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Fear of mistakes: Physical education and activity experiences of autistic teenagers

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Abstract: Individuals on the autism spectrum can have behavioral, physical, and social difficulties. This can limit their participation in physical education, which reduces the physical, social, and psychological benefits received from physical activity. The purpose of this qualitative study was to explore the physical education and physical activity experiences of students on the autism spectrum aged 13–18 years old. One time, semi structured interviews were conducted on nine participants recruited from schools in Northern California to explore their experiences in PE and PA. Two themes emerged from the participants: (a) interpersonal influences, which included how teachers, family members, and peers impacted their experiences; and (b) environmental influences, which included physical or instructional factors related to participant engagement. The results from this study articulate the experiences of the participants with stakeholders and the authors suggest programming modifications to improve the overall physical education and physical activity experiences of individuals on the autism spectrum.

Keywords: autism; stakeholder experiences; qualitative; adapted physical education

Introduction

Autism is a set of persistent heterogeneous neurodevelopmental conditions characterized by early-onset impairments in social interaction, repetitive sensory-motor behaviors, and restricted interests (Kaur et al., 2018). According to the Centers for Disease Control, autism currently affects 1 out of every 54 children in the United States of America (Maenner et al., 2016). Children on the autism spectrum tend to have less-developed motor skills compared to neurotypical peers (Lang et al., 2010; Ruggeri et al., 2020). Specific difficulties include balance, postural stability, gait, joint flexibility, and movement speed (Chen et al., 2019; Pace et al., 2016; Vukićević et al., 2019).

Deficits in motor skills lead to sedentary behavior and avoidance of physical activity (PA). Difficulties with performing age-appropriate motor skills may limit participation in the activities necessary to support the development of social, behavioral, cognitive, and communication skills (Bhat et al., 2011). These motor impairments may also limit participation in physical activities required for promoting optimal health and wellness (Srinivasan et al., 2014). Additionally, individuals on the autism spectrum have a higher tendency to engage in sedentary behaviors and are less likely to participate in PA as age increases (Jones et al., 2017; McCoy & Morgan, 2020). Children on the autism spectrum are also at an increased risk of having a higher body mass index. A study by Healy et al. (2019), found that 10-17-year-olds on the autism spectrum have significantly higher odds of being overweight or obese, and adolescents are 41% more likely to be overweight and 84% more

likely to be obese compared to their typically developing counterparts (McCoy & Morgan 2020).

Research shows that children on the autism spectrum receive many health benefits from PA. Benefits include favorable physiological outcomes, such as reduced risk of cardiovascular disease and lower probability of developing diabetes and obesity (Gehricke et al., 2020), such as working memory, attention, emotional regulation, and planning tasks have been noted, include improvements in motor control and self-efficacy, but also adhering to schedules and routines (Gregor et al., 2018). Research on children in general has shown that there are tremendous benefits to engaging in appropriate amounts of physical activity. These include improved academic performance and increased social and communication skills combined with decreased maladaptive and stereotyped behaviors are also benefits from PA (Niemistö et al., 2020). The benefits of PA are directly associated with the amount of activity; the more PA individuals do, the greater the health benefits (Janssen & Leblanc, 2010). Understanding the barriers and facilitators to participation in Physical Education (PE) and PA that exist for individuals on the autism spectrum may help improve health outcomes, quality of life, academic performance, and classroom behaviors for this population. engaging in appropriate amounts of physical activity. These include improved academic performance and increased social and communication skills combined with decreased maladaptive and stereotyped behaviors are also benefits from PA (Niemistö et al., 2020). The benefits of PA are directly associated with the amount of activity; the more PA individuals do, the greater the health benefits (Janssen & Leblanc, 2010). Understanding the barriers and facilitators to participation in Physical Education (PE) and PA that exist for individuals on the autism spectrum may help improve health outcomes, quality of life, academic performance, and classroom behaviors for this population.

