Comparison of Physical Activity Levels Between Children With and Without Autistic Spectrum Disorders

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The purpose of this study was to compare daily, physical education, recess, and after school moderate to vigorous physical activity (MVPA) levels between children with and without autistic spectrum disorders (ASD). Children ages 5 to 12 years wore a uniaxial accelerometer for five days (four weekdays, one weekend day). There were no differences between children with and without ASD at any physical activity setting. Both groups were more active during recess compared to after school, and children with ASD were similarly active in recess and physical education. Although many children with ASD acquired 60 min of physical education per day, this may decrease with age as opportunities for recess and physical education are eliminated.

Children with autistic spectrum disorders (ASD) may be at risk for being physically inactive because characteristics of the disability interfere with successful participation in traditional forms of physical activity. Children without disabilities acquire a majority of their physical activity during transportation (i.e., walking to school), informal play (i.e., unstructured neighborhood play), and formal play (i.e., competitive sports; Fox & Riddoch, 2000). Children with ASD demonstrate (a) restricted, repetitive, and stereotyped patterns of behavior, interests, and activities; (b) qualitative impairments in social interaction; and (c) qualitative impairments in communication (American Psychiatric Association, 2000). These impairments may interfere with a variety of physical activity opportunities, such as riding a bike to school without supervision or playing tag with peers during recess.

The limited available research on movement and children with ASD has focused on using exercise to reduce maladaptive behaviors (Celiberti, Bobo, Kelly, Harris, & Handleman, 1997; Levinson & Reid, 1993). These studies found that vigorous exercise has a temporal effect on stereotypies or self-stimulating activities;
however, there is relatively little information regarding physical activity behaviors in children with disabilities and only one study (Levinson & Reid, 1991) that includes children with ASD. The authors used a questionnaire to measure parent-perceived physical activity of children with various developmental disabilities, including those with autism, between the ages of 4 to 21. Findings indicated that 75% of parents of children ages 4 to 10 perceived their child to engage in three or more hours of activity per week for nine or more months per year as compared to 56% of parents of children ages 11 to 21. The study provides support that physical activity decreases with age, but it does not provide specific information as to the daily physical activity of the participants. Furthermore, there were no details on the children with autism. Related research in youth with mental retardation is somewhat equivocal. Lorenzi, Horvat, and Pellegrini (2000) compared the recess physical activity levels of children with and without mental retardation grades kindergarten through fifth using heart rate monitoring, accelerometry, and systematic observation. No significant differences existed between group physical activity, as measured by systematic observation. Accelerometry and heart rate monitoring indicated males with mental retardation were more active than were males without mental retardation. Sharav and Bowman (1992) measured physical activity of 30 sibling pairs with and without Down syndrome using a parent-report questionnaire, and found that children with Down syndrome were less active than siblings were. Faison-Hodge and Porretta (2004) used systematic observation to measure the physical activity of children with and without disabilities during physical education and recess. The authors observed no difference in group physical activity levels within either setting. Large variability in assessment methods from the aforementioned studies limit generalization; however, this lack of agreement among these findings supports the rationale that diagnosis is a determinant of physical activity behavior (Longmuir & Bar-Or, 2000).

The health benefits of participating in adequate amounts of physical activity and the fact that health behaviors are established during childhood are well documented (Raitakari et al., 1994). It is recommended that children engage in more than 60 min and up to several hours of moderate to vigorous physical activity (MVPA) per day, 10 to 15 min or more in duration (Corbin & Pangrazi, 1999), but it is unclear whether children with ASD are meeting these guidelines. Since impairments associated with the disability may place individuals with ASD at risk for inactivity, addressing positive physical activity habits early in life could contribute to regular participation in physical activity, which leads to enjoyment of health benefits and contributes to maximal community participation (i.e., employment and recreation) as an adult.

