Parent Perceptions of Factors Influencing After-School Physical Activity of Children With Autism Spectrum Disorders

Iva Obrusnikova and Dannielle L. Miccinello
University of Delaware

The study assessed parental perceptions of the benefits of physical activity (PA) and the factors that influence participation of children with autism spectrum disorders in PA after school. Data were collected from 103 parents using an online open-ended questionnaire and focus-group interviews. Data were analyzed using a socioecological model. Parents provided 225 responses that were coded as advantages, 106 as disadvantages, 225 as facilitators, and 250 as barriers of PA. The most frequently reported advantages were physical, followed by psychosocial, and cognitive. Disadvantages were psychosocial and physical. The most frequently reported barriers were intrapersonal, followed by interpersonal, physical, community, and institutional. Facilitators were intrapersonal, followed by physical, interpersonal, community, and institutional. Public policy factors were elicited in the interviews.

Keywords: physical activity, autism spectrum disorders, barriers, obesity

Autism spectrum disorders is an umbrella term commonly used to describe five subtypes of neurodevelopmental disorders in which individuals have deficits in communication and social skills and exhibit rituals and stereotypes (American Psychiatric Association, APA, 2000). The number of children diagnosed with ASD has been steadily increasing. In 2009, approximately one in every 110 children, aged 3–17 years, in the United States was diagnosed with ASD (Kogan et al., 2009). The prevalence of childhood obesity in this population has also become evident (Curtin, Bandini, Perrin, Tybor, & Must, 2005). For example, in a study of children with ASD, aged 2–19 years, Curtin et al. (2005) found that 36% were at risk for being overweight and 19% were overweight. These percentages were substantially larger among older children.

Physical activity (PA) is an important component in the prevention of childhood obesity. As part of a national health initiative, the U.S. Department of Health and Human Services recommends that children and adolescents, ages 6–17 years, participate in 60 min or more of moderate to vigorous PA every day and 20-min
bouts of continuous, vigorous activity at least three days per week (USDHHS, 2010). By meeting this recommendation, children and adolescents can improve cardiorespiratory fitness, muscular strength, blood pressure, and decrease depressive symptoms (USDHHS, 2010). In addition, in children with ASD, continuous participation in PA has been shown to reduce restricted, stereotyped, repetitive behaviors (Rosenthal-Malek & Mitchell, 1997).

Despite the benefits of PA, many children with ASD fail to meet the USDHHS recommendation and become increasingly less active during adolescence (Pan & Frey, 2006; Reid, 2005). A multitude of factors related to the unique characteristics of children with ASD might contribute to the low levels of PA in this population (Obrusnikova & Cavalier, 2011). For example, communication and social skill deficits of children with ASD (Müller, Schuler, & Yates, 2008) may lower their opportunities for peer interaction, which may ultimately pose challenges to their participation in PA. Children with ASD also exhibit inattentive and hyperactive behaviors (Holtmann, Bolte, & Poustka, 2007), strong preference toward sedentary activities (e.g., playing video games, watching television; Obrusnikova & Cavalier, 2011), narrowly focused interests in certain routines and procedures (Obrusnikova & Dillon, 2011), and deficits in performance of fine and gross motor skills (Fournier, Hass, Naik, Lodha, & Cauraugh, 2010). All these characteristics may become barriers to PA.

To counter the decline in PA among typically developing children, researchers (e.g., Dwyer, Needham, Simpson, & Heeney, 2008; Gyurcsik, Bray, & Brittain, 2004) have advocated the use of the multidimensional socioecological model developed by McLeroy, Bibeau, Steckler, and Glanz (1988). The model divides factors that influence PA behavior into five domains: intrapersonal, interpersonal, institutional, community, and public policy. Intrapersonal factors are the characteristics of an individual that are modifyable (e.g., attitude and knowledge) or nonmodifiable (e.g., age and gender). Interpersonal factors are formal and informal social networks and groups that influence PA (e.g., lack of peers to play with). Institutional factors are formal and informal contexts that influence PA within social institutions (e.g., lack of physical education). Community factors are the relationships that exist among organizations and informal networks within defined geographic boundaries. Lastly, public policy factors are the local, state, and national laws and policies that influence PA. Although McLeroy et al. (1988) did not identify a category for physical factors (i.e., the natural or constructed physical contexts that influence PA), recent studies (e.g., Sallis, Bauman, & Pratt, 1998; Gyurcsik et al., 2004) have promoted inclusion of these factors in the model.

To date, only a few studies have assessed barriers children with disabilities encounter when participating in PA (Law et al., 2007; Menear, 2007; Obrusnikova & Cavalier, 2011). For example, using self-administered questionnaires, Law et al. (2007) found that parents of children with physical disabilities believed that barriers to PA frequently occurred in school and work settings due to social and attitudinal beliefs. Additional barriers were related to the environment, public policy, and programs. Findings also indicated that as children got older, the presence of barriers increased. Similarly, Menear (2007) interviewed parents of children with Down syndrome from preschool through adolescence and found that all parents were supportive of their child's PA. The type of barriers varied as a function of age.
Parents reported that preschool-aged children with Down syndrome were naturally active; however, as they entered elementary school and adolescence, they became less motivated and interested in PA and more interested in sedentary activities. Safety and a lack of facilities were also frequently reported barriers in the study. Although this research provided important first-hand information about factors that influence PA behavior in children with disabilities, the broad and sometimes poorly defined categories of factors make comparison of the findings across studies and populations challenging. Consequently, a more systematic approach, such as the socioecological model, to classifying factors that influence PA is needed (Gyurcsik et al., 2004).

