permitted by the GPE teacher. During the wait Lee received several positive interactions with classmates for his performance during his turn hitting. The praise seemed to make Lee happy and he appeared eager to get another turn so he could possibly receive more praise. So, waiting time may be undesirable when the goal is to maintain a high physical activity level, but in this study it may have provided valuable social interaction time.

Limitations

Sample size. The primary limitation of this study was sample size. A small multiple-case study does not lend to generalizability. However, this study was exploratory and descriptive in nature and did not aim to produce wide-spread generalizable findings.

Representative sample of students with autism. A second limitation was the differences between the personal characteristics of the students with autism in each case. Kevin and Lee were only one year apart in age. Though this was only one chronological year difference, Kevin was in elementary school and Lee was in middle school. These separate environments may have influenced the social climate of the classes. Kevin predominately used an electronic communication board for interactions, while Lee was fully verbal. Difference in communication style may have limited Kevin's ability to socially interact.

A limitation inherent to research with students with autism is the heterogeneity of children placed under the diagnosis of autism. Parents of students with autism in this study did answer questions relating to the DSM-IV-TR diagnosis, however, two individuals both diagnosed with autism can be quite different. Both Kevin and Lee were

similar in their physical ability and had the motor skills needed to participate in GPE alongside their classmates.

The difference in class environments may have also presented limitations to the study. The students with autism were not in the same GPE and academic classes, therefore the nature of the curricula were different. Case 1 occurred with all of the same students in math and GPE, but Case 2 had a mixture of overall students in social studies and GPE. The comparison classmate remained the same, but the difference in classmates may have influenced the number of social interactions in the setting.

In Case 2 there were also more students in the GPE class than the social studies class, which increased the student to teacher ratio in GPE. This increased ratio may have limited the GPE teacher's opportunity to interact with students on an individual basis. In addition, the comparison academic classes varied between cases. The differences between math and social studies may have influenced the results.

The different levels of experience of the teachers may have also presented limitations. For example, Mrs. Davis and Mrs. Simon were separated in number of years of experience and in experience with individuals with disabilities. This may have contributed to the interaction between the teachers and the students with autism. The aides in this study had spent different lengths of time working with the participants with autism. This may have altered how they interacted with the participants.

Limitations may have also occurred due to the special education schedule and staffing. Kevin missed multiple days during data collection due to scheduling and staffing conflicts in his special education classroom. Though research data were simply collected on another day, these absences may have disrupted socialization for Kevin.

These scheduling conflicts are a limitation, but the difficulties are inherent to special education.

Research methodology. In reference to instrumentation, the ALT-PE categories may have presented a limitation. Though there were five separate ALT-PE categories, several interactions fell under the activity category. Further divisions of the activity category may have provided more insight to understanding during which types of activities social interactions occur. One possibility could be to divide activity into independent, small group, or large group work.

In regards to data collection, a limitation was the fact that not all consent documents were returned in Case 2 which deterred video-taping. Therefore, data were collected in real-time which resulted in no videotape to review. In addition, the students with autism would not tolerate wearing a wireless microphone, as it was too distracting. Therefore all audio data were acquired from the videotape. The videotape provided ample sound, but may have missed some details when the participants were far from the camera.

Reactivity to the presence of the observers or to the video-camera may have also been a limitation during this study. Although initial sessions occurred to acclimate the students to the presence of the observers and camera, the students or teachers may still have altered their behavior during observation. The multiple class session observations were designed to minimize this limitation, however, the possibility of reactivity still existed. The most observers present in any situation was two, which was rather distracting to the students with autism. Having more than two or bringing an entirely

new person to observe would have been very disruptive to the routine of the students with autism.

Recommendations

There is ample room for more research in the area of social interactions of individuals with autism. Based on the results of the present study, several recommendations for future research and practitioners are presented here.

Future Research

- Future research should aim to replicate or expand on these findings using larger sample sizes. Larger sample size may allow for more generalizability. However, it is critical to remember that individuals with autism are a heterogeneous population. Therefore, results and findings should not be over-expanded.
- Future research should aim to accumulate more observation times, perhaps spread throughout the school year. The current study had only five observed class sessions for each setting per case. Increased observation time could provide a more detailed picture of the social interactions. Observations across an entire school year or across multiple school years might show development of or loss of social skills.
- Future research should analyze social interactions of students with autism in regards to which individual initiates the interactions. Research could show not only who initiates interactions, but also what types of interactions are initiated by the different individuals. This could help illustrate any social challenges of students with autism more specifically.

- Future research should attempt to compare GPE to other non-academic classes such as music or art. This could help to further understand any unique contributions of GPE, or other non-academic classes, toward fostering social interactions.
- Future research should focus on acquiring more detailed information about classroom context. The ALT-PE categories used in this study were general, with the majority of interactions being seen in the activity category. Perhaps researchers could investigate more specific types of activity to examine social interactions.
- Future research should more closely consider the experience and background of the teachers and aides in reference to interactions. Simple demographic forms were completed in this study; however, detailed interviews or surveys could shed more light on the potential influences of the attitudes of educators.
- Future research should focus on these findings in reference to planning effective social interventions. For example, this study found an increase in social interactions of students with autism with classmates during GPE. Therefore, GPE may be a valuable time to employ interventions such as peer tutoring. Peer tutoring may allow increased numbers of interactions as students may be more able to interact during GPE. If GPE is a uniquely social setting, then it is important to utilize the setting as much as possible.

Practitioners

- Practitioners should be provided with training about working with individuals with disabilities, including autism. The current study observed that the teacher

with the most special education training interacted with the student with autism at the highest rate. Training and education will hopefully prepare educators to comfortably teach students with autism in their classrooms.

- Practitioners should be aware of the potentially unique social setting created in GPE. Therefore, if appropriate, educators should work to allow students with autism to participate in GPE with classmates without disabilities. This inclusion may provide valuable social interactions for all individuals involved.
- Practitioners should understand the importance of activity class time in fostering social interactions. Though all class time cannot be activity time, it may be important to provide activity to allow for interactions. The current study found a relatively low rate of inappropriate and off-task interactions for students with autism, therefore, students with autism should be allowed to interact during appropriate activities.
- Practitioners, especially physical education teachers, should consider the use of peer tutors for students with autism. The current study observed classmates as very willing to interact with students with autism when asked to do so by teachers. However, assigning a peer tutor to only the student with autism could draw unnecessary attention to the student with autism. Therefore, it may be appropriate to assign all students to small groups to encourage interactions.
- Practitioners should be aware of the importance of social skill development in all students, including those with autism. Understanding this developmental need may lead to increased attempts to provide opportunities to develop these skills for all students.

Summary

Difficulty with social skills is an extremely prominent feature of autism. Individuals with autism have been found to have low levels of peer relationships, friendships, and participation in social and recreational activities (Orsmond et al., 2004). As social competence and skills are often lacking in youths with autism (McConnell, 2002; Rogers, 2000), and physical education provides a potential beneficial environment for gaining social interactions (Groft & Block, 2003), it is critical to understand any connections between social interactions and the physical activity environment. Therefore, the purpose of this study was to examine the nature and frequency of social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides) during various tasks in general physical education (GPE), relative to social interactions in other education settings.

A multiple-case study approach was used to investigate the research questions (Yin, 2003). This study primarily used observational data, supplemented by qualitative field notes and demographic data. Each of two cases were comprised of a student with autism, a comparison classmate without disability, and a shared GPE and one other academic class. Each case was observed for at least five class sessions in both GPE and another academic class (i.e., math, social studies). Behavioral observations were coded using the AIPE-SR (Hodge & Hersman, 2007), ALT-PE (Siedentop et al., 1982), and in Case 1 the BEACHES (McKenzie et al., 1991). Data were analyzed using basic descriptive statistics, chi-square analyses and visual analyses.

Results of the study revealed that students with autism did not interact with classmates at the same level as age-matched classmates without disabilities. However,

students with autism did interact more with classmates during GPE than during the academic class. Students with autism were observed interacting with aides more than with classmates in all but one instance. Specifically, one participant with autism interacted more with classmates than with aides in GPE. The number of interactions of students with autism with their teachers was very low. In fact, in certain class sessions students with autism had no direct interactions with teachers.

Results indicated that the majority of interactions by students with autism were appropriate or positive in nature. The highest number of positive interactions occurred for both students with autism in GPE. All four students had the highest number of interactions during the ALT-PE activity category. The highest numbers of positive interactions across participants and settings occurred during activity time. Students with autism were observed having lower levels of inappropriate and off-task behaviors than their classmates.

The individuals in the setting, the tasks in which they engage, and the nature of the physical activity environment, should all be considered when evaluating social interactions among students with autism in GPE and academic settings. Suomi and colleagues (2003) listed four major factors which affect social experience of students, including (a) teachers, (b) social nature of the tasks, (c) classroom cultures, and (d) social skills of the students. This study investigated similar constructs in relation to students with autism. When there is a desire to foster social interactions, there must be time allowed for activity in the class. On the basis of this study, it is difficult to say conclusively that GPE is an environment which fosters social interactions for students with autism, but it does support the claim that GPE may be a more social environment

than academic classes. GPE was found to be a unique educational setting in which appropriate and positive interactions with classmates were fostered in all students, including students with autism.