The most opportune time periods for children to engage in MVPA during the school year are during a physical education class, the recess period, and the hours after school. It is recommended that children engage in MVPA at least 50% of the time during physical education, but this objective is not being met (McKenzie, Marshall, Sallis, & Conway, 2000; United States Department of Health and Human Services, USDHHS, 2000). Although recess provides elementary-aged children with an opportunity to be active during the school day, studies indicate that children do not spend more than 50% of recess in MVPA (McKenzie et al., 1997; Scruggs, Beveridge, & Watson, 2003; Zask, van Beurden, Barnett, Brooks, & Dietrich, 2001). Healthy People 2010 objectives call for a reduction in sedentary activities (USDHHS, 2000), but research indicates that children are primarily inactive during
after-school leisure time (McKenzie, Sallis, Nader, Broyles, & Nelson, 1992). It is
unknown whether children with ASD are experiencing similar trends because no
data exist on physical activity patterns in this population.

The purpose of this study was to compare physical activity levels and patterns
between children with and without ASD. Of particular interest were four specific
time periods when children are most likely to be active: daily, physical education,
recess, and after-school. It was hypothesized that children with ASD would be less
active than neurotypical peers, across settings.

Method

Participants

A convenience sample of 15 children with ASD (10 males and 5 females) and
13 children without ASD (8 males, 5 females) ages 5 to 12 years volunteered to
participate. Prior to study involvement, parents signed a guardian consent form,
and children above the age of seven years, if able, signed an assent form. Parents
signed the assent form if the child was unable and provided an explanation why
the child did not sign the form. All consent documents were previously approved
by both the university Institutional Review Board and participating school district
review boards.

Both children with and without ASD were included to establish a context
in which data from the ASD group would have greater meaning. All participants
were recruited through available resources within a 100 mile radius of the main
research site. Participants were free from physical, medical, or sensory conditions
that might impede or interfere with physical activity. Children with ASD were also
screened for extreme behaviors, such as aggression and self-abuse, which could
affect participation in the project. Information regarding intellectual quotient was
not addressed since ASD is a disorder of language, communication, and behavior,
and mental retardation is not a consistent marker for ASD; however, parents did
not identify mental retardation as a co-occurring condition.

The ASD group consisted of nine children with autism, two children with
Asperger syndrome, and four children with Pervasive Developmental Disorder – Not
Otherwise Specified, and all received school-based Special Education services under
the diagnostic category of autism. Thirteen were verbal and two were nonverbal.
Children with verbal skills possessed receptive abilities adequate to understand
verbal or gestural prompts. Expressive skills ranged from being able to answer
questions using one word to answering questions using complete sentences. Age
and gender matched peers without disabilities were recruited through principals
of participating schools.

Physical education placements for children with ASD included three in regular
physical education without an aide, five in regular physical education with an aide,
one in reverse mainstream physical education, and four in segregated physical
education taught by a special education teacher. Four children with ASD attended
an inclusive recess without an aide, five attended an inclusive recess with an aide,
and three attended a self-contained recess period, segregated from regular education
peers. Four children with ASD and 10 without ASD participated in organized,
extracurricular activities at least once per week. Three children from the ASD
group participated in a school-based after-school program. All children without
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ASD received recess and physical education services. Participant demographics are presented in Table 1.

Data were initially collected on 35 children, but seven (six with ASD, one without ASD) were excluded due to incomplete weekend data. In these cases, parents and children with and without ASD failed to comply with study guidelines. The final sample sizes for each physical activity time period were as follows: (a) all day included 28 children (15 ASD, 13 non-ASD), (b) after school included 28 children (15 ASD, 13 non-ASD), (c) physical education class included 26 children (13 ASD, 13 non-ASD), and (d) recess period included 23 children (12 ASD, 11 non-ASD).

Measurements and Procedure

Physical activity of children is characteristically spontaneous and occurs in short durations (Bailey et al., 1995); therefore, two physical activity assessment methods were used to adequately describe physical activity behavior (Welk, Corbin, & Dale, 2000). Accelerometry and direct observation were employed in this study as both are considered objective, valid, and reliable measures of physical activity in children (Welk et al., 2000).