Current research regarding the PE and PA experiences of individuals on the spectrum is limited. Several authors (Arnell et al. 2018, Blagrave 2017, Blagrave & Kemper 2022, Healy et al. 2013, Jachyra et al. 2021, and Yessick 2018), identified barriers and facilitators to PA participation for a variety of younger children on the autism spectrum. Barriers that have been largely identified as negative influences include peers, teachers, and sensory inputs. Peers can be seen as perpetrators of bullying who dissuade individuals from participating because they are made fun of, or physically picked on. Teachers can provide negative experiences via temperament, outright exclusion, or using activities that aren't engaging to the participants. Sensory inputs such as temperature, noise, equipment texture, and visual inputs can be overstimulating and cause sensory overload. Facilitators in these studies have been expressed as positive social support, enjoyment of activities, and well-established instructional spaces. Social support includes encouraging families, caring teachers, and friends. Individuals report that PA is enjoyed when it is predictable, there is freedom of choice, and it is a preferred activity. Participants reported a preference to well-established instructional spaces that account for sensory inputs and provide multiple modalities for receiving instruction including using verbal and visual prompting as well as physical demonstrations. Blagrave and Kemper (2022), and Yessick (2018), explored experiences of individuals on the autism spectrum with minimal expressive abilities and found that participants largely enjoyed engaging in PA because of their connections with peers and teachers, but similar to the abovementioned studies, there were sensory concerns in PE environments (Yessick, 2018). Additionally, Blagrave and Kemper (2022), found that there was a preference to more individualized sports and activities.

Studies have explored the PA experiences of teenagers on the autism spectrum (Arnell, 2018; Healy, 2013; Jachyra et al., 2021) in European countries and Canada. To date, no studies have focused on a similar age group's PE and PA experience in the United States. Scant research exists that has examined preteens and those in their early teens on the autism

spectrum, and there is a research gap for individuals in their late teens and early adulthood. Therefore, the purpose of this qualitative study was to explore the PA and PE experiences of students ages 13-18 on the autism spectrum. The overarching research question that guided the study was: What are the experiences of students ages 13-18 on the autism spectrum in both PE and PA settings? The following sub-questions were also considered: (a) what are the experiences of this population in PE; (b) what are the experiences of this population in community-based PA; and (c) what could teachers and peers do differently to improve or better facilitate these experiences?

Materials and Methods

This qualitative study used Bronfenbrenner's (1977) socio-ecological model to examine barriers and facilitators to participation in PE and PA settings for teenagers and young adults on the autism spectrum. According to Gyurcsik et al. (2006), this socio-ecological model explores barriers and facilitators on five levels: (a) interpersonal barriers, which can be the attitudes and behaviors of the individual; (b) institutional barriers, such as those of the school or organization; (c) community barriers; (d) public policy barriers; and (e) physical barriers. Within this model, the individual sits at the center of these interactions receiving both positive and negative influences. These factors are important determinants of the experiences individuals on the autism spectrum may have. Identifying the barriers and facilitators of a given experience can help create solutions to improve the experiences of individuals involved (Gyurcsik et al., 2006).

Participants

Participants were purposefully recruited from school districts in Northern California that met the following inclusion criteria: Participants were between the ages 13-18, included in general PE, had a formal autism diagnosis as reported by a parent or caregiver, and were able to communicate verbally at a level readily understood by an interviewer unfamiliar with the participant. Participants were excluded from this study if they fell outside the designated age range, received direct Adapted Physical Education (APE) services, did not have a formal autism diagnosis, or did not have expressive language skills readily understood by an interviewer unfamiliar with the participant. Parents contacted the researchers directly if, after receiving fliers sent home by PE teachers, they felt that their teen on the spectrum would want to engage in the study.