APPENDICES

APPENDIX A:
DSM-IV-TR DEFINITION OF AUTISM

Diagnostic Criteria for 299.00 Autistic Disorder

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3)

(1) Qualitative impairment in social interaction, as manifested by at least two of the following:
   (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
   (b) failure to develop peer relationships appropriate to developmental level
   (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
   (d) lack of social or emotional reciprocity

(2) Quantitative impairments in communication as manifested by at least one of the following:
   (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
   (c) stereotyped and repetitive use of language or idiosyncratic language
   (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

(3) Restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least two of the following:
   (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
   (b) apparently inflexible adherence to specific, nonfunctional routines or rituals
   (c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
   (d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder

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APPENDIX B:
MSU IRB APPROVAL LETTER

MICHIGAN STATE
UNIVERSITY

Initial IRB Application Approval

December 10, 2008

To: Gail DUMMER
138 IM Sports Circle
MSU

Re: IRB# 08-1103 Category: EXPEDITED 2-7
Approval Date: December 8, 2008
Expiration Date: December 7, 2009

Title: Social Interactions of Students with Autism in General Physical Education

The Institutional Review Board has completed their review of your project. I am pleased to advise you that **your project has been approved.**

This project has been bumped to Expedited status, category 2-7. Be sure to provide the BIRB with copies of the letters of permission from the elementary school(s).

The committee has found that your research project is appropriate in design, protects the rights and welfare of the human subjects, and meets the requirements of MSU's Federal Wide Assurance and the Federal Guidelines (45 CFR 46) and 21 CFR Part 50). The protection of human subjects in research is a partnership between the IRB and the investigators. We look forward to working with you as we both fulfill our responsibilities.

Renewals: IRB approval is valid until the expiration date listed above. If you are continuing your project, you must submit an ***Application for Renewal*** application at least on month before expiration. If the project is completed, please submit an ***Application for Permanent Closure.***

Revisions: The IRB must review any changes in the project, prior to initiation of the change. Please submit an ***Application for Revision*** to have your changes reviewed. If changes are made at the time of renewal, please include an ***Application for Revision*** with the renewal application.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that may increase the risk to the human subjects, notify the IRB office promptly. Forms are available to report these issues.

Please use the IRB number listed above on any forms submitted which relate to this project, or on any correspondence with the IRB office.

Good luck in your research. If we can be of further assistance, please contact us at 517-355-2180 or via email at IRB@msu.edu. Thank you for your cooperation.

Sincerely,

Ashir Kumar, M.D.
BIRB Chair

c: Mary Douglas
IM Circle Room 39

APPENDIX C:
CONSENT AND ASSENT DOCUMENTS

Research Participant Information and Consent Form
Students with Autism

You are being asked to give consent for your child to participate in a research project. Researchers are required to provide a consent form to inform you about the study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Social Interactions of Students with Autism in General Physical Education

Researchers: Mary Martha Douglas, Graduate Student
Dr. Gail M. Dummer, Professor

Department and Institution: Department of Kinesiology, Michigan State University

Address and Contact Information:

Mary Martha Douglas
Department of Kinesiology
39 IM Sports Circle
Michigan State University
East Lansing, MI 48824
Cell: (515) 554-9668
Fax: (517) 353-2944
dougl119@msu.edu

Gail M. Dummer
Department of Kinesiology
138 IM Sports Circle
Michigan State University
East Lansing, MI 48824
Work: (517) 355-4744
Fax: (517) 353-2944
dummer@msu.edu

Purpose

You are being asked to give your consent for your child to participate in a research study about the nature and frequency of naturally occurring social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides), during various tasks in multiple educational settings, including academic and general physical education (GPE) classes. Your child was selected as a possible participant in this study because you have volunteered information that your child has autism. From this study, the investigators hope to gain: (a) a detailed picture of what is socially occurring for youth with autism in GPE in comparison to classmates without disabilities, (b) baseline data from which appropriate social intervention goals can be set for youth with autism, (c) data about tasks in GPE which elicit social interactions that may be used for interventions or social skill training and (d) an understanding of whether or not GPE provides a unique setting for social interactions during school. In the entire study, approximately 40 people are being asked to participate. Your child's participation in this study will take about two months.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

What You Will Do
You will first complete a short survey on which you will be asked to provide information about your child's age, gender, grade in school, and diagnosis of autism. Then Mary Douglas (or another trained observer) will attend at least four hours of your child's GPE class and another academic class (such as math or social studies) to watch, take notes, and video- and audio-record what occurs. Your child will be asked to wear a wireless microphone during class to better record what occurs. Mary Douglas will sit off to the side of the gymnasium or classroom with a video-camera and unobtrusively record what occurs. The environment and tasks of your child's GPE or academic class will not be altered by the researcher. This study aims to understand what is naturally occurring, and therefore will not interfere with your child's educational experience. The recorded data will be analyzed using several observation instruments which evaluate social interactions, classroom context, and physical activity. All video- and audio-data will be analyzed in a private location so no one outside of the research team may see the data. Once the data have been analyzed, all video- and audio-recordings will be destroyed. If you so desire, you will be provided with written results of this study.

Potential Benefits
Your child will not directly benefit from participation in this study. However, your child's participation in this study may contribute to the understanding of what is socially occurring for students with autism in GPE and other academic settings. Results may also help form more appropriate social interaction goals and aid in understanding any unique attributes of GPE.

Potential Risks
The only known risk of participation is breach of confidentiality. All of the precautions below will be taken to avoid this risk.

Privacy and Confidentiality
Information about your child will be protected to the maximum extent allowable by law. Specific confidentiality provisions include: (a) the use of pseudonyms in the data or any final publications or presentations; (b) all data will be kept in a locked file cabinet in a locked office or on a password protected computer; and (d) only Mary Douglas, Gail Dummer, and the other IRB trained observers will have access to the recorded data. The results of this study may be published or presented at professional meetings, but the identities of research participants will remain confidential.

Your Rights to Participate, Say No, or Withdraw
Participation in this research project is completely voluntary. You and your child have the right to say no. You and your child may change your mind at any time and withdraw. There will be no consequences from withdrawal, simply inform the researchers that you wish to withdraw your child from the study. You may choose to not answer specific questions on the demographic form or stop participating at any time. You indicate your voluntary agreement for your child to participate by completing the consent form. Your child will indicate voluntary agreement by completing the assent form. You and your child's participation in this study will be greatly appreciated.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Costs and Compensation for Being in the Study
There are no costs for participating in this study. You will not receive money or any other form of compensation for participating in this study.

Contact Information for Questions and Concerns
If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researchers.

Mary Martha Douglas
Department of Kinesiology
39 IM Sports Circle
Michigan State University
East Lansing, MI 48824
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Fax: (517) 353-2944
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If you have questions or concerns about your child's role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 202 Olds Hall, MSU, East Lansing, MI 48824.

Thank you for your time and cooperation.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Parent/Caregiver Consent Form – Students with Autism
Social Interactions of Students with Autism
in General Physical Education

Your signature below means that you voluntarily agree to allow your child to participate in the research study named above (including videotaping of classes at school), as well as your agreement to complete the demographic survey for your child.

Child's Name _____ Child's Age in Years _____

Child's Relationship to Parent/Guardian Giving Permission _____

Your Printed Name _____ Your Signature _____

Date _____

Your signature below indicates your voluntary agreement to allow Mary Martha Douglas to contact your child's school in order to obtain access to your child's most recent Individual Education Program (IEP) in his or her permanent school record to verify the diagnosis of autism.

Your Printed Name _____ Your Signature _____

Date _____ Your Child's Name _____

You will be given a copy of this form to keep.

Please provide contact information if you would like to receive the results of this study.

Address (Street, City, State, Zip) _____

Email _____

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Participant Assent Form
Social Interactions of Students with Autism
in General Physical Education

Hi! My name is Marty Douglas. I am a graduate student at Michigan State University. I am here to ask you to help me with my school project. I would like to come to some of your classes at school including physical education. I will sit off to the side with a video camera and watch you and your class. You will wear a microphone during class, so I can hear what you say. I will show you the microphone, and then you can tell me if you would like to help me or not. *Participant will be shown the microphone and will get a chance to feel what it is like to wear it.*

Do you have any questions?

YES	NO
☺	☹

Can I come to your classes and watch what you do?

YES	NO
☺	☹

If answered yes and able: sign name below.

_____ _____
Your Printed Name Your Signature

_____
Date

If participant cannot provide written assent, he or she must provide verbal assent. Both the researcher and the parent/legal guardian must witness the assent.