Obrusnikova and Cavalier (2011) were one of the first to use a socioecological model to examine factors that influence participation of children with ASD in PA after school. Using the Photovoice methodology, a community and participatory action research tool (Wang & Burris, 1994), 14 children with ASD, aged 8–14 years, were asked to express their perceptions of barriers and facilitators. Photographs taken by the participants and follow-up discussions with a researcher revealed that the most frequently cited barriers were intrapersonal (e.g., engaging in sedentary activities), followed by interpersonal (e.g., lack of exercise partner), physical (e.g., inclement outdoor conditions), community (e.g., lack of transportation), and institutional (e.g., lack of time). The most frequent facilitators were physical (e.g., appropriate exercise equipment), followed by intrapersonal (e.g., playing individual or dual sports), interpersonal (e.g., peers are supportive or physically active), community (e.g., accessible PA programs), and institutional (e.g., school after-school PA programs). This study had a number of limitations. For example, it targeted only a small sample of children who could verbally describe their photographs, which was not representative of the entire population of children with ASD. In addition, it did not reveal any factors related to public policy, which might have been due to the age of the participants. Therefore, the researchers recommended collecting data from parents.

Parental beliefs, perceptions, and support for PA play an important role in the development of children’s health-related behavior (Baranowski, 1997; Sallis, Prochaska, & Taylor, 2000). The routines children establish early in life can ultimately influence their risk of obesity in adulthood (Brustad, 1993). Baranowski (1997) in his review suggested that parents can influence their children’s health-related behaviors through genetics, direct modeling, rewarding appropriate behaviors, applying consequences or ignoring inappropriate behaviors, establishing or eliminating barriers, providing resources to perform the behaviors, and promoting their self-control skills. For example, in a study done by Brustad (1993) with typically developing children, it was determined that parents who enjoyed participating in PA provided more encouragement to their children, which positively influenced their children’s perceived competence and ultimately their level of PA participation. Therefore, the purpose of this study was to investigate parental perceptions of the factors that influence afterschool PA participation of children with ASD. The two research questions that guided the study were (a) What do parents believe are the advantages and disadvantages of their child participating in PA after school? and (b) What do parents believe are the barriers to and facilitators of their child participating in PA after school? Elicitation of these factors using a socioecological model will help us understand a multitude of factors associated with afterschool PA.
This will provide guidance for developing appropriate and sensitive assessments and interventions aimed at effectively eliminating barriers to PA and ultimately preventing obesity of children with ASD.

**Method**

**Participants**

Participants who completed an online questionnaire were a convenience sample of 103 parents, aged 29–57 years ($M = 43.75, SD = 6.49$), from the states of Delaware (53%), Maryland (19%), and Pennsylvania (28%). The criteria to participate in the study were (a) be a biological parent, stepparent, or have lawfully adopted a child with ASD and (b) live in the Tristate area. The three states were selected because the state demographic data (i.e., gender, race, and education level attained) were collectively comparable to those of the United States as a whole (U.S. Census Bureau, 2001). A child with ASD had to meet the following criteria for her or his parents to be eligible to participate in the study: (a) be between the ages of 5 and 21 years, (b) qualify for or be currently receiving special education services under the diagnosis of ASD (i.e., autism disorder, pervasive developmental disorder, not otherwise specified, PDD-NOS, Asperger syndrome, childhood disintegrative disorder, or Rett disorder) in school or home school settings (American Psychiatric Association, 2000), and (c) be without an educational diagnosis of an orthopedic impairment.

The participants included 90 birth mothers, seven birth fathers, four lawful adoptive mothers, one lawful adoptive father, and one stepmother. A large majority of the participants (93%) identified themselves as Caucasian Americans, 3% as Asian Americans, 2% as African Americans, 1% as Native Hawaiian/Pacific Islanders, and 1% as multiple races. When asked about the highest educational degree attained, 3% of the participants reported a vocational degree, 23% a high-school degree, 15% an associate degree, 40% a Bachelor’s degree, 10% a Master’s degree, and 6% a doctoral degree. Of the 103 participants, 57% reported to have one child, 28% two children, 8% three children, 5% four children, and 1% five or six children. Ninety-three percent reported to have one child with ASD, 6% two children with ASD, and 1% three children with ASD. When participants had multiple children with ASD, they were instructed to randomly select a child that met the eligibility criteria. The average age of the children (85 boys and 15 girls) they selected as the focal person for the questionnaire was 12 years (range = 5–21, $SD = 3.81$). Their ASD diagnoses were (a) autism (42%), (b) Asperger syndrome (41%), and (c) PDD-NOS (18%). The ratio of boys and girls in the sample is representative of the four to one ratio of boys and girls diagnosed with ASD (Kogan et al., 2009).

Of the 103 participants who took the questionnaire, 21 expressed an interest in a focus-group interview. Responses to the demographic questionnaire were used to purposively select 11 parents who expressed an interest in the interview using a maximum variation sampling (Patton, 2002). The final selection of the parents for the focus-group interviews was based on the following dimensions: (a) level of education attained, (b) relationship to the child with ASD, and (c) the type of their child’s ASD diagnosis. Every attempt was made to include parents (a) with lower and higher education level attained, (b) who were biological and lawfully
adoptive parents, and (c) whose children were diagnosed with either autism, Asperger syndrome, or PDD-NOS.