**Accelerometry.** Physical activity levels were objectively measured using a Manufacturing Technology Inc. (MTI, formerly CSA) 7164 uniaxial accelerometer. The accelerometer is a small, lightweight electronic device (about the size of a pocket watch) designed to detect vertical acceleration as a measure of human motion. Accelerometers have been used extensively and reported as a valid measure of physical activity in children (Trost et al., 1998). The accelerometer was placed in a pouch, which was clipped to the child’s pants or shorts, toward the back of the non-dominant side. The device was kept close to the body, and its placement discouraged tampering. All children were instructed not to touch the accelerometer or let others touch it, and participants with ASD were read a social story, if appropriate, by the parent prior to the day that they were scheduled to wear the device. The social story had a twofold purpose: (a) to explain that the accelerometer belonged to the child and (b) to explain who was allowed to help the child put it on and take it off.

Each participant wore the accelerometer for four school days and one weekend day to measure daily physical activity. Data for each participant were collected within a 14-day period. It was not required that the participant wear the

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**Table 1  Demographic Data of Participants**

<table>
<thead>
<tr>
<th></th>
<th>ASD (n = 15)</th>
<th>Non-ASD (n = 13)</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>9.5 ± 1.9</td>
<td>8.9 ± 2.0</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>33.4 ± 8.1</td>
<td>33.5 ± 10.6</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>134.4 ± 11.2</td>
<td>133.1 ± 12.4</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>18.3 ± 3.15</td>
<td>18.5 ± 3.5</td>
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*Note. Values represent M SD.*
accelerometer five consecutive days because parents of children with and without ASD forgot to place the accelerometer on the child or the child refused to wear it on a particular day. Inter-day reliability in physical activity and youth has been demonstrated using nonconsecutive days (Janz, Witt, & Mahoney, 1995). Not all youth were measured on the same weekend day, and there exists no research to suggest there is a difference between Saturday and Sunday physical activity levels.

The time periods of interest were all day (10:00 a.m. – 7:00 p.m.), physical education, recess, and after school (4:00 p.m. – 7:00 p.m.). The researchers were able to maximize compliance of participants by starting the monitoring time at 10:00 a.m. rather than 8:00. The 10:00 to 7:00 was acceptable since it represented at least 50% of a waking day. Pilot work revealed that parents of children with and without cognitive disabilities (not part of the current study) failed to comply with researchers’ directions and allowed children to sleep late on the weekend, thus failing to place the accelerometer on the child prior to 10:00 a.m.. Although physical activity was not being measured until 10:00, parents were asked to place the accelerometer on the child by 8:00, prior to school, each day for two reasons: eliminating the requirement of the child’s teacher to attach the accelerometer and establishing consistent directions for weekdays and weekends. Participants were excluded from the data analyses if (a) less than four weekdays and one weekend day of complete all day data during the 10:00 to 7:00 time period was measured, (b) the accelerometer was not worn for five or more min during the 10:00 to 7:00 time period any particular day, or (c) less than two days of accelerometer-measured physical activity in physical education or recess was collected.

Data were collected in 1-min intervals for the measurement period. For each minute, the accelerometer provided an activity count as a measure of movement, with larger counts representing greater activity levels. The activity counts were uploaded into a computer program to determine time spent in four, age-specific, physical activity intensity categories using metabolic equivalents (METs): light (< 3.0), moderate (3.0 - 5.9), vigorous (6.0 - 8.9), and very vigorous (9; Trost et al., 1998).

Participants, parents, and teachers were encouraged to maintain normal schedules and activities during the monitoring period. Parents were given time sheets to record which days were monitored and when the accelerometer was placed on and taken off the child. Teachers used time sheets to record days and time periods that the child received physical education and recess. The study was conducted over a two-year time period that excluded summers. Data were not collected during the first and last months of school to avoid schedule variations associated with holidays, new classes, testing, etc. as well as during periods of inclement weather when children were not allowed outside for recess.