Witness to the participant's assent:

_____ _____
Parent/legal guardian Signature & Date Mary Douglas' Signature & Date

_____ _____
Print Name Print Name

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Research Participant Information and Consent Form
Classmates

You are being asked to give consent for your child to participate in a research project. Researchers are required to provide a consent form to inform you about the study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Social Interactions of Students with Autism in General Physical Education

Researchers: Mary Martha Douglas, Graduate Student
Dr. Gail M. Dummer, Professor

Department and Institution: Department of Kinesiology, Michigan State University

Address and Contact Information:

Mary Martha Douglas
Department of Kinesiology
39 IM Sports Circle
Michigan State University
East Lansing, MI 48824
Cell: (515) 554-9668
Fax: (517) 353-2944
dougl119@msu.edu

Gail M. Dummer
Department of Kinesiology
138 IM Sports Circle
Michigan State University
East Lansing, MI 48824
Work: (517) 355-4744
Fax: (517) 353-2944
dummer@msu.edu

Purpose

You are being asked to give consent for your child to participate in a research study about the nature and frequency of naturally occurring social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides), during various tasks in multiple educational settings, including academic and general physical education (GPE) classes. Your child was selected as a possible participant in this study because your child has class with a student who has autism. From this study, the investigators hope to gain: (a) a detailed picture of what is socially occurring for youth with autism in GPE in comparison to classmates without disabilities, (b) baseline data from which appropriate social intervention goals can be set for youth with autism, (c) data about tasks in GPE which elicit social interactions that may be used for interventions or social skill training and (d) an understanding of whether or not GPE provides a unique setting for social interactions during school. In the entire study, approximately 40 people are being asked to participate. Your child's participation in this study will take about two months.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

What You Will Do
You will first complete a short survey on which you will be asked to provide your child's age, gender, and grade in school. Then Mary Douglas (or another trained observer) will attend at least four hours of your child's GPE class and another academic class (such as math or social studies) to watch, take notes, and video- and audio-record what occurs. Your child may be asked to wear a wireless microphone during class to better record what occurs. Mary Douglas will sit off to the side of the gymnasium or classroom with a video-camera and unobtrusively record what occurs. The environment and tasks of your child's GPE or academic class will not be altered by the researcher. This study aims to understand what is naturally occurring, and therefore will not interfere with your child's educational experience. The recorded data will be analyzed using several observation instruments which evaluate social interactions, classroom context, and physical activity. All video- and audio-data will be analyzed in a private location so no one outside of the research team may see the data. Once the data have been analyzed, all video- and audio-recordings will be destroyed. If you so desire, you will be provided with written results of this study.

Potential Benefits
Your child will not directly benefit from participation in this study. However, your child's participation in this study may contribute to the understanding of what is socially occurring for students with autism in GPE and other academic settings. Results may also help form more appropriate social interaction goals and aid in understanding any unique attributes of GPE.

Potential Risks
The only known risk of participation is breach of confidentiality. All of the precautions below will be taken to avoid this risk.

Privacy and Confidentiality
Information about your child will be protected to the maximum extent allowable by law. Specific confidentiality provisions include: (a) the use of pseudonyms in the data or any final publications or presentations; (b) all data will be kept in a locked file cabinet in a locked office or on a password protected computer; and (d) only Mary Douglas, Gail Dummer, and the other IRB trained observers will have access to the recorded data. The results of this study may be published or presented at professional meetings, but the identities of research participants will remain confidential.

Your Rights to Participate, Say No, or Withdraw
Participation in this research project is completely voluntary. You and your child have the right to say no. You and your child may change your mind at any time and withdraw. There will be no consequences from withdrawal, simply inform the researchers that you wish to withdraw your child from the study. You may choose to not answer specific questions on the demographic form or stop participating at any time. You indicate your voluntary agreement for your child to participate by completing the consent form. Your child will indicate voluntary agreement by completing the assent form. You and your child's participation in this study will be greatly appreciated.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Costs and Compensation for Being in the Study
There are no costs for participating in this study. You will not receive money or any other form of compensation for participating in this study.

Contact Information for Questions and Concerns
If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researchers.

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Thank you for your time and cooperation.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Parent/Caregiver Consent Form - Classmates
Social Interactions of Students with Autism
in General Physical Education

Are you willing to have your child participate in this study? Please check **Yes** or **No**.

Yes	No
☐	☐

Your signature below means that you voluntarily agree to allow your child to participate in the research study named above (including videotaping of classes at school), as well as your agreement to complete the demographic survey for your child.

_____ _____
Child's Name Child's Age in Years

_____
Child's Relationship to Parent/Guardian Giving Permission

_____ _____
Your Printed Name Your Signature

_____
Date

You will be given a copy of this form to keep.

Please provide contact information if you would like to receive the results of this study.

_____
Address (Street, City, State, Zip)

_____
Email

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Participant Assent Form - Classmates
Social Interactions of Students with Autism
in General Physical Education

Hi! My name is Marty Douglas. I am a graduate student at Michigan State University. I am asking you to help me with my school project. I would like to come to some of your classes at school. I will sit off to the side with a video camera and watch you and your classmates so that I can understand what happens. Please ask me any questions that you have, my contact information is in this packet.

Are you willing to help me with this project? Please check **Yes** or **No**.

Yes ☐ No ☐

_____ _____

Your Printed Name Your Signature

_____

Date

You will be given a copy of this form to keep.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Research Participant Information and Consent Form
Teachers and Aides

You are being asked to participate in a research project. Researchers are required to provide a consent form to inform you about the study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Social Interactions of Students with Autism in General Physical Education

Researchers: Mary Martha Douglas, Graduate Student
Dr. Gail M. Dummer, Professor

Department and Institution: Department of Kinesiology, Michigan State University

Address and Contact Information:

Mary Martha Douglas
Department of Kinesiology
39 IM Sports Circle
Michigan State University
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East Lansing, MI 48824
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dummer@msu.edu

Purpose

You are being asked to participate in a research study of the nature and frequency of naturally occurring social interactions among students with autism and other individuals (i.e., classmates, teachers, and aides), during various tasks in multiple educational settings, including academic and general physical education (GPE) classes. You have been selected as a possible participant in this study because your class has a student with autism. From this study, the investigators hope to gain: (a) a detailed picture of what is socially occurring for youth with autism in GPE in comparison to classmates without disabilities, (b) baseline data from which appropriate social intervention goals can be set for youth with autism, (c) data about tasks in GPE which elicit social interactions that may be used for interventions or social skill training and (d) an understanding of whether or not GPE provides a unique setting for social interactions during school. In the entire study, approximately 40 people are being asked to participate. Your participation in this study will take about two months.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

What You Will Do
You will first complete a short survey on which you will be asked to provide your age, gender, and information about your teaching experiences. Then Mary Douglas (or another trained observer) will attend at least four hours of your class in which you have a student with autism to watch, take notes, and video- and audio-record what occurs. She will sit off to the side of the gymnasium or classroom with a video-camera and unobtrusively record what occurs. The environment and tasks of the class will not be altered by the researcher. This study aims to understand what is naturally occurring, and therefore will not interfere with your lesson plans or activities. The recorded data will be analyzed using several observation instruments which evaluate social interactions, classroom context, and physical activity. All video- and audio-data will be analyzed in a private location so no one outside of the research team may see the data. Once the data have been analyzed, all video- and audio-recordings will be destroyed. If you so desire, you will be provided with written results of this study.

Potential Benefits
You will not directly benefit from your participation in this study. However, your participation in this study may contribute to the understanding of what is socially occurring for students with autism in GPE and other academic settings. Results may also help form more appropriate social interaction goals and aid in understanding any unique attributes of GPE.

Potential Risks
The only known risk of participation is breach of confidentiality. All of the precautions below will be taken to avoid this risk.

Privacy and Confidentiality
Information about you will be protected to the maximum extent allowable by law. Specific confidentiality provisions include: (a) the use of pseudonyms in the data or any final publications or presentations; (b) all data will be kept in a locked file cabinet in a locked office or on a password protected computer; and (d) only Mary Douglas, Gail Dummer, and the other IRB trained observers will have access to the recorded data. The results of this study may be published or presented at professional meetings, but the identities of research participants will remain confidential.

Your Rights to Participate, Say No, or Withdraw
Participation in this research project is completely voluntary. You have the right to say no. You may change your mind at any time and withdraw. There will be no consequences from withdrawal, simply inform the researchers that you wish to withdraw. You may choose to not answer specific questions or stop participating at any time. You indicate your voluntary agreement to participate by completing the consent form. Your participation in this study will be greatly appreciated.

Costs and Compensation for Being in the Study
There are no costs for participating in this study. You will not receive money or any other form of compensation for participating in this study.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Contact Information for Questions and Concerns
If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researchers.

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If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 202 Olds Hall, MSU, East Lansing, MI 48824.

Thank you for your time and cooperation.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

Teacher Consent Form
Social Interactions of Students with Autism in General Physical Education

Are you willing to participate in this study? Please check **Yes** or **No**.

Yes	No
☐	☐

Your signature below means that you voluntarily agree to participate in this research study (including videotaping of your classes), and voluntarily agree to complete the demographic survey.

_____ _____

Your Printed Name Your Signature

_____

Date

You will be given a copy of this form to keep.

Please provide contact information if you would like to receive the results of this study.

_____

Address (Street, City, State, Zip)

_____

Email

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Approved 12/8/08 – valid through 12/7/09. This version supersedes all previous versions. IRB # 08-1103.

APPENDIX D:
DEMOGRAPHIC FORMS

STUDENT WITH AUTISM DEMOGRAPHIC PROFILE

PARENT/CAREGIVER INFORMATION

Name: _____

Relation to child: Mother Father Caregiver/Legal guardian

Phone Number: _____

Email Address: _____

YOUR CHILD'S INFORMATION

Child's Name: _____

Age: _____ Grade in School: _____

Gender: _____

Child's Disability(s): _____

Who diagnosed your child? _____

Does your child have difficulty with social interactions? Yes
No
If yes, describe the nature of social interactions.

Does your child have difficulty with communication? Yes
No
If yes, describe the nature of communication.

Does your child do any repetitive or stereotyped behaviors? Yes
No
If yes, describe these behaviors.

Did your child have any of these difficulties before 3 years of age? Yes
No
If yes, what behaviors did you notice?