Procedures & Data collection

Data collection began upon receiving approval from the author's California State University, Chico (IRB 2021-07) Institutional Review Board in the fall of 2021. Data was collected from January to March 2022, using one-time, semi-structured interviews. Questions from previously published research by Blagrave (2017), Healy (2013), and Yessick (2018), were modified by the primary researcher (CL). Additional items aligning with the studies research questions were added to the interview schedule using the ecological model as a guide when considering questions exploring barriers and facilitators to PA and PE engagement. The completed interview schedule was reviewed by three outside reviewers who have experience interviewing individuals on the autism spectrum for content validity. The complete interview schedule is available in the appendix.

Prior to interviews taking place, parents signed a consent form and participants signed an assent form. Interviews lasted approximately 35-40 minutes and were conducted either in person or through zoom, whichever the participant was most comfortable with, with special consideration given to family preference and safety during continued COVID-19 restrictions in California. Aligning with previous interview protocols developed by Blagrave

et al. (2021), Blagrave (2017), and Colombo-Dougovito et al. (2021), participants were provided with the interview questions ahead of time to reduce anxiety and improve quality of responses. If participants needed clarification on any of the questions, this was provided prior to the start of the formal interview schedule. Follow up probes and prompts were utilized when needed during the interview process to facilitate data saturation. All interviews were audio recorded and transcribed verbatim. To promote trustworthiness, data was member-checked at the end of each interview for improved validity. This occurred by the researchers (A.B. & C.L.) summarizing major concepts (i.e., enjoyment, frustration, engagement) back to the participants for clarity based on the reflexive notes that were taken during the interview.

Data analysis

Initial reactions were bracketed and set aside to minimize bias throughout data analysis. Thematic analysis guided by Bronfenbrenner's (1977) socio-ecological model was used to explore shared themes across participants. Utilizing Braun and Clarke's (2006) steps for analysis, the first step was to become familiar with the data. Data was transcribed verbatim from the audio and re-read until the authors were thoroughly knowledgeable with the interviews. The second step was to generate initial codes from the data. Once the codes were created, as part of the third step, themes were generated from the data. The fourth step was to review the themes to identify which ones fit and had meaning. The fifth step was to define and name these themes. Lastly, for our sixth step, a report was produced. The authors discussed their analysis of the data and resolved any variations in understanding through dialogue until an agreement was met.

Results

Participant Demographic Information

Participants in this study were predominantly Caucasian and male. Self-selected pseudonyms are used in this study as a way for participants to connect to the study (Itzik & Walsh 2023) and as measure for participant anonymity. Of the participants selected, two shared a similar PE teacher and went to the same high school (Hunter and Bright) and all were in PE classes required for their diploma or certificate track. See Table 1 for demographic information on the nine participants.

Table 1. Participant demographics

Participant	Age	Gender	Ethnicity
Aurachi	18	M	Caucasian
Bright	15	M	Hispanic
Emily	14	F	Caucasian
Everlast	13	M	Hispanic
Hermione	13	F	Caucasian
Hunter	15	M	Hispanic
Johnny	16	M	Caucasian
Nerf	15	M	Caucasian
Tina	13	F	Caucasian

For a theme to be overarching across all participant experiences, it had to be present in each narrative (Smith et al., 2009). Two themes emerged from participant data: (a) interpersonal influences and (b) environmental influences. These influences are further defined and described below and in Table 2. The results have also not been divided between PA and PE experiences as the participants did not distinguish in their reporting of their experiences in both settings and as the meaning of these experiences was explored, there appeared to be limited differences between PE and PA environments.

Table 2. Themes and subthemes

Themes	Subthemes
Interpersonal Influences	Peers
	Teachers
	Family Members
Environmental Influences	Learning Environments & Modalities
	Physical Location
	Sensory Experiences

Interpersonal Influences

Interpersonal influences denoted anytime participants described how people around them affected their experiences. This included teachers, family members, and peers. Interpersonal experiences could be positive or negative depending on the type of interaction.