Interview participants’ age ranged from 31 to 54 years \( (M = 43.5, SD = 7.6) \). Eight of the participants were birth mothers, one a birth father, one a lawful adoptive mother, and one a lawful adoptive father. A majority of the participants (82%) identified themselves as Caucasian Americans, 9% as African Americans, and 9% as Native Hawaiian/Pacific Islanders. When asked about the highest educational degree attained, 36% of the participants reported a high-school degree, 27% a Bachelor’s degree, 9% a vocational, associate, Master’s, or doctoral degree. Although the interview participants predominantly included Caucasian American parents (82%), this racial distribution was typical of the area from which the population was drawn (State of Delaware, 2009). Delaware was selected for the interviews because the interested parents could participate in face-to-face interviews. A majority of the interview participants (54%) reported to have only one child, 15% two children, and 15% four children. All participants had only one child with ASD. The average age of their children (10 boys and a girl) was 11 years \( (SD = 2.09; \text{range} = 8–14 \text{ years}) \). Parents’ reports indicated that their child’s ASD diagnosis was (a) autism (42%), (b) Asperger syndrome (41%), and (c) PDD-NOS (18%).

The Social Responsiveness Scale (SRS) was administered to parents before the interview to validate their child’s diagnosis. The \( T \)-scores showed that all children were in the severe range of social impairment \( (T \geq 76) \). This range is associated with a clinical diagnosis of autism, Asperger syndrome, or more severe cases of PDD-NOS (Constantino & Gruber, 2005).

**Instrumentation**

Data in this study were gathered in two ways: (a) an online questionnaire and (b) focus-group interviews. The online questionnaire included questions on participants’ demographics (i.e., age, sex, race, state of residence, education, annual household income, ASD diagnosis of their child, and relationship to the child with ASD), a definition of PA, and four open-ended questions. The following definition of PA that was presented to the parents was similar to that used in Obrusnikova and Cavalier (2011):

> Physical Activity is when you move your arms and/or legs. Your heart beats faster and you breathe harder. If done long enough, you start sweating. For example, walking, jogging, doing sit-ups, playing soccer or Wii Fit, or dancing.

The open-ended questions asked parents what they thought were the advantages or disadvantages of their child participating in PA after school the previous month. The other two questions asked what made it hard or easy for their child with ASD to participate in PA after school the previous month.

A panel of judges evaluated content validity, readability, and technical quality of the online questionnaire. Using a four-point scale ranging from 4 (very well represented) to 1 (not well represented at all), the judges independently evaluated how well the demographic variables (e.g., household income) were represented in the questionnaire items. Furthermore, they evaluated technical quality and readability of the items using a four-point scale ranging from 4 (excellent) to 1 (poor). The questionnaire was pilot tested with five parents selected from the target population to
ensure the format and wording was appropriate. After all comments were addressed, the questionnaire was sent to the panel for final review. The content validity ratings ranged from 3.8 to 4.0, indicating excellent representativeness.

Following the questionnaire, three semistructured audio-recorded focus group interviews were conducted with 11 parents who completed the questionnaire. The rationale for the interviews was to (a) validate our interpretation of the questionnaire responses, (b) investigate sensitive questions and contradictions in the findings, and (c) provide additional and more detailed information about the responses (Creswell & Plano Clark, 2007). The interviews were initiated with the four questionnaire questions. Participants’ responses allowed the interviewer to probe for details and discuss further topics or relationships among topics. The interview guide was modified after each interview to focus on areas of importance (Lofland & Lofland, 1995). Researchers knew the participants and their children from their involvement in an after-school PA program, which might have facilitated conversations during the interview and understanding of the participant responses (Becker & Geer, 1957).

Procedure

The treatment of participants was in accordance with the ethical standards of the American Psychological Association. Approval to conduct the study was obtained from the University of Delaware Institutional Review Board (IRB). A two-stage protocol was adopted in this study. First, an online invitation explaining qualification criteria, the purpose of the study, and directions for accessing an online questionnaire was e-mailed to all members of autism support organizations in the states of Delaware, Maryland, and Pennsylvania (N = 1,103). Participants who were interested in taking the questionnaire consented by pressing the “Next” button on the invitation page. Three reminders to take the questionnaire were sent two weeks apart until data saturation began appearing. In the second stage, parents who completed the questionnaire (n = 103) were asked if they would like to participate in a follow-up interview that would take place at the University of Delaware. Three 1.5-hr focus groups (3–4 participants per each group) were conducted during a two-week period in a conference room by the first author. All parents signed and submitted consent forms as required by the University of Delaware IRB. Each interview was voice recorded and transcribed verbatim within 48 hr.

Data Analysis

Both qualitative and quantitative analyses were performed to obtain a more in-depth view of the findings (Corbin & Strauss, 2008). Data collection and analysis occurred concurrently. After about 50 questionnaires were completed, two researchers independently verified that responses were appropriately segmented into four data sets (i.e., advantages, disadvantages, barriers, and facilitators) and then independently proposed a preliminary set of coding categories, subcategories, and themes for each data set. After the initial codebook was created, two researchers independently coded the questionnaires using in NVivo. If new codes were derived, the researchers met to discuss those changes and then recoded the entire data set. Consistent with Obrusnikova and Cavalier (2011), the research team agreed to classify barriers and facilitators using the socioecological framework (McLeroy et al., 1988). The researchers terminated data collection after
two months because data started to saturate and no further unique categories emerged (Corbin & Strauss, 2008). Finally, frequencies of responses under each category were calculated.