Direct Observation. Physical activity levels within the physical education and recess environments were assessed using physical activity behavior definitions from the validated instrument, Behavior of Eating and Activity for Children’s Health: Evaluation System (BEACHES; McKenzie, Sallis, Nader, Patterson et al., 1991). Child physical activity behavior was coded into one of five subcategories relative to physical activity intensity (lying down, sitting, standing, walking, or very active) using a momentary time sampling procedure with a 25-second observe and 35-second record cycle. A cassette player and ear piece were used to maintain the 1-min interval pace of the observation. Each child was systematically observed one
time in both physical education and recess, and observations of the two settings
did not consistently occur on the same day. Informal observations on days prior to
formal data collection helped reduce reactivity, and conversations with teachers
after the formal observation verified that data were collected on typical physical
activity behaviors.

Observer Training and Interrater Reliability. The authors were formally
trained by the creator of BEACHES to measure physical activity behaviors using
systematic observation methods. The first author engaged in at least six months of
practice observations and additional training with the second author prior to data
collection. Practice observations consisted of systematically observing physical
activity of children with mental retardation, children with ASD, and children without
disabilities in physical education classes and recess periods. A certified adapted
physical educator was trained by the first author to use systematic observation
methods and this study’s direct observation instrument. Interrater reliability was
established with this individual at the beginning of each semester that data was
collected (90%, 91%, and 90%) using videotaped sessions. Interrater reliability was
calculated using percent agreement during the total observation time. Due to limited
staff and financial resources for the study, only the first author conducted observation
sessions. Coding definitions were reviewed at least every three weeks.

Data Analyses

Accelerometer and observational data were analyzed using SPSS 11.0 for Windows.
Homogeneity of variance was tested using Levene’s test, and the t value for unequal
variances was reported in cases where Levene’s revealed heterogeneous variances.
Univariate ANOVA analyses were used to determine (a) gender effects on physical
activity within each group and (b) differences between genders according to age,
height, weight, and body mass index within each group. Independent t tests and
paired t tests were used to analyze between and within group differences in
MVPA, respectively. Differences between more than two related samples were
determined by repeated-measures ANOVA. Paired t tests were subsequently
conducted contingent upon Wilks’’. The relationship between physical activity
measures was assessed using Pearson product-moment correlations. Effect size
calculations are reported as partial eta-squared (\( \eta^2 \)). Data are reported as mean ±
SD and statistical significance was set at \( p < .05 \). Data are reported as percentages
rather than minutes to accommodate inconsistencies in time allotted for recess and
physical education among individuals.

Results

There were no differences between genders within either group according to all
variables, thus gender was combined in subsequent analyses. Time spent in vigorous
and very vigorous physical activity was minimal for both groups, so these categories
were combined with moderate physical activity to report MVPA. All other activity
was categorized as light physical activity (Trost, Pate, Freedson, Sallis, & Taylor,
2000). There were no between-day MVPA differences, so weekday and weekend
data for the 10:00 a.m. to 7:00 p.m. time period were collapsed. The walking and
very active categories from the systematic observation instrument were collapsed
to obtain MVPA (McKenzie, Sallis, & Nader, 1991). The correlation between the
systematic observation and accelerometer data during physical education and recess was significant, $r(24) = .74, p < .00$ and $r(20) = .65, p < .00$, respectively.

### All Day Activity

Children with ASD were less active than children without ASD across all time periods, but these differences were not significant; therefore, no further information of between group differences across specific time periods will be presented (Figure 1). Ten children with ASD and 12 children without ASD engaged in at least 60 min of MVPA on the five monitored days, and few children from either group (3 ASD, 5 non-ASD) engaged in at least 120 min of MVPA on the five monitored days. Both groups spent more percent time in light physical activity (ASD, $76.39 \pm 13.39$; non-ASD, $69.98 \pm 8.45$) than MVPA during the day ($p \leq .00$, $r^2 = .81$; Figure 1). Group mean min spent in MVPA during the day (10:00 a.m. – 7:00 p.m.), physical education, recess, and after school (4:00 – 7:00) are reported in Table 2.