For the participants in this study, attitudes of and interactions with teachers contributed strongly to their overall experience in PE. These factors were shared as motivators and facilitators of activity engagement. Aurachi described positive teachers as "responsible, respectful, safe, nice, polite, and caring." Emily and Everlast shared this sentiment, preferring teachers who were caring and kind. Everlast also added he liked teachers who were fun and encouraging, specifically stating: "They're just nice people." Tina preferred teachers that could be goofy and relatable, saying things such as, "Don't eat it like a burrito!" while holding a yoga mat. Participants often laughed and smiled while sharing these examples and seemed to genuinely like their accompanying sense of humor. For participants in this study, it was important that their teachers encouraged and interacted with them. Emily preferred teachers who actively engaged with their students instead of "just sitting to the side." Everlast also shared that he liked an engaged teacher who participated: "Like if we're running suicides, uh, they-they run them with us. And if-if you're running with someone. It's, like, easier to do it 'cause you could be talking." Hermione summarized positive teachers with the phrase "strict, but willing to have fun." It was also important for participants to feel safe and trust their teachers. Tina shared, "I feel like I can talk to her, sometimes about how sad I am."

Family also contributed to interpersonal influences. The activity levels of parents or caregivers were not reported as a motivator for the teen, but in instances where parents or caregivers were more engaged, participants were more likely to be active. Everlast shared, "Me and my mom, in the start of COVID, we went on a bike ride once every day." Hunter and Bright enjoyed going to the gym with their dad, "lifting weights and walking on the treadmill." Aurachi enjoyed doing outdoor activities with his family, such as playing darts and weekend bike rides. Hermione even included activities like horseback riding and outdoor summer camps that her mom "insisted that she do." Parents also promoted more leisurely activities. Emily shared, "My mom and dad are always like, 'let's go on hikes, you wanna go on a hike? I think it would be good for you.'" Johnny listed his dad and Emily listed her mom as their biggest advocates and motivators for being physically active.

Participants shared that they experienced opportunities for positive social interactions and friendships with peers in both PE and PA settings. Everlast stated, "Playing is a great way to get to know someone. I have a couple friends I just know because we play together." Aurachi shared that his best friend is his primary motivator for getting outdoors and being active: "Just in case we get bored, we either bike or do a make-believe story. Football, soccer, sometimes race each other, etc." Further positive experiences stemmed from participants being in appropriately competitive environments. Tina shared that her activities in class were appropriately challenging for her: "It was challenging, I like a challenge sometimes."

Hermione relished the memory of succeeding during physical fitness testing: "It was just really fun, to out push-up all the boys."

Many participants reported that while parents, peers, and teachers could be facilitators to engagement, they could also be barriers. Peers frequently proved a barrier to participation in PE for participants, being a victim of bullying came up most often. Emily described her peer experiences in PE settings as poor, specifically because of one individual: "Well, there is this kid in my class who's mean to me, not just me, but to everyone, he made fun of my shaking, which I do when I'm nervous." Bright also mentioned that "the weak getting bullied" is something he dislikes about PE class. Participants struggled to share these negative peer experiences; their entire demeanor changed, and their voices became quieter. When Hunter was asked what his peers could do to make class more enjoyable, his answer was simple: "Not stealing my stuff." Additional factors that led to negative experiences involved peers cheating and not following instructions. Aurachi shared, "Those who play by the rules win fair and square. As for the other players, they straight-up ignore them [rules] and just cheat." Teachers could also be a source of negative influences for participants. When Everlast was prompted to share negative experiences regarding teachers, his immediate response was "Oh, Mr. *****, he was really mean." Participants also shared that teachers could negatively influence experiences when they automatically paired the participants with other students or teams. Emily shared that she "would prefer being paired up with someone who is like them," and Johnny said that he preferred to "be offered a choice" regarding the team he was assigned to or the person he was paired with. Johnny also mentioned that he "didn't like when teachers resorted to hand-over-hand instruction." Nerf mentioned