CLASSMATE DEMOGRAPHIC PROFILE

YOUR CHILD'S INFORMATION

Child's Name: _____

Age: _____ Grade in School: _____

Gender: _____

TEACHER DEMOGRAPHIC PROFILE

TEACHER INFORMATION

Name: _____

Phone Number: _____

Email Address: _____

Age: _____

Gender: _____

How long have you been a certified (e.g. K-12 physical education) teacher? ____

How long have you been a teacher at this school? _____

How long have you taught the participant with autism? _____

Please describe any past training you have received about teaching students with disabilities?

_____

_____

_____

Please describe any past training you have received about teaching students with autism?

_____

_____

_____

APPENDIX E:
OBSERVATION FIELD NOTES

Case 1 – Kevin and Adam
Observation 1

Physical Education
- Rollerblading

Kevin	Adam
• Had guidance of aide to get equipment on • Did not interact with any classmates while preparing • Wanted to skate as soon as protective equipment was in place • Skated around gym while several other students just stood around	• Quick to put on equipment • Had conversations with surrounding classmates while putting on equipment • Played "tag" on skates with other male classmates

Math
- Fractions

Kevin	Adam
• Currently table made up of all female classmates, including a student who the researcher was told has been his friend for multiple years • Friend tries to interact with him briefly at start of lesson but is taken away as she has to keep up with her worksheet • Aide leads him through entire activity which is a bit different than classmates'	• Classmates engaging in quite a bit of off-task chatter during the math worksheet assignment • Teacher lead short math discussion prior to start of worksheet • Adam works on sheet when not distracted by table-mates • Asks questions when stuck on problems

Observation 2

Physical Education
- Video-games and golf putting

Kevin	Adam
• Followed class stretches well – stretches are same each class time for all students • When the teacher asked students to make pairs Kevin did nothing – eventually two female classmates said he could be part of their group • They left him after the first rotation – then he was only with his aide for the duration of class • Played Wii bowling and baseball, and putted with help of aide	• Rotated through all stations • Extremely enjoyed Dance Dance Revolution game and became upset when other students took multiple turns before him • Golf putted and went into fitness room where he played on the elipitical machine • Had a partner who went through all stations with him

Math • Fractions	
Kevin	Adam
• Completed worksheet with help of aide • Used special pen to write answer and also picked answers from multiple small slips of paper • Identifies fractions by pictures	• Sits quietly and works on math sheet • Moves on in packet when he completes the initial sheet • Talks with classmate at another table and is reprimanded by the teacher for shouting across room • Most classmates are not quiet when doing math work • They keep asking when it is time for recess
Observation 3 Physical Education • Kickball	
Kevin	Adam
• Participated in warm-up activities without help from aide or classmates • Gazed around the room while teacher gave beginning announcement and 'lecture' • Needed help from aide to play the running card game in which teams had to run and pick up cards in attempt to find the assigned suit • During kickball aide went up to bat and out in the field with Kevin • Kevin batted once successfully and was helped around the bases • While in the outfield he stood to one corner of the room and did not get involved • So uninvolved that one ball was actually kicked right near him, and it hit his aide – he made no attempt to get it	• Was very competitive during kickball • Screamed at teammates and other team for various reasons • Actually so vocal with other students that teacher stopped game to lecture class on sportsmanship • Was on much better behavior after the lecture
Math • Fractions	
Kevin	Adam
• Worked on finishing same task as last observation - led mostly by aide • Classmates offered praise and high fives when they saw aide giving it • Classmates showed interest in Kevin's task and even asked aide if they could help	• Not on particularly good behavior • Completed worksheet but was very distracted • Did not really attend to teacher's instructions

Observation 4

Physical Education

- Tee-ball

Kevin	Adam
• Completed stretch and warm-up independently • Needed help of aide and teacher to hit ball off of tee and fetch it • Received high fives when he got back to line after hitting the ball • Gazed around room while in line – did not show any interest in others or their hits off the tee • During the short tee-ball game he stayed far out in the outfield and needed help to take turn batting • Seemed to enjoy running around bases	• Was very excited upon entering the gym and seeing the tee-ball equipment • Started talking about baseball teams and told other classmate he could hit the ball better • Was very excited to get a turn to hit and hit as hard as he could • Pushed to get to front of batting line during game • Played first base in field and ran everywhere trying to get involved

Math

- Fractions

Kevin	Adam
• Had trouble focusing at the beginning • Aide works to get and keep his attention • Completes same worksheet as classmates but uses visual aides of fractions to help answer questions • A few outbursts to room, but no one takes notice	• Was very focused on recess – kept asking when recess would be • After teacher gave firm answer about recess time he quieted down • Helped another student with their assignment • Tried to get the researcher to help him with his fraction sheet

Observation 5

Physical Education

- Track & Field Stations

Kevin	Adam
• Long time friend made sure he was in her group during stations • Stations included small hurdles, short high jump, and fitness room equipment • Preferred running over hurdles and did not want to leave that station • Aide had to step in to help when classmates became distracted from helping Kevin at stations – distracted by competition	• Loved the high jump station • Took multiple turns and did not want to leave when told to change stations • Competed with classmates to see who could jump the best • Talked at almost all times while in line – joked around with other boys in class • Was loud during line-up at the end of class

Math

- Fractions and division

Kevin	Adam
• Aide sat next to him as always • Did same fractions worksheet, but did not switch to division when classmates did • Was very quiet and did not use electronic communication board during math • Took interest in what table mates were working on when they switched to a different task	• Distracted – all students becoming restless as it is nearing the end of the school year • Did worksheets quickly and then worked on coloring the cover of his yearbook the class made • Talked with tablemates while coloring • Asked researcher if she liked his cover

Case 2 – Lee and Zack
Observation 1

Physical Education

- Floor Hockey

Lee	Zack
• Completed stretching and warm-up just as directed • When whole class was told to jog around the gym for 5 minutes Lee was one of the few who actually jogged – others walked and talked • Was placed on a hockey team and was excited to get a stick – raised it above head and smiled • Although while play was happening did not move out of position – only tried to hit puck when play cam near him • While in fitness room – when not his turn to play hockey – got right on the pull-up machine and stationary bike • Did not really talk to anyone in fitness room – most other classmates in there were not working and mainly goofing off • Wanted to know when he would get to go back to hockey • Would talk to others when they approached him in fitness room, but did not really initiate • Some stimming occurred when bored in fitness room	• Greeted teacher upon entering gym after changing clothes • Talked during warm-up with those around him • Did not jog, but mainly walked during 5 minute jog and talked with several classmates • Very involved in the hockey games – chased puck around the entire floor • Talked to others while playing – some 'smack talk' • In fitness room got on exercise bike and rode it for duration of time • Talked with Lee while riding bike

Social Studies

- Silk Road Posters

Lee	Zack
• Sits at front of room, in first row with only his twin brother – all other students in rows behind • Did not turn around to speak with classmates • Worked independently on creating his poster • Enjoys drawing and coloring and his aide made sure he was drawing the correct things on his poster • Aide wrote the words for Lee to copy onto the poster • Tried to read magazine for awhile, but was redirected to his poster • A few shouts to the room, but nothing too distracting	• Worked on poster with help of student sitting next to him • Zack sits next to one of the few males in the class and they appear to be good friends • Talk while working • After poster was complete, sat and quietly read independent reading book – which followed teacher instructions • Did not have many interactions while reading

Observation 2

Physical Education

- Basketball

Lee	Zack
• During warm-up game of Sharks and Minnows no one will chase Lee • Eventually Lee runs straight at the sharks – they pretend to be unable to get him – then Lee pretty much forces the sharks to tag him • Appears confused as to why they will not chase him • Very involved during basketball – can continually spin basketball on finger as long as he wants to • Good at making baskets – classmates pass to him often • Classmates praise Lee after every made basket – even if a foul occurs before (traveling) • Lee shouts "I did it!" and puts his hand up several times after making baskets • Appeared like several more classmate interactions were occurring compared to floor hockey day last observation • Was so excited about basketball even talked about it when the game was over and the class was lining up	• Happy to learn basketball was the activity for the day • Said hello to Lee while sitting in pre-class spots • 'Smack talked' during game with some other classmates • Was very engaged in game – played hard • Talked with teacher during game rotations • Three half-court games were going on at the same time and students rotated through playing each of the other teams

Social Studies
- Workbook activities

Lee	Zack
• Class began with discussion about China and the Silk Road – during this discussion Lee colored on his notebook • Aide wrote answers to workbook questions for Lee to copy • Quietly copied all responses and reviewed them with his aide • Upon completion Lee was allowed to look at magazines – he was very excited about this • Magazines appear to be quite the motivator/positive reward for Lee	• Worked with classmate next to him on workbook • Finished pages quickly and soon other classmates were asking him for answers or looking to copy his pages • Zack did not allow classmates to simply copy his writing – but would talk to them about what he wrote • After workbook pages were done, started on reading assignment for language arts class (teacher is same for social studies and language arts) • After this was read, he switched to his independent reading book

Observation 3

Physical Education
- Tennis at Outdoor Courts

Lee	Zack
• Excited to play tennis – tells this to observer • Runs to tennis courts by self and does not talk to other classmates while jogging • Does not interact when doing independent drills – such as practicing bouncing ball on racket over and over • Receives praise in line after hitting • Hits hard as though he is playing baseball • At times classmates seem to be teasing him on in line – Lee does not seem to notice • Looks to aide for praise occasionally after making a good hit	• Not on very good behavior today • Dawdles to the tennis courts and arrives after other students • Talks with classmates throughout all drills – especially while in line • For awhile jokes about hitting ball as far as he can – does it and it goes over the fence – gets reprimand from teacher • After offers to help teacher collect tennis balls at the end of class – stays to put away tennis rackets in the outdoor storage closet