![Figure 1](image-url)  
*Figure 1 — Percent time spent in moderate to vigorous physical activity (MVPA) across four settings. * Denotes significantly different from physical education. † Denotes significantly different from after school.
Physical Education

There was no group difference in time allotted for physical education (ASD = 31.21 ± 4.71 min; non-ASD = 33.79 ± 8.27 min; \(t(24) = -98, p = .34, \quad p^2 = .04\)). Children with ASD only spent 41% of class time in MVPA, which was not significantly less than children without ASD (51%). Comparison between MVPA and light physical activity within groups was not significantly different for either the ASD or non-ASD group (Figure 1).

Recess

Groups spent different amounts of time in recess (ASD = 26.78 ± 8.62 min; non-ASD = 32.34 ± 8.41 min; \(t(21) = -156, p = .13, \quad p^2 = .10\)). Children with ASD engaged in relatively similar amounts of MVPA and light activity, and the non-ASD group spent significantly more percent time in MVPA than light physical activity during recess: \(t(10) = -4.10, p < .00, \quad p^2 = .63\) (Figure 1).

After School

Physical activity was measured on 4.00 ± .00 days for both groups. Children from both groups spent a smaller percentage of after school time in MVPA compared to light activity: ASD = \(t(14) = 3.91, p < .00, \quad p^2 = .56\); non-ASD = \(t(12) = 3.75, p < .00, \quad p^2 = .54\) (Figure 1).

Comparison of Time Periods

Analysis revealed significant differences in MVPA when physical education, recess, and after school time periods were compared, Wilks’ \(\lambda = .12, F(3, 9) = 22.15, p = .00, \quad p^2 = .88\) and non-ASD, Wilks’ \(\lambda = .12, F(3, 8) = 31.52, p = .00, \quad p^2 = .92\), groups. The ASD group was similarly active during recess and physical education, but the non-ASD group spent significantly more percent time in MVPA during recess than physical education: \(t(10) = -3.12, p < .01\) (Figure 1). The ASD group, \(t(12) = -2.58, p < .02, \quad p^2 = .36\) and non-ASD group, \(t(12) = -2.57, p < .02, \quad p^2 = .36\), spent more percent time in MVPA during physical education than after school: \(t(12) = 3.30, p < .01\) (Figure 1). Both groups spent more percent time in MVPA during recess compared to the after school period: ASD, \(t(11) = -3.30, p < .00, \quad p^2 = .50\); non-ASD, \(t(10) = -5.49, p < .00, \quad p^2 = .75\) (Figure 1).

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Table 2  Group Mean Minutes in MVPA in Four Settings

<table>
<thead>
<tr>
<th></th>
<th>ASD</th>
<th>Non-ASD</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Day</td>
<td>127.5 ± 72.3</td>
<td>162.1 ± 45.6</td>
</tr>
<tr>
<td>PE</td>
<td>12.8 ± 6.8</td>
<td>16.7 ± 4.8</td>
</tr>
<tr>
<td>Recess</td>
<td>15.5 ± 8.8</td>
<td>22.6 ± 7.8</td>
</tr>
<tr>
<td>After School</td>
<td>51.9 ± 35.7</td>
<td>66.2 ± 22.8</td>
</tr>
</tbody>
</table>

Note. Values represent \(M \quad SD\).
Continuous Activity

There were no between group differences in bouts of daily, continuous MVPA lasting 5, $F(1, 26) = 0.77, p = .39$; 10, $F(1, 26) = 1.60, p = .22$; and 20, $F(1, 26) = 0.00, p = .95$ min (Figure 2). Both groups engaged in more continuous bouts lasting 5 compared to 10 min, ASD, $t(14) = -4.35, p = .00, \quad r^2 = .57$; non-ASD, $t(12) = -9.66, p = .00, \quad r^2 = .89$, 10 compared to 20 min, ASD, $t(14) = -4.28, p = .00, \quad r^2 = .57$; non-ASD, $t(12) = -8.15, p = .00, \quad r^2 = .85$, and 5 compared to 20 min, ASD, $t(14) = -4.40, p = .00, \quad r^2 = .58$; non-ASD, $t(12) = -10.13, p = .00, \quad r^2 = .90$.