Analysis of interviews occurred immediately after the data collection by two independent researchers using the questionnaire codes. If a new code emerged from the interview, both researchers independently recoded all data sets. After the third interview, data saturation began appearing; therefore, the total number of 11 interviewees was deemed adequate (Corbin & Strauss, 2008). To offset potential interviewer bias and support the credibility of the interview data, peer review, debriefing, and member checking were used (Lincoln & Guba, 1985). Member checking was done by presenting the transcripts to the participants within one week of each interview. Participants were instructed to proof read the transcripts for accuracy and, if they desired, write comments to clarify statements or correct grammar. The eight parents who responded confirmed that the themes reflected their experiences and perspectives well. Intercoder reliability was calculated between the two researchers for both the questionnaire and interview coding using Cohen’s kappa (1960), which yielded a questionnaire reliability score of 0.93 and an interview reliability score of 0.97. All disagreements between the coders were discussed. Any changes to the codebook resulted in recoding of all data sets.

Results

Advantages and Disadvantages of After-School Physical Activity

The questionnaire was completed by 103 parents who reported 225 (69%) advantages and 106 (31%) disadvantages of afterschool PA participation for children with ASD. Tables 1–2 indicate that the most frequently cited advantages were physical, followed by psychosocial and cognitive. Disadvantages were either psychosocial or physical.

Levels of the Socio-Ecological Model

The questionnaire elicited 250 perceived barriers and 225 facilitators. Using a socioecological model that was developed by McLeroy et al. (1988) and modified by Gyurcsik et al. (2004) as the guiding analytical framework, responses were assigned to one of the six categories. This paralleled categories used in prior research with children with ASD (Obrusnikova & Cavalier, 2011) and with typically developing children (Gyurcsik et al., 2004). Tables 3 through 5 contain response frequencies within each category of the socioecological model for parents who completed the questionnaire. Each parent reported an average of 2.2 barriers \( (SD = 1.9, \text{ range } = 0–8) \) and 1.8 facilitators \( (SD = 1.7, \text{ range } = 0–7) \). Twenty-two participants did not report any barrier and 27 did not report any facilitator. The most frequently cited barriers were intrapersonal, followed by interpersonal, physical, community, and institutional. The most frequently cited facilitators were intrapersonal, followed by physical, interpersonal, community, and institutional. No public policy barriers or facilitators were found in the questionnaire data.
Intrapersonal Barriers and Facilitators

Frequently reported intrapersonal barriers in both the questionnaire and interviews were a child’s lack of motivation or interest in PA and a child’s preference to engage in sedentary activities after school (see Table 3). As one of the parents cited, “PA

---

**Table 1  Advantages of Physical Activity Listed by the Participants**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Responses</th>
<th>n&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>128 (57%)</td>
<td>103</td>
</tr>
<tr>
<td>Increased fitness</td>
<td>36 (16%)</td>
<td>30</td>
</tr>
<tr>
<td>Weight management</td>
<td>32 (14%)</td>
<td>29</td>
</tr>
<tr>
<td>Increased motor control</td>
<td>24 (11%)</td>
<td>19</td>
</tr>
<tr>
<td>Energy release and improved sleep</td>
<td>17 (8%)</td>
<td>16</td>
</tr>
<tr>
<td>Increased physical health</td>
<td>16 (8%)</td>
<td>15</td>
</tr>
<tr>
<td>Increased energy</td>
<td>3 (1%)</td>
<td>3</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>99 (44%)</td>
<td>57</td>
</tr>
<tr>
<td>Increased socialization opportunities</td>
<td>37 (16%)</td>
<td>32</td>
</tr>
<tr>
<td>Increased confidence and self-esteem</td>
<td>16 (7%)</td>
<td>15</td>
</tr>
<tr>
<td>Increased mental health</td>
<td>15 (7%)</td>
<td>14</td>
</tr>
<tr>
<td>Increased social skills</td>
<td>14 (6%)</td>
<td>11</td>
</tr>
<tr>
<td>Decreased anxiety and frustration</td>
<td>9 (4%)</td>
<td>8</td>
</tr>
<tr>
<td>Increased concentration</td>
<td>8 (4%)</td>
<td>8</td>
</tr>
<tr>
<td>Cognitive</td>
<td>8 (4%)</td>
<td>8</td>
</tr>
<tr>
<td>Increased knowledge of sports rules</td>
<td>4 (2%)</td>
<td>4</td>
</tr>
<tr>
<td>Increased knowledge of the outside environment</td>
<td>4 (2%)</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note. Numbers in parentheses represent the percentage of total responses. Data corresponds to 128 participants (N = 103).*

**Table 2  Disadvantages of Physical Activity Listed by the Participants**

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>Responses</th>
<th>n&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychosocial</td>
<td>71 (67%)</td>
<td>43</td>
</tr>
<tr>
<td>Increased negative affective reactions</td>
<td>21 (20%)</td>
<td>21</td>
</tr>
<tr>
<td>Decreased enjoyment and engagement</td>
<td>17 (16%)</td>
<td>16</td>
</tr>
<tr>
<td>Teasing and bullying</td>
<td>15 (14%)</td>
<td>15</td>
</tr>
<tr>
<td>Increased social isolation</td>
<td>8 (10%)</td>
<td>8</td>
</tr>
<tr>
<td>Decreased self-esteem</td>
<td>6 (6%)</td>
<td>6</td>
</tr>
<tr>
<td>Overstimulation</td>
<td>4 (4%)</td>
<td>4</td>
</tr>
<tr>
<td>Physical</td>
<td>35 (33%)</td>
<td>30</td>
</tr>
<tr>
<td>Lack of success in motor performance</td>
<td>25 (24%)</td>
<td>23</td>
</tr>
<tr>
<td>Increased fatigue and physical discomfort</td>
<td>10 (9%)</td>
<td>10</td>
</tr>
</tbody>
</table>

*Note. Numbers in parentheses represent the percentage of total responses. Data corresponds to 128 participants (N = 103).*

---

*Intrapersonal Barriers and Facilitators:* Additionally, parents reported that increased anxiety and frustration, lack of self-esteem, and overstimulation were significant intrapersonal barriers. Furthermore, increased fatigue and physical discomfort, decreased success in motor performance, and decreased enjoyment and engagement were also identified as significant barriers.