Social Studies
- Textbook Worksheets

Lee	Zack
• Important day – students told to switch seats and for the first time all year Lee picks a seat amongst his classmates – both aide and teacher surprised at his pick • Worked on copying aide given	• Appears sleepy/tired this morning • Attends to teacher while she is speaking • Raises hand several times to answer teachers questions during 'lecture' about China

responses while classmates did same worksheets • For first time in social studies, interactions with classmates were observed – mainly with females • Classmates next to him did offer some help with sheets • Still looked for praise from aide at the completion of each question	• Once worksheets were complete, quietly read to himself • Quiet reading did not result in many interactions – not necessarily a bad thing
Observation 4 Physical Education • Tennis – Serving	
Lee	Zack
• Quiet during warm-up and jog over to courts • Talked with classmates while in line to hit tennis ball – mostly male • Part way through class teacher reviewed tennis serving • Students spread out to practice serve – Lee did not talk much with anyone while practicing serve	• Almost all interactions happened while waiting in tennis lines • Not all were appropriate – some were making fun of other students • Pretended racket was sword and fought with other students in line until reprimanded by teacher • Enjoyed practicing serves and had little competitions with classmates around him while serving • Most interactions occurred with males, not females
Social Studies • Textbook readings and worksheet	
Lee	Zack
• Needed to complete reading a chapter and aid suggested that some classmates read with him – two girls volunteered and went into the hallway with him to read • Lee did not really listen to classmates read – but turned pages when they did • The girls tried to help him follow along, then he took over and did not take turns reading • Seemed distracted while the others read • Classmates tried to help him but treated him as though he was very young or maybe even dumb – they did seem to have very good intentions in helping	• Students had a long list of things they could be working on, but were supposed to be working quietly • Some classmates were finishing an exam – Zack had already finished and worked quietly while others took exam • Zack then worked with classmate next to him on a pen pal letter to a student in England – went to computer to type up letter • After finishing letter Zack read his independent reading book quietly

Observation 5

Physical Education

- German kickball

Lee	Zack
• Class played German kickball – kickball but multiple people can be on a base at the same time and one has to run around the bases twice to score – five outs per side per inning • Lee was observed cheering Zack on during the game • Lee could not understand the running around the bases twice and always got back in batting line after running around only once • Received praise while batting • In the field Lee insisted on being the pitcher – mimicked a baseball pitch at first but then properly rolled the ball • Always had hands in air demanding the ball back after the play had ended • Seemed to enjoy being pitcher	• Talked a lot during kickball • However talking was allowed as long as the game was still being played • Therefore talking was not deemed inappropriate • Once dropped the ball on purpose because if he would have caught it Lee would have been out at first base • Engaged in some 'trash talk' but no more than most of the other classmates

Social Studies

- Quiz and worksheets

Lee	Zack
• Classmates were taking quiz while Lee completed the quiz with his aide • Therefore he was talking with her as the whole class was quiet • This appeared to make him stand out very much as different • After quiz he worked quietly on copying notes made for him by aide • Lee could use the copied notes during his upcoming exam on Asia	• Several classmates were asking Zack for his answers on his worksheets • He quietly read until it was time for the quiz as he had completed all other necessary work • After the quiz began Zack was silent – no interactions should have been occurring • One classmate did try to speak with Zack during quiz, but he ignored him • There was lots of quiet work today, therefore interaction numbers may be low

APPENDIX F:
COMBINED OBSERVATION INSTRUMENT

Observation Cover Sheet

Observer Name: _____
Date: _____
Start Time: _____
End Time: _____
Total Observation Time: _____
Teacher: _____
Location: _____
Grade: _____
Participant Observed: _____
_____

Codes:

Interactions (AIPE-SR)
- A ..... Appropriate
- P..... Positive Appropriate
- I ..... Inappropriate
- O ..... Off-task

With Whom
- C ..... Classmate without a disability
- D ..... Classmate with a disability
- T..... Teacher
- A ..... Aide
- O ..... Other
- **Circle symbol if interaction was initiated by student with autism**

Activity (BEACHES)
- 1..... Lying Down
- 2..... Sitting
- 3..... Standing
- 4..... Walking
- 5..... Very Active

Tasks (ALT-PE)
- A ..... Activity
- W..... Waiting
- T..... Transition
- M ..... Management
- K ..... Knowledge

		Page _ of _		
Interval/#	Interactions	With Whom	Activity	Tasks
1	A P I O	C D T A O	1 2 3 4 5	A W T M K
2	A P I O	C D T A O	1 2 3 4 5	A W T M K
3	A P I O	C D T A O	1 2 3 4 5	A W T M K
4	A P I O	C D T A O	1 2 3 4 5	A W T M K
5	A P I O	C D T A O	1 2 3 4 5	A W T M K
6	A P I O	C D T A O	1 2 3 4 5	A W T M K
7	A P I O	C D T A O	1 2 3 4 5	A W T M K
8	A P I O	C D T A O	1 2 3 4 5	A W T M K
9	A P I O	C D T A O	1 2 3 4 5	A W T M K
10	A P I O	C D T A O	1 2 3 4 5	A W T M K
11	A P I O	C D T A O	1 2 3 4 5	A W T M K
12	A P I O	C D T A O	1 2 3 4 5	A W T M K
13	A P I O	C D T A O	1 2 3 4 5	A W T M K
14	A P I O	C D T A O	1 2 3 4 5	A W T M K
15	A P I O	C D T A O	1 2 3 4 5	A W T M K
16	A P I O	C D T A O	1 2 3 4 5	A W T M K
17	A P I O	C D T A O	1 2 3 4 5	A W T M K
18	A P I O	C D T A O	1 2 3 4 5	A W T M K
19	A P I O	C D T A O	1 2 3 4 5	A W T M K
20	A P I O	C D T A O	1 2 3 4 5	A W T M K
21	A P I O	C D T A O	1 2 3 4 5	A W T M K
22	A P I O	C D T A O	1 2 3 4 5	A W T M K
23	A P I O	C D T A O	1 2 3 4 5	A W T M K
24	A P I O	C D T A O	1 2 3 4 5	A W T M K
25	A P I O	C D T A O	1 2 3 4 5	A W T M K
26	A P I O	C D T A O	1 2 3 4 5	A W T M K
27	A P I O	C D T A O	1 2 3 4 5	A W T M K
28	A P I O	C D T A O	1 2 3 4 5	A W T M K
29	A P I O	C D T A O	1 2 3 4 5	A W T M K
30	A P I O	C D T A O	1 2 3 4 5	A W T M K
31	A P I O	C D T A O	1 2 3 4 5	A W T M K
32	A P I O	C D T A O	1 2 3 4 5	A W T M K
33	A P I O	C D T A O	1 2 3 4 5	A W T M K
34	A P I O	C D T A O	1 2 3 4 5	A W T M K
35	A P I O	C D T A O	1 2 3 4 5	A W T M K
36	A P I O	C D T A O	1 2 3 4 5	A W T M K

Observation Summary Sheet

Observer Name: _____
Date: _____
Participant Observed: _____
Total Intervals/# Observed: _____

	Page #	1	2	3	4	5	Total	%
Interactions								
(A)	Appropriate							
(P)	Positive Appropriate							
(I)	Inappropriate							
(O)	Off-task							
With Whom								
(C)	Classmate w/o D							
(D)	Classmate w/ D							
(T)	Teacher							
(A)	Aide							
(O)	Other							
Activity								
(1)	Lying Down							
(2)	Sitting							
(3)	Standing							
(4)	Walking							
(5)	Very Active							
Tasks								
(A)	Activity							
(W)	Waiting							
(T)	Transition							
(M)	Management							
(K)	Knowledge							

Notes:

REFERENCES

REFERENCES

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th ed.). Washington DC: American Psychiatric Association.

Archie, V. W., & Sherrill, C. (1989). Attitudes toward handicapped peers of mainstreamed and nonmainstreamed children in physical education. *Perceptual and Motor Skills, 69*, 319-322.

Autism Society of America. (2008). What is autism? Retrieved February 8th, 2008, from http://www.autism-society.org

Auxter, D., Pyfer, J., & Huettig, C. (1997). *Principles and methods of adapted physical education and recreation* (8th ed.). St. Louis: Times Mirror/Mosby College Pub.

Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development, 71*(2), 447-456.

Bauminger, N., Shulman, C., & Agam, G. (2004). The link between perceptions of self and of social relationships in high-functioning children with autism. *Journal of Developmental and Physical Disabilities, 16*(2), 193-214.

Bellack, A. S. (1983). Recurrent problems in the behavioral assessment of social skill. *Behavioral Research and Therapy, 21*, 29-41.

Berg, B. L. (2007). *Qualitative research methods for the social sciences* (6th ed.). Boston: Allyn and Bacon.

Berkeley, S. L., Zittel, L. L., Pitney, L. V., & Nichols, S. E. (2001). Locomotor and object control skills of children diagnosed with autism. *Adapted Physical Activity Quarterly, 18*(4), 405-416.

Black, B. (1989). Interactive pretense: Social and symbolic skills in preschool play groups. *Merrill-Palmer Quarterly, 35*, 379-397.

Blinde, E. M., & McCallister, S. G. (1998). Listening to the voices of students with physical disabilities. *Journal of Physical Education, Recreation & Dance, 69*, 64-68.

Block, M. E. (1995). Development and validation of the children's attitudes towards integrated physical education-revised (CAIPE-R) inventory. *Adapted Physical Activity Quarterly, 12*, 60-77.