Discussion

Activity levels of children with and without ASD were similar across all time periods. This finding was unexpected since studies have reported that children with mental retardation (Davies & Joughin, 1993; Sharav & Bowman, 1992), physical disabilities (van den Berg-Emons et al., 1995), and cystic fibrosis (Nixon, Orenstein, & Kelsey, 2001) are less active than those without disabilities. However,
the current findings are precedented as other studies have found children with mental retardation (Faison-Hodge & Porretta, 2004; Lorenzi et al., 2000), physical disabilities (Fredricksen et al., 2000), and juvenile rheumatoid arthritis (Henderson, Lovell, Specker, & Campagne, 1995) to be similarly active or more active than children without a disability. The inconsistent findings in the literature highlight the importance of using objective assessment methods, support the examination of physical activity levels within various environments, and confirm the need to measure the physical activity of specific subgroups to avoid generalizations across different disabling conditions.

Evidence of similarities in physical activity levels between the two groups may be found in the systematic observations and parent-reported daily activities. First, all children attended academic classes during the day, and most attended both physical education (ASD, 77%; non-ASD, 69%) and recess (ASD, 58%; non-ASD, 82%) four days out of the week. Second, both groups participated in some amount of MVPA after school, despite differences in the types of community program in which the children were involved. Third, parents reported that children with ASD engaged in unstructured physical activity at home, such as wandering around the house, displaying self-stimulatory behavior, swimming, jumping, throwing, climbing, being chased by a sibling, walking with a parent in the neighborhood, running errands with a parent, and attending therapy sessions. Based on these data, it is concluded that school activities and unstructured after-school activities provide opportunities for children with ASD to be active. Considering that children with ASD may engage in MVPA in isolated or social contexts, it appears that physical activity interventions could be conducted in both contexts.

Participants with ASD received recess in both segregated and inclusive settings, with varying levels of support. In this study, the recess environment was not controlled and many variables existed; therefore, conclusions regarding the effect of placement or amount of support on physical activity levels in recess are not possible. There is previous literature that has reported no difference in physical activity levels in children with mental retardation regardless of inclusive or segregated recess setting (Horvat & Franklin, 2001). Future studies would do well to control for recess variables and provide additional knowledge about the influential nature of segregated and inclusive settings on the physical activity levels of children with ASD.

Since recess is an apparently valuable source of MVPA for children with ASD, it should not be sacrificed to accommodate other curricula. Although both groups were allotted similar amounts of time in recess, it was observed that eight children with ASD were removed early by teachers, seven of whom were in self-contained classrooms. Previous research has cited instances where recess is reduced or eliminated for the sake of academic time (Newman, Brody, & Beauchamp, 1996). In this study, teachers removed children with ASD from recess early to ease transitions between classes or start assignments early in subsequent classes. Since it appears that children with ASD are engaging in a majority of MVPA during recess, additional reductions in this time could have a negative impact on their opportunity to engage in daily MVPA.