---

*Note. Numbers in parentheses represent the percentage of total responses. Data corresponds to 128 participants (N = 103).*
becomes a chore rather than an activity that he looks forward to do.” Sedentary activities included playing video games or using a computer, watching television or favorite shows, or playing board games such as legos or cards. Lack of time due to a child’s schoolwork, decreased energy and focus, therapy, and work, as well as a lack of independence were also frequently cited barriers in the study. One parent stressed this point via the following statement: “By the time he is done with homework and wasting time procrastinating over doing homework it is dinnertime and too late for him to play.”

Impairments in motor, social, and communication skills were also perceived by the parents as barriers to their child’s participation in PA after school. For example, eight parents reported that their child “cannot keep up with other children because of their lack of coordination, balance, and poor gross motor skills.” These challenges were reported to lead to bullying and consequently to “frustration, anger, and sadness.” More specifically, parents noted that their children have difficulty taking turns, initiating social interaction with peers, expressing their thoughts, or comprehending rules or regulations. Parents also believed their children with ASD become easily preoccupied with or distracted by their favorite topics during conversation with peers. In addition, some parents suggested that unless supervised, it is unsafe for these children to engage in outdoor PA after school because they “are oblivious to oncoming traffic,” “like talking to strangers,” “walk out into the street,” and “wander too much.”

To promote PA after school, six parents reported that they used their child’s favorite sedentary activities as a reward for completing PA. However, trying to engage an older child with ASD in PA rather than allowing sedentary activities resulted in refusal of the PA. This scenario was depicted in the following statement:

It is hard to get him to participate in PA if he feels he has not had his “allotted” reward of two hours of screen time [time spent in front of a computer, television

Table 3 Intrapersonal Barriers and Facilitators Listed by the Participants

<table>
<thead>
<tr>
<th>Barriers and Facilitators</th>
<th>Responses</th>
<th>n&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapersonal barriers</td>
<td>142 (57%)</td>
<td>66</td>
</tr>
<tr>
<td>Lack of motivation or interest in PA</td>
<td>44 (18%)</td>
<td>34</td>
</tr>
<tr>
<td>Lack of time</td>
<td>24 (10%)</td>
<td>20</td>
</tr>
<tr>
<td>Engagement in sedentary activities</td>
<td>20 (8%)</td>
<td>19</td>
</tr>
<tr>
<td>Impaired social and communication skills</td>
<td>16 (6%)</td>
<td>14</td>
</tr>
<tr>
<td>Lack of independence</td>
<td>11 (4%)</td>
<td>9</td>
</tr>
<tr>
<td>Health issues</td>
<td>10 (4%)</td>
<td>10</td>
</tr>
<tr>
<td>Impaired attention and comprehension</td>
<td>9 (4%)</td>
<td>8</td>
</tr>
<tr>
<td>Impaired motor performance</td>
<td>8 (3%)</td>
<td>8</td>
</tr>
<tr>
<td>Intrapersonal facilitators</td>
<td>66 (29%)</td>
<td>44</td>
</tr>
<tr>
<td>Emphasizing enjoyment of PA</td>
<td>47 (21%)</td>
<td>38</td>
</tr>
<tr>
<td>Using managerial strategies to promote PA</td>
<td>11 (5%)</td>
<td>11</td>
</tr>
<tr>
<td>Maximizing success and achievement in PA</td>
<td>8 (4%)</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. Numbers in parentheses represent the percentage of total responses.

<sup>a</sup> Number of questionnaire participants providing responses (N = 103).
or video game] per day for doing his school work and chores. If he feels the activity will cancel out or get in the way of his “reward,” he balks at going to it.

Therefore, some parents reported that they try to combine PA with their child’s narrow interests (e.g., WiiFit, paintball, games with the same concept as video games). Children’s favorite PA were mostly individual or dual (e.g., swimming, hiking, swinging, playing basketball, running, riding a scooter, weight lifting, horseback riding, marshal arts, gymnastics, trampoline, bicycling, WiiFit, yoga, and skiing). Another strategy that parents found useful in overcoming intrapersonal barriers was using routines, structure, and schedules to incorporate PA into their child’s day. For example, one parent said, “. . . if the activity is a scheduled activity and he knows it happens every week on the same day at the same time, he is ready to go as soon as I announce that it will be time to go.”

Interpersonal Barriers and Facilitators

Categories of interpersonal barriers and facilitators are listed in Table 4. Previously mentioned intrapersonal barriers often required either a lot of prompting from the parents (e.g., “They are not self-starting kids. These are not kids who are going to initiate PA . . . we have to structure the time for them”) or parents physically participating in the PA with their child (e.g., “We are always trying to get our children out. Sometimes even just sitting there and catching a ball. He may miss my glove 100 times, but being there to participate with them helps”). However, 25% of the questionnaire sample and 82% of the interviewees cited that they do not always have the time, energy, or patience to support or engage their child with ASD in PA. Three reasons were cited. First, children with ASD require too much attention from the parents who have a full-time job or other responsibilities at the house (e.g., “She complains a lot about doing anything physical and requires lots of outside motivation from me and I’m doing dinner about that time”). Second, the duty of providing transportation to PA programs can be difficult (e.g., “I have to drive her places to do organized sports and when we do, it uses up a lot of time and that makes the rest of the evening stressful”). Third, parents have to adjust to the lack of motivation and success in PA by their child with ASD, which may lead to parents being frustrated and ultimately avoiding PA participation with their child. This was illustrated in this point:

With my child with ASD, I find it more difficult to participate than with my typically developing kids because there is not that level of success in what he does. That sounds very selfish and not like I am being a very good parent, but there are times where we will go out and I try to promote PA but it lasts much shorter periods of time because there is a loss of interest in it and there is not always a great success rate with what you are doing.