Block, M. E. (1999). Did we jump on the wrong bandwagon? Problems with inclusion in physical education. *Palaestra, 15*(3), 30-36, 55-56.

Block, M. E. (2006). Introduction to the special feature on autism. *Teaching Elementary Physical Education, 17*(6), 6.

Block, M. E. (2007). *A teacher's guide to including children with disabilities in general physical education* (3rd ed.). Baltimore, MD: Paul H. Brookes Publishing Co.

Block, M. E., & Obrusnikova, I. (2007). Inclusion in physical education: A review of the literature from 1995-2005. *Adapted Physical Activity Quarterly, 24*, 103-124.

Block, M. E., & Rizzo, T. L. (1995). Attitudes and attributes of physical education teachers towards including students with severe and profound disabilities into regular physical education. *Journal of the Association for Persons with Severe Handicaps, 20*, 80-87.

Block, M. E., & Vogler, E. W. (1994). Inclusion in regular physical education: The research base. *Journal of Physical Education, Recreation & Dance, 65*(1), 40-44.

Bramston, P., Chipuer, H., & Pretty, G. (2005). Conceptual principles of quality of life: An empirical exploration. *Journal of Intellectual Disability Research, 49*, 728-733.

Brown, R., & Brown, I. (2005). The application of quality of life. *Journal of Intellectual Disability Research, 49*, 718-727.

Burgess, A. F., & Gutstein, S. E. (2007). Quality of life for people with autism: Raising the standard for evaluating successful outcomes. *Child and Adolescent Mental Health, 12*(7), 80-86.

Can, F., Yilmaz, I., Birken, B., Yanardag, M., Konukman, F., & Bumin, G. (2004). *Effects of Halliwick's swimming education program on water orientation skills of children with autism.* Paper presented at the American Alliance of Health, Physical Education, Recreation, and Dance.

Caron, J., Lecomte, Y., Stip, E., & Renaud, S. (2005). Predictors of quality of life in schizophrenia. *Community Mental Health Journal, 41*, 399-417.

Chadsey-Rusch, J., Rusch, F. R., & O'Reilly, M. F. (1991). Transition from school to integrated communities. *Remedial and Special Education, 12*, 23-33.

Chamberlain, B., Kasari, C., & Rotheram-Fuller, E. (2007). Involvement or isolation? The social networks of children with autism in regular classrooms. *Journal of Autism and Developmental Disorders, 37*, 230-242.

Church, C., Alinsanski, S., & Amanullah, S. (2000). The social, behavioral, and academic experiences of children with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities, 15*, 12-20.

Collard, K. M. (1981). Leisure education in the schools: Why, who, and the need for advocacy. *Therapeutic Recreation Journal, 15*(4), 8-16.

Collier, D., & Reid, G. (2003). The autism spectrum disorders: Prevention and coping with difficult behaviors - Part IV. *Palaestra, 19*(3), 36-45.

Conatser, P., Block, M., & Gansneder, B. (2002). Aquatic instructors' beliefs toward inclusion: The theory of planned behavior. *Adapted Physical Activity Quarterly, 19*, 172-187.

Cooper, J. O., Heron, T. E., & Heward, W. L. (1987). *Applied behavior analysis.* Columbus, OH: Merrill.

Coyne, P., & Fullerton, A. (2004). *Supporting individuals with autism spectrum disorder in recreation.* United States: Sagamore Publishing.

DeMyer, M. K., Hingtgen, H., & Jackson, K. (1981). Infantile autism reviewed: A decade of research. *Schizophrenia Bulletin, 7*(388-451).

DePauw, K. P., & Doll-Tepper, G. (2000). Toward progressive inclusion and acceptance: Myth or reality? The inclusion debate and bandwagon discourse. *Adapted Physical Activity Quarterly, 17*, 135-143.

Downing, J. E. (2002). *Including students with severe and multiple disabilities in typical classrooms: Practical strategies for teachers* (2nd ed.). Baltimore, MD: Paul H. Brookes Publishing Co.

Downs, P., & Williams, T. (1994). Student attitudes toward integration of people with disabilities in activity settings: A European comparison. *Adapted Physical Activity Quarterly, 11*, 32-43.

Edgar, E. (1987). Secondary programs in special education: Are many of them justifiable? *Exceptional Children, 53*(6), 55-561.

Edgar, E. (1988). Transition from school to community: Promising programs. *Teaching Exceptional Children, 20*(2), 73-75.

Elksnin, L. K., & Elksnin, N. (1995). *Assessment and instruction of social skills.* San Diego, CA: Singular Publishing Group.

Elksnin, L. K., & Elksnin, N. (2003). Fostering emotional learning in the classroom. *Education, 124*, 63-75.

Elksnin, N., & Elksnin, L. K. (1998). *Teaching occupational social skills*. Austin, TX: PRO-ED.

Elksnin, N., & Elksnin, L. K. (2001). Adolescents with disabilities: The need for occupational skills training. *Exceptionality, 9*(1), 91-100.

Ellis, D. N., Wright, M., & Cronis, T. G. (1996). A description of the instructional and social interactions of students with mental retardation in regular physical education settings. *Education and Training in Mental Retardation and Developmental Disabilities, 31*, 235-241.

Fisher, A. G., Murray, E. A., & Bundy, A. C. (1991). *Sensory integration: Theory and practice*. Philadelphia, PA: F.A. Davis Company.

Fox, L., Dunlap, G., & Buschbacher, P. (2000). Understanding and intervening with young children's problem behavior. In A. M. Wetherby & B. M. Prizant (Eds.), *Autism spectrum disorders: A transactional developmental perspective* (pp. 307-331). Baltimore, MD: Paul H. Brookes.

Garfin, D. G., & Lord, C. (1986). Communication as a social problem in autism. In E. Scholper & G. B. Mesibov (Eds.), *Social behavior in autism* (pp. 133-151). New York, NY: Plenum Press.

Gaylord-Ross, R., Stremel-Campbell, K., & Storey, K. (1986). Social skills training in natural contexts. In R. H. Horner, L. H. Meyer & H. D. B. Fredericks (Eds.), *Education of learners with severe handicaps* (pp. 161-187). Baltimore, MD: Brookes.

Godbout, P., Brunelle, J., & Tousignant, M. (1983). Academic learning time in elementary and secondary physical education class. *Research Quarterly for Exercise and Sport, 54*(1), 11-19.

Goodwin, D. L. (2001). The meaning of help in physical education: Perceptions of students with physical disabilities. *Adapted Physical Activity Quarterly, 18*, 289-303.

Goodwin, D. L., & Watkinson, E. J. (2000). Inclusive physical education from the perspective of students with physical disabilities. *Adapted Physical Activity Quarterly, 17*, 144-160.

Graham, G., Holt/Hale, S. A., & Parker, M. (2007). *Children moving: A reflective approach to teaching physical education* (7th ed.). New York, NY: McGraw Hill.

Groft, M., & Block, M. E. (2003). Children with Asperger syndrome: Implications for general physical education and youth sports. *Journal of Physical Education, Recreation & Dance, 74*(3), 38-43.

Harris, S. L. (1998). Behavioural and educational approaches to the pervasive developmental disorders. In F. R. Volkmar (Ed.), *Autism and pervasive developmental disorders*. New York, NY: Cambridge University Press.

Hartup, W. W. (1996). The company they keep: Friendships and their developmental significance. *Child Development, 67*(1), 1-13.

Helgeson, V. (2003). Social support and quality of life. *Quality of Life Research, 12*(Suppl. 1), 25-31.

Hermelin, B., & O'Connor, N. (1985). Logico-affective states and nonverbal language. In E. Scholper & G. B. Mesibov (Eds.), *Communication problems in autism* (pp. 283-310). New York, NY: Plenum Press.

Hersman, B. L. (2007). The effects of adventure education on the social interactions of students with disabilities in general physical education. Unpublished doctoral dissertation. The Ohio State University.

Ho, H., Eaves, L. C., & Peabody, D. (1997). Nutrient intake and obesity in children with autism. *Focus on Autism and Other Developmental Disabilities, 13*, 187-192.

Hodge, S. R., Ammah, J. O. A., Casebolt, K., LaMaster, K., & O'Sullivan, M. (2000). Analysis of inclusion practice in physical education. Unpublished observational behavioral instrument. The Ohio State University.

Hodge, S. R., & Hersman, B. L. (2007). Analysis of inclusion practices in physical education form S-Student version revised. Unpublished systematic observation instrument. The Ohio State University.

Howlin, P. (1986). An overview of social behavior in autism. In E. Scholper & G. B. Mesibov (Eds.), *Social behavior in autism* (pp. 103-131). New York, NY: Plenum Press.

Howlin, P., & Yates, P. (1999). The potential effectiveness of social skills groups for adults with autism: Information update. *Autism, 3*(3), 299-307.

Hurlbutt, K., & Chalmers, L. (2004). Employment of adults with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities, 19*(4), 215-222.

Hutzler, Y., Fliess, I., Chacham, A., & van den Auweele, Y. (2002). Perspectives of children with physical disabilities on inclusion and empowerment: Supporting and limiting factors. *Adapted Physical Activity Quarterly, 19*, 300-317.

Jansiewicz, E. M., Goldberg, M. C., Newschaffer, C. J., Denckla, M. B., Landa, R., & Mostofsky, S. H. (2006). Motor signs distinguish children with high functioning autism and asperger's syndrome from controls. *Journal of Autism and Developmental Disorders, 36*, 613-621.