Children with ASD did not engage in adequate amounts of MVPA during physical education. According to national standards, children should be physically active at least 50% of the time during physical education (USDHHS, 2000), and children with ASD in this study were only active 41% of the time. This was less
than the non-ASD group but not significantly different. Several factors may have contributed to this result. First, children with and without ASD frequently sat or stood prior to engaging in physical activity (i.e., waiting in line) in physical education. This is consistent with previous reports of physical activity during physical education in children without disabilities (McKenzie et al., 2000). Second, children with ASD were observed requiring verbal and physical prompts to complete activities. Time needed for extra assistance may limit the child’s activity involvement. Third, excessive time dedicated to classroom management (i.e., taking roll, transitioning from one activity to another) may limit opportunities of all children to engage in activities that promote MVPA. Fourth, at least four children with ASD were receiving physical education instruction from special education teachers who were not certified to teach that content area. Teacher variables, such as expertise or effectiveness, were not components of the systematic observation instrument, thus discussion of teacher associated variables is beyond the scope of this study. Previous research suggests that effective teaching behaviors are associated with higher levels of student activity during physical education (Faucette & Patterson, 1990), but this should be explored further in children with ASD.

It was expected that children with ASD would be less active than children without ASD after school because prior research has indicated individuals with disabilities have limited opportunities for active leisure time (Schleien, Germ, & McAvoy, 1996). This was not the case in the present study as both groups were similarly active after school, but it was disheartening that each group was primarily inactive during this time. The majority of children with ASD spent after-school leisure time in light physical activity, and none participated in competitive or inclusive community activities. Six were in segregated programs, including private dance lessons and an activity program specially designed for children with disabilities, but these were not sufficiently frequent to promote regular MVPA. In contrast, nine children without ASD participated in competitive community activities, such as soccer and baseball. Since the non-ASD group was not significantly more active after school than those with ASD, it appears that these competitive outlets were also not sufficiently frequent to promote regular MVPA.

A majority of children from both groups reportedly went directly home after school and engaged in sedentary, technology-based activities that likely contributed to inactivity. Technology-based activities such as video games and television distract children from the opportunity of being physically active (McKenzie et al., 1992), and parents reported that these activities were part of the daily routine for a majority of children in this study. In many cases, television or video viewing was used to occupy children with ASD so parents could complete household duties or interact with other children in the home. While it may seem logical that these same trends apply to children without ASD, it was not confirmed by a majority of the parents of children without ASD. This reliance on technology-based activities rather than physical activities during leisure presents a serious concern for children with ASD for several reasons: (a) It is well documented that physical activity significantly decreases from childhood to adolescence (Raitakari et al., 1994); (b) it may be difficult to find activity opportunities for children with ASD as they move into adolescence because of less involvement in play environments; and (c) available activity programs become more competitive during adolescence and competitive programs are typically not appropriate for youth with ASD (Schultheis, Boswell, & Decker, 2000). If this population does not develop participation in leisure-time
physical activity as a regular health behavior, then it is likely they will become increasingly sedentary with age and predisposed to develop certain chronic diseases.

This is the first known attempt to objectively measure all day physical activity in children with ASD. The validity of our findings was enhanced by using (a) two objective methods to assess physical activity (Welk et al., 2000), (b) a five day monitoring period, and (c) an age-matched comparison group. Both assessment methods were significantly correlated and suitable for a small-scale investigation of this type. The small, cross-sectional sample somewhat limits generalizability, and recruitment of participants from a variety of physical education and recess placements is a design weakness that must be considered when interpreting these findings. Examining the influence of educational placement on physical activity in this population is an area that requires further inquiry.

Design limitations notwithstanding, these findings provide meaningful, new information regarding the physical activity patterns of children with ASD. While the mean physical activity levels of children with ASD were lower than peers without ASD, these differences were not significant, and most children were capable of accruing minimum recommended minutes of daily MVPA. Children with ASD may still be at-risk for developing sedentary behaviors as they mature due to (a) the potential overuse of technology-based activities during leisure time and (b) loss of recess time as a primary source of MVPA in middle and high school.

References


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**Acknowledgments**

This research was partially funded by the Department of Health and Kinesiology and the Office of Graduate Studies of Texas A&M University. The authors would like to thank all children, parents, teachers, and school districts who participated in and provided support for this project. Additional gratitude is extended to Dr. J. Thomas Kellow for his statistical advice.