Playing with siblings or certain peers was also noted to facilitate participation in PA of children with ASD. Seven parents found siblings more appropriate exercise partners than typically developing peers because “they have a better understanding of a disability.” Parents in the questionnaire sample associated their child’s difficulties in developing peer relationships to (a) not having peers in the neighborhood \((n = 18)\) and (b) being teased or bullied by neighborhood kids \((n = 3)\). As one father noted,

Peers and parents that do not get him can be cruel and difficult. We just went through a situation like that. We were with friends who have typically developing
Table 4  Interpersonal and Physical Barriers and Facilitators Listed by the Participants

<table>
<thead>
<tr>
<th>Barriers and Facilitators</th>
<th>Responses</th>
<th>n^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal barriers</td>
<td>47 (19%)</td>
<td>37</td>
</tr>
<tr>
<td>Parents do not have time or energy</td>
<td>26 (10%)</td>
<td>23</td>
</tr>
<tr>
<td>Lack of peer exercise partner</td>
<td>21 (8%)</td>
<td>20</td>
</tr>
<tr>
<td>Interpersonal facilitators</td>
<td>51 (23%)</td>
<td>35</td>
</tr>
<tr>
<td>Friends/peers are supportive or physically active</td>
<td>22 (10%)</td>
<td>18</td>
</tr>
<tr>
<td>Parents are supportive or physically active</td>
<td>16 (7%)</td>
<td>15</td>
</tr>
<tr>
<td>Siblings are supportive or physically active</td>
<td>12 (5%)</td>
<td>7</td>
</tr>
<tr>
<td>Dogs are physically active</td>
<td>1 (&lt;1%)</td>
<td>1</td>
</tr>
<tr>
<td>Physical barriers</td>
<td>27 (11%)</td>
<td>21</td>
</tr>
<tr>
<td>Inclement outdoor conditions</td>
<td>19 (8%)</td>
<td>15</td>
</tr>
<tr>
<td>Lack of equipment/resources</td>
<td>8 (3%)</td>
<td>8</td>
</tr>
<tr>
<td>Physical facilitators</td>
<td>56 (25%)</td>
<td>48</td>
</tr>
<tr>
<td>Appropriate resources at/around house</td>
<td>34 (15%)</td>
<td>29</td>
</tr>
<tr>
<td>Good outdoor conditions</td>
<td>22 (10%)</td>
<td>21</td>
</tr>
</tbody>
</table>

Note. Numbers in parentheses represent the percentage of total responses.

^a Number of questionnaire participants providing responses (N = 103).

kids who did not tolerate my son the way he was. It turned out to be a very ugly situation where we were excluded and my child was seriously impacted by that.

Physical Barriers and Facilitators

While good outdoor conditions (e.g., good weather, no insects) were perceived as facilitators of PA, bad outdoor conditions (e.g., inclement weather, allergies, or presence of insects were reported as barriers to PA. About a third of the parents also reported that availability and quality of resources in or outside of their house promote their child’s PA, even during inclement weather conditions (e.g., “For bad weather, we bought Wi-Fit and he likes the fact that his movements equal the movements he sees on the television screen”). Outdoor resources that were reported to facilitate their child’s PA included basketball hoop, bicycle, trampoline, playground equipment, fenced flat backyard, pool, climbing tree, garden, swings, slides, or a hockey stick. Indoor resources that were reported to facilitate their child’s PA, included Wii Fit, ride-on toys, a gym in the basement, tumbling mats, a stationary bike, and a treadmill.

Community Barriers and Facilitators

Community barriers and facilitators are listed in Table 5. Almost a third of the parents reported that availability of community programs or locations with developmentally appropriate and affordable PA opportunities (e.g., YMCA, Special Olympics, specially designed programs, sports clubs, accessible playgrounds and parks) is a critical factor in their child’s level of engagement in and enjoyment of PA. The negative feelings associated with community programs not accommodating a child’s disability were well depicted in the following statement:
We did try to put him [a boy with autism] in a couple of community programs. It was a real draw on the rest of the team and it made him look even that much different. You are putting him in the programs so he fits in but in actuality, it is retroactive because he looks all the more abnormal.

Along these lines, eight parents reported that staff members of existing PA programs in their community did not have the appropriate training to work with their children with ASD. For example, one father stated during the interview, “I think most community programs are unaware of the issues of the autism spectrum and those involved in those programs tend to be volunteers who are not necessarily skilled or aware or educated to the issues that we face everyday.” Six parents also stated that unsafe neighborhoods (e.g., unsafe biking or playgrounds, inappropriate peer behavior) reduced PA for their children with ASD.

**Institutional Barriers and Facilitators**

The only institutional barrier identified by two parents in the questionnaire and seven interviewees was that their children do not receive physical education that accommodates their child’s needs at school (Table 5). Those barriers were depicted in this statement:

> The gym is a terrifying place for our kids; it is loud, bright, and noisy. The natural tendency of the gym teacher is to be loud. So, I think the whole environment in the gym for our kids needs to be modified. It sounds like an adaptive PE program would be a lot more effective for our kids.