Jansma, P. (1982). Physical education for the severely and profoundly handicapped. *Exceptional Education Quarterly, 15*(1), 35-41.

Jenkins, J. R., Odom, S. L., & Speltz, M. L. (1989). Effects of social integration on preschool children with handicaps. *Exceptional Children, 55*, 420-428.

Kann, L., Warren, W., & Harris, W. A. (1999). Youth risk behavior surveillance-United States, 1995. *Journal of School Health, 66*, 365-377.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2*, 217-250.

Kazdin, A. E. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York, NY: Oxford University Press.

Kennedy, C. H., & Shukla, S. (1995). Social interaction research for people with autism as a set of past, current, and emerging propositions. *Behavioral Disorders, 21*, 21-35.

Kessler, R., & McLeod, J. (1985). Social support and psychological distress in community surveys. In S. Cohen & S. Syme (Eds.), *Social support and health* (pp. 19-40). New York, NY: Academic.

Kitson, V. (1993). Providing opportunities for physical education for children with autism. *British Journal of Physical Education, 24*(3), 15.

Koegel, L. K., Koegel, R. L., & Dunlap, G. (1996). *Positive behavioral support: Including people with difficult behavior in the community*. Baltimore, MD: Paul H. Brookes.

Koegel, L. K., Koegel, R. L., Hurley, C., & Frea, W. D. (1992). Improving social skills and disruptive behavior in children with autism through self-management. *Journal of Applied Behavior Analysis, 25*, 341-353.

Konging, C., & Magill-Evans, J. (2001). Social and language skills in adolescent boys with Asperger syndrome. *Autism, 5*, 23-36.

Kosma, M., Cardinal, B. J., & Rintala, P. (2002). Motivating individuals with disabilities to be physically active. *Quest, 54*(2), 116-132.

Kowalski, E. M., & Rizzo, T. L. (1996). Factors influencing preservice student attitudes toward individuals with disabilities. *Adapted Physical Activity Quarterly, 13*, 180-196.

Kozub, F. M., & Lienert, C. (2003). Attitudes toward teaching children with disabilities: Review of literature and research paradigm. *Adapted Physical Activity Quarterly, 20*, 323-346.

Kudlacek, M., Valkova, H., Sherrill, C., Myers, B., & French, R. (2002). An inclusion instrument based on planned behavior theory for prospective physical educators. *Adapted Physical Activity Quarterly, 19*, 280-299.

Le Couteur, A., Rutter, M., Lord, C., Rios, P., Robertson, S., Holdgrafer, M., et al. (1989). Autism diagnostic interview: A standardized investigator-based instrument. *Journal of Autism and Developmental Disorders, 19*, 363-387.

Lee, S. M., Burgeson, C. R., Fulton, J. E., & Spain, C. G. (2007). Physical education and physical activity: Results from the school health policies and programs study 2006. *Journal of School Health, 77*(8), 435-463.

Lee, S. M., & Odom, S. L. (1996). The relationship between stereotypic behavior and peer social interaction for children with severe disabilities. *Journal of the Association for Persons with Severe Handicaps, 21*, 88-95.

Lisboa, F. L. F. (1997). Interaction and social acceptance of children with autism in physical education. *Brazilian International Journal of Adapted Physical Education Research, 4*, 1-14.

Lisboa, F. L. F., Butterfield, S. A., Reif, G., & McIntire, W. (1995). ALT-PE by children with autism placed in regular, reversed mainstreamed, and adapted physical education classes. *Perceptual and Motor Skills, 80*, 553-554.

Lord, C. (1993). Early social development in autism. In E. Scholper & M. E. Van Bourgondien (Eds.), *Preschool issues in autism: Current issues in autism* (pp. 61-94). New York, NY: Plenum Press.

Lord, C., & Magill-Evans, J. (1995). Peer interactions of autistic children and adolescents. *Development & Psychopathology, 7*, 611-626.

Lord, C., & Venter, A. (1992). Outcome and follow-up studies of high functioning autistic individuals. In E. Scholper & G. B. Mesibov (Eds.), *High functioning individuals with autism* (pp. 187-200). New York, NY: Plenum

Marks, S., Schrader, C., Longaker, T., & Levine, M. (2000). Portraits of three adolescent students with Asperger's syndrome: Personal stories and how they can inform practice. *The Journal of the Association for Persons with Severe Handicaps, 25*, 3-17.

McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Journal of Autism and Developmental Disorders, 32*(5), 351-372.

McConnell, S. R., Sisson, L. A., Cort, C. A., & Strain, P. S. (1990). Effects of social skills training and contingency management of reciprocal interaction of preschool children with behavioral handicaps. *Journal of Special Education, 24*, 473-495.

McGee, G. G., Feldman, R. S., & Morrier, M. J. (1997). Benchmarks of social treatment for children with autism. *Journal of Autism and Developmental Disorders, 27*(4), 353-364.

McKenzie, T. L., Sallis, J. F., & Armstrong, C. A. (1994). Association between direct observation and accelerometer measure of children's physical activity during physical education and recess. *Medicine and Science in Sports and Exercise, 26*(5), Supplement, 143.

McKenzie, T. L., Sallis, J. F., Nader, P. R., Patterson, T. L., Elder, J. P., Berry, C. C., et al. (1991). BEACHES: An observational system for assessing children's eating and physical activity behaviors and associated events. *Journal of Applied Behavior Analysis, 24*, 141-151.

Mesibov, G. B. (1983). Current perspectives and issues in autism and adolescence. In E. Scholper & G. B. Mesibov (Eds.), *Autism in adolescents and adults* (pp. 37-53). New York, NY: Plenum Press.

Mesibov, G. B., & Handlan, S. (1997). Adolescents and adults with autism. In D. J. Cohen & F. R. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (2nd ed., pp. 309-322). New York, NY: John Wiley & Sons.

Metzler, M. (1979). The measurement of academic learning time in physical education. Unpublished Doctoral dissertation. The Ohio State University.

Metzler, M. (1989). A review of research on time in sport pedagogy. *Journal of Teaching in Physical Education, 8*, 87-103.

Mirenda, P. L., Donnellan, A. M., & Yoder, D. E. (1983). Gaze behavior: A new look at an old problem. *Journal of Autism and Developmental Disorders, 13*, 397-409.

Morin, B., & Reid, G. (1985). A quantitative and qualitative assessment of autistic individuals on selected motor tasks. *Adapted Physical Activity Quarterly, 2*(1), 43-55.

Mosston, M., & Ashworth, S. (2002). *Teaching physical education* (5th ed.). San Francisco, CA: Benjamin Cummings.

O'Connor, J., French, R., & Henderson, H. (2000). Use of physical activity to improve behavior of children with autism. *Palaestra, 16*(3).

Odom, S. L., McConnell, S. R., & McEvoy, M. A. (1992). Peer-related social competence and its significance for young children with disabilities. In S. L. Odom, S. R. McConnell & M. A. McEvoy (Eds.), *Social competence of young children with disabilities* (pp. 3-35). Baltimore, MD: Paul H. Brookes

Odom, S. L., & Ogawa, I. (1992). Direct observation of young children's social interaction with peers: A review of methodology. *Behavioral Assessment, 14*, 407-441.

Orsmond, G. I., Krauss, M. W., & Seltzer, M. M. (2004). Peer relationships and social and recreational activities among adolescents and adults with autism. *Journal of Autism and Developmental Disorders, 34*(3), 245-256.

Ozonoff, S., Dawson, G., & McPartland, J. (2002). *A parent's guide to Asperger syndrome and high-functioning autism: How to meet the challenges and help your child thrive*. New York, NY: Guilford Press.

Pan, C. Y. (2008). School time physical activity of students with and without autism spectrum disorders during PE and recess. *Adapted Physical Activity Quarterly, 25*, 308-321.

Pan, C. Y., & Frey, G. C. (2006). Physical activity patterns in youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 36*(5), 597-606.

Parker, J. G., & Gottman, J. M. (1989). Social and emotional development in a relational context: Friendship interactions from early childhood to adolescence. In T. Berndt & G. Ladd (Eds.), *Peer relationships in child development* (pp. 95-131). New York, NY: John Wiley & Sons.

Parker, M. (1989). Academic learning time-Physical education (ALT-PE), 1982 Revision. In P. W. Darst, D. B. Zakrajsek & V. H. Mancini (Eds.), *Analyzing physical education and sport instruction* (2nd ed., pp. 195-205). Champaign, IL: Human Kinetics.

Patton, M. Q. (1997). *Utilization-focused evaluation* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Piaget, J. (1926). *Language and thought of the child.* London, England: Kegan & Paul.

Place, K., & Hodge, S. R. (2001). Social inclusion of students with physical disabilities in general physical education: A behavioral analysis. *Adapted Physical Activity Quarterly, 18*, 389-404.

Placek, J., & Randall, L. (1986). Comparison of academic learning time in physical education: Students with specialist and nonspecialists. *Journal of Teaching in Physical Education, 5*(3), 157-165.

Powers, M. D. (2000). *Children with autism: A parents' guide.* Bethesda, MD: Woodbine House.

Prior, M., & Ozonoff, S. (1998). Psychological factors in autism. In F. R. Volkmar (Ed.), *Autism and pervasive developmental disorders.* New York, NY: Cambridge University Press.

Reid, G., & Collier, D. (2002). Motor behavior and the autism spectrum disorders - Introduction. *Palaestra, 18*(4), 20-27.