The only institutional facilitator reported by seven parents was related to schools’ after-school PA programs that were specially designed for children with ASD (Table 5).

### Table 5 Community and Institutional Barriers and Facilitators Listed by the Participants

<table>
<thead>
<tr>
<th>Barriers and Facilitators</th>
<th>Responses</th>
<th>n²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community barriers</td>
<td>32 (13%)</td>
<td>23</td>
</tr>
<tr>
<td>Lack of community PA programs or locations</td>
<td>18 (7%)</td>
<td>15</td>
</tr>
<tr>
<td>Lack of staff training</td>
<td>8 (3%)</td>
<td>8</td>
</tr>
<tr>
<td>Community safety</td>
<td>6 (2%)</td>
<td>6</td>
</tr>
<tr>
<td>Community facilitators</td>
<td>45 (20%)</td>
<td>23</td>
</tr>
<tr>
<td>Availability of community PA programs or locations</td>
<td>35 (16%)</td>
<td>30</td>
</tr>
<tr>
<td>Trained staff</td>
<td>10 (4%)</td>
<td>9</td>
</tr>
<tr>
<td>Institutional barriers</td>
<td>2 (&lt;1%)</td>
<td>2</td>
</tr>
<tr>
<td>Not enough developmentally appropriate PE</td>
<td>2 (&lt;1%)</td>
<td>2</td>
</tr>
<tr>
<td>Institutional facilitators</td>
<td>7 (3%)</td>
<td>7</td>
</tr>
<tr>
<td>School offers after-school PA opportunities</td>
<td>7 (3%)</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note. Numbers in parentheses represent the percentage of total responses.

² Number of questionnaire participants providing responses (N = 103).
Public Policy Barriers and Facilitators

Interestingly, the questionnaire did not reveal any public policy factors. Therefore, the researchers specifically asked parents during the interview whether they knew the daily recommended amount of time their children should spend in moderate to vigorous PA to achieve health benefits. Of 11 parents, only one answered correctly (USDHHS, 2010). When asked to provide suggestions on how to raise awareness among parents about the PA guidelines, four suggested advocating at the state level. This is exemplified in the following statement:

It is like going back to the days when we did not wear seatbelts. Now everyone wears a seatbelt no matter what. We educated the public over so many years through a government process and then partnered with different entities—schools, health centers, community organizations. . . . I would like to see our governor’s office with the same sort of enthusiasm when it comes to PA.

Discussion

This research is one of the first studies to systematically investigate parental perceptions of the factors that influence afterschool PA participation of children with ASD. Parents from diverse backgrounds generally held positive beliefs about the benefits of PA for their children with ASD. These beliefs were primarily physical and psychosocial. Despite the numerous perceived benefits of PA for children with ASD, parents also noted a multitude of factors that negatively influenced their child’s PA participation. In addition, they were able to suggest facilitators that were effective in engaging their child with ASD in afterschool PA.

Consistent with prior research (Gyurcsik et al., 2004; Obrusnikova & Cavalier, 2011), the most commonly perceived factors among the parents were intrapersonal in nature. The findings support the claim that social, motor, attention, and behavioral deficits, as well as a narrow interest in screen-based activities, may contribute to inactivity in children with ASD (Obrusnikova & Cavalier, 2011; Pan & Frey, 2006; Reid, 2005). It may either decrease the amount of time a child with ASD has after school to participate in PA or may contribute to PA performance challenges (Allison, Dwyer, & Makin, 1999; Obrusnikova & Cavalier, 2011).

To maximize PA participation, parents reported that it is important to monitor their child’s engagement in sedentary pursuits and find motivational strategies to channel those pursuits into PA (Menear, 2007; Reid, 2005). To counter a lack of motivation for PA, parents placed a lot of emphasis on their children with ASD perceiving the PA as important, enjoyable, interesting, useful, and easy to perform (Allender, Cowburn, & Foster, 2006). In addition, providing structure and recognition for continued participation and extra opportunities for skill development was perceived as important to improve self-efficacy and consequently increase PA levels in this population (Allison et al., 1999). Likewise, parents reported that establishing predictability through schedules and routines and allowing their children with ASD to have choices during PA gives these children a sense of control over each situation and ultimately increases their PA participation (Jolivette, Stichter, & McCormick, 2002). Rewards were also reported by the parents to increase PA in this population. While parents noted that younger children with ASD respond well to extrinsic
rewards (e.g., earning TV time), adolescents with ASD seemed to respond better to intrinsic rewards (e.g., enjoyment of the PA; Zhang, 2009).

Interpersonal factors identified in this study were similar to those reported by children with ASD in Obrusnikova and Cavalier (2011). Parents in this study perceived parent, peer, sibling, and pet supports as important factors influencing their child’s PA participation after school. To encourage PA in children with ASD, the findings suggest that parents need to be physically active and take the time to explore the different PA opportunities in which their child with ASD may enjoy participating (Brustad, 1993; Sallis et al., 2000). Despite the reported benefits of peer support in increasing PA levels in children (Davison, 2004), parents in this study indicated that their children with ASD lack or have difficulty developing age-appropriate peer relationships, especially outside of prearranged settings (Orsmond, Krauss, & Seltzer, 2004). The two factors that parents reported to contribute to these difficulties were (a) a peer’s lack of understanding of the unique needs of children with ASD and (b) bullying (Orsmond et al., 2004). The social and psychological ramifications of the two factors may hinder a child’s physical, social, and emotional development, which can ultimately lead to inactivity and ultimately obesity (Janssen, Craig, Boyce, & Pickett, 2004). Therefore, some parents in this study expressed great importance of empathy and disability awareness training for people surrounding the child with ASD in and outside of the school (e.g., classmates and their parents, neighbors, school and community program staff).

Some physical, community, and institutional factors were perceived by parents to hinder and others to facilitate engagement of children with ASD in PA after school. Environments that hindered PA participation were those that lacked resources, were expensive, or posed barriers, such as inclement weather or high crime rates (Carson, Kuhle, Spence, & Veugelers, 2010; Menear, 2007; Obrusnikova & Cavalier, 2011; Sallis et al., 1998). In addition, a number of parents noted that there are not enough programs, segregated or integrated, in their community that provide necessary supports needed to meet the unique needs of their children with ASD (Dwyer et al. 2008; Reid, 2005). If an appropriate program is not available in the community, parents suggested using different recreational opportunities such as outside of their house (e.g., backyard), in a neighborhood park, or on a playground. As such, even children who are not interested in joining a community program have the opportunity to enjoy informal PA (e.g., playing catch) with their parents or peers. In addition, consistent with previous research (Carson et al., 2010; Dwyer et al. 2008; Sallis et al., 1998), increasing perceived neighborhood safety and availability of public resources was perceived important to increase engagement of children with ASD in PA. Studies of specific environmental characteristics that support participation of children with ASD in PA are needed.

Schools are potentially attractive settings in which to promote PA due to the large amounts of time children spend in this environment; however, a number of parents in this study noted that their children with ASD do not always receive the support necessary to meet their unique physical education needs (Pan & Frey, 2006; Reid, 2005). Parents suggested that physical educators should strive to engage students with ASD in developmentally appropriate practices, integrated or segregated, and offer opportunities to participate in additional PA during and immediately after school (e.g., during recess and lunch periods, in intramural sports).
Parents of children with ASD also perceived community awareness via public policies and mass media campaigns as an important facilitator of PA in their children with ASD (Sallis et al., 1998). They described a range of policy initiatives that they believed were necessary to tackle the various barriers perceived to inhibit their children’s levels of PA. They felt that any policy changes should position American schools, community organizations, health care providers, and other institutions as leaders in addressing an enormous public health challenge. Empirical evidence on how public policy affects PA levels of children with ASD is needed.

**Strengths, Limitations, and Implications**

The present study extends the literature in several ways. First, factors influencing PA of children with ASD after school have never been studied from a parent perspective. Second, two different sources of information were used to collect data (i.e., an online questionnaire and focus groups). This offered different perspectives regarding the questions and provided a more complex picture of the phenomenon. In addition, the focus-group setting allowed the participants to build on each other’s ideas and comments, which provided extensive input for the study (Creswell & Plano Clark, 2007). Third, participants in the interview included (a) parents with lower and higher education level attained, (b) biological and lawfully adoptive parents, and (c) parents whose children were diagnosed with autism, Asperger syndrome, and PDD-NOS.

There are a number of limitations to this study. First, the findings pertain to a group of parents who had an online access and volunteered to take the online questionnaire. In addition, parents participating in the interview had at some point enrolled their children in a community PA program and 73% of them had their children enrolled in a PA program at the time of the study. Therefore, the researchers were unable to fully discount the likelihood of these participants being more physically active and positively biased toward PA. As such, the findings may not apply to parents who did not volunteer to participate in the study, are less likely to enroll in a PA program, or do not perceive as barriers those things which they already have overcome. Second, although this study provided important first-hand information about the perceptions of parents of children with ASD, there was no external measure that would validate the factors. Thus, inferences about the objective nature of those factors are limited. Information collected from children with ASD, as was done by Obrusnikova and Cavalier (2011), their physical educators, and community recreational programs would significantly contribute to the understanding of these factors. Third, although the three selected states were collectively comparable to demographic data of the United States as a whole (U.S. Census Bureau, 2001), these findings may not be fully generalizable to regions of the United States or other countries with different demographics or in which the educational and environmental constraints might be different. Fourth, the authors did not verify validity of parental reports of their child’s diagnosis through review of medical or educational records.

Despite these limitations, findings from this preliminary study have multiple implications for future research and practice. To the degree that the findings apply to other similarly-situated children and adolescents with ASD, the study calls for a multipronged approach when designing PA programs and interventions for this population (Obrusnikova & Cavalier, 2011). Schools and communities need to
provide resources that meet the needs and interests of all participants to continuously and actively engage in PA (Centers for Disease Control, CDC, 1997). The authors are planning to use the findings to construct a theoretically sound scale measuring beliefs toward and perceptions of factors influencing after school PA of children with ASD. Improved assessment and understanding of the factors that influence PA in this population would provide a foundation for interventions targeting those factors to promote health and prevent obesity.

Summary

Participants in this study generally reported positive beliefs about participation of their children with ASD in PA after school. In addition, they also provided a multitude of factors that they perceived to facilitate or hinder PA levels of their children with ASD after school. The data suggest that parents must make conscious efforts to limit sedentary activities, including screen based activities, in their children with ASD while facilitating PA that are perceived by their children as enjoyable, interesting, and easy to do. In addition, parents have to overcome barriers caused by the characteristics of their child’s disability, such as motor, social, attention, and behavioral deficits, as well as a lack of resources or PA programs that will accommodate the unique needs of children with ASD. Attention also needs to be paid to barriers related to peers and parent support. Although some outdoor play environments offer important PA opportunities for children with ASD, they are not always affordable and safe. Future recreational programs should use preexisting education settings to create and establish more opportunities for children with ASD. Interventions aimed at maximizing PA levels in children with ASD should be designed to incorporate the multiple levels of factors of the socioecological model.

References