Reid, G., Collier, D., & Morin, B. (1983). The motor performance of autistic individuals. In R. Eason, T. Smith & F. Caron (Eds.), *Adapted physical activity* (pp. 201-218). Champaign, IL: Human Kinetics.

Reid, G., & O'Connor, J. (2003). The autism spectrum disorders: Activity selection, assessment, and program organization - Part II. *Palaestra, 19*(1), 20-27.

Reid, G., O'Connor, J., & Lloyd, M. (2003). The autism spectrum disorders: Physical activity instruction - Part III. *Palaestra, 19*(2), 20-26.

Renty, J., & Roeyers, H. (2006). Quality of life in high-functioning adults with autism spectrum disorder: The predictive value of disability and support characteristics. *Autism, 10*(5), 511-524.

Ricks, D. M., & Wing, L. (1976). Language, communication and use of symbols. In L. Wing (Ed.), *Early childhood autism* (pp. 93-134). Oxford, England: Pergamon Press.

Rizzo, T. L. (1984). Attitudes of physical educators toward teaching handicapped pupils. *Adapted Physical Activity Quarterly, 1*, 267-274.

Rizzo, T. L., & Kirkendall, D. R. (1995). Teaching students with mild disabilities: What affects attitudes of future physical educators? *Adapted Physical Activity Quarterly, 12*, 205-216.

Rizzo, T. L., & Vispoel, W. P. (1991). Physical educators' attributes and attitudes toward teaching students with handicaps. *Adapted Physical Activity Quarterly, 8*, 4-11.

Rizzo, T. L., & Vispoel, W. P. (1992). Changing attitudes about teaching students with handicaps. *Adapted Physical Activity Quarterly, 9*, 54-63.

Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders, 30*(5), 399-409.

Rowe, P. J., Schuldheisz, J. M., & van der Mars, H. (1997). Measuring physical activity in physical education: Validation of the SOFIT direction observation instrument for use with first to eighth grade students. *Pediatric Exercise Science, 9*(2), 136-149.

Rubin, K. H., Bukowski, W., & Parker, J. G. (1998). Peer interactions, relationships, and groups. In N. Eisenberg (Ed.), *Handbook of child psychology* (5th ed., Vol. 3, pp. 619-700). New York, NY: Wiley.

Rusch, F. R., Chadsey-Rusch, J., & Johnson, J. R. (1991). Supported employment: Emerging opportunities for employment integration. In L. H. Meyer, C. A. Peck & L. Brown (Eds.), *Critical issues in the lives of people with severe disabilities* (pp. 145-169). Baltimore, MD: Brookes.

Rutter, M. (1970). Autistic children: Infancy to adulthood. *Seminars in Psychiatry, 2*, 435-450.

Schleien, S. J., Heyne, L. A., & Berken, S. B. (1988). Integrating physical education to teach appropriate play skills to learners with autism: A pilot study. *Adapted Physical Activity Quarterly, 5*, 182-192.

Schmidt-Gotz, E., Doll-Tepper, G., & Lienert, C. (1994). Attitudes of university students and teachers towards integrating students with disabilities in regular physical education classes. *Physical Education Review, 17*, 43-57.

Seltzer, M. M., Krauss, M. W., Shattuck, P., Orsmond, G. I., Swe, A., & Lord, C. (2003). Changes in symptoms of autism in adolescence and adulthood. *Journal of Autism and Developmental Disorders, 33*, 565-581.

Sherrill, C. (2004). *Adapted physical activity, recreation and sport: Crossdisciplinary and lifespan* (6th ed.). Boston, MA: McGraw-Hill

Shute, S., Dodds, P., Placek, J., Rife, F., & Silverman, S. J. (1982). Academic learning time in elementary school movement education: A descriptive analytic study. *Journal of Teaching in Physical Education, 1*(2), 3-14.

Siedentop, D. (1983). Academic learning time: Reflections and prospects. In P. Dodds & F. Rife (Eds.), *Time to learn in physical education: History, completed research, and potential future for academic learning time in physical education. Journal of Teaching in Physical Education (Summer Monograph I), 3-7.*

Siedentop, D., Tousignant, M., & Parker, M. (1982). Academic learning time-physical education: 1982 revision coding manual. Unpublished manual, School of Health, Physical Education and Recreation. The Ohio State University.

Sigman, M., & Ruskin, E. (1999). Continuity and change in the social competence of children with autism, Down syndrome, and developmental delays. *Monographs of the Society for Research in Child Development, 64*, 1-130.

Sirard, J. R., & Pate, R. R. (2001). Physical activity assessment in children and adolescents. *Sports Medicine, 31*(6), 439-454.

Slininger, D., Sherrill, C., & Jankowski, K. (2000). Children's attitudes toward peers with severe disabilities: Revising contact theory. *Adapted Physical Activity Quarterly, 17*, 176-196.

Smith, A. L. (2007). Youth peer relationships in sport. In S. Jowett & D. Lavallee (Eds.), *Social psychology in sport*. Champaign, IL: Human Kinetics.

Snell, M. E., & Eichner, S. J. (1989). Integration for students with profound disabilities. In F. Brown & D. H. Lehr (Eds.), *Persons with profound disabilities: Issues and practices* (pp. 109-138). Baltimore, MD: Paul H. Brookes Publishing Co.

Stainback, S., & Stainback, W. (1990). Inclusive schooling. In S. Stainback & W. Stainback (Eds.), *Support networks for inclusive schooling* (pp. 3-24). Baltimore, MD: Paul H. Brookes Publishing Co.

Stainback, W., Stainback, S., & Bunch, G. (1989). A rationale for the merger of regular and special education. In W. Stainback, S. Stainback & M. Forest (Eds.), *Educating all students in the mainstream of regular education* (pp. 15-28). Baltimore, MD: Paul H. Brookes Publishing Co.

Stanton, K., & Colvin, A. (1996). The physical educator's role in inclusion. *Strategies, 9*(4), 13-15.

Strain, P. S., & Odom, S. L. (1986). Peer social initiatives: Effective interventions for social skill development of exceptional children. *Exceptional Children, 52*, 543-552.

Strayer, F. F. (1989). Co-adaptation within the early peer group: A psychobiological study of competence. In B. Schneider, G. Attili, J. Nadel & R. Weissberg (Eds.), *Social competence in developmental perspective* (pp. 145-174). Boston, MA: Kluwer Academic Publishers.

Suomi, J., Collier, D., & Brown, L. (2003). Factors affecting the social experiences of students in elementary physical education classes. *Journal of Teaching in Physical Education, 22*, 186-202.

Tager-Flusberg, H. (1981). On the nature of linguistic functioning in early infantile autism. *Journal of Autism and Developmental Disorders, 11*, 45-56.

Tager-Flusberg, H., & Anderson, M. (1991). The development of contingent discourse ability in autistic children. *Journal of Child Psychology and Psychiatry, 32*, 1123-1134.

Tantam, D. (2003). The challenge of adolescents and adults with Asperger syndrome. *Child and Adolescent Psychiatric Clinics of North America, 12*(1), 143-163.

Temple, V. A., & Walkley, J. W. (1999). Academic learning time-physical education (ALT-PE) of students with mild intellectual disabilities in regular Victorian schools. *Adapted Physical Activity Quarterly, 16*, 64-74.

Tripp, A. (1988). Comparison of attitudes of regular and adapted physical educators toward disabled individuals. *Perceptual and Motor Skills, 66*, 425-426.

Tripp, A., French, R., & Sherrill, C. (1995). Contact theory and attitude of children in physical education programs toward peers with disabilities. *Adapted Physical Activity Quarterly, 12*, 323-332.

United States Department of Education. (2001). Statistics on autism. Retrieved August 15, 2008, from http://www.IDEAdata.org/tables/ar_aa2.htm

Verderber, J. M. S., Rizzo, T. L., & Sherrill, C. (2003). Assessing student intention to participate in inclusive physical education. *Adapted Physical Activity Quarterly, 20*, 26-45.

Verdugo, M., Schalock, R., Keith, K., & Stancliffe, R. (2005). Quality of life and its measurement: Important principles and guidelines. *Journal of Intellectual Disability Research, 49*, 707-717.

Vogler, E. W., Koranda, P., & Romance, T. (2000). Including a child with severe cerebral palsy in physical education: A case study. *Adapted Physical Activity Quarterly, 17*, 161-175.

Volkmar, F. R., & Klin, A. (1995). Social development in autism: Historical and clinical perspectives. In S. Baron-Cohen, H. Tager-Flusberg & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from autism* (pp. 40-55). New York, NY: Oxford University Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Warren, S. F., & Reichle, J. E. (1992). *Causes and effects in communication and language intervention: Communication and language intervention series* (Vol. 1). Baltimore, MD: Paul H. Brookes.

Wehman, P., & Schleien, S. J. (1981). *Leisure programs for handicapped persons: Adaptations, techniques, and curriculum*. Austin, TX: PRO-ED.

Winnick, J. P. (2005). *Adapted physical education and sport* (4th ed.). Champaign, IL: Human Kinetics.

Woods, J. J., & Wetherby, A. M. (2003). Early identification of and intervention for infants and toddler who are at risk for autism spectrum disorder. *Language, Speech, and Hearing Services in School, 34*, 180-193.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Yun, J., & Ulrich, D. A. (2002). Estimating measurement validity: A tutorial *Adapted Physical Activity Quarterly, 19*(1), 32-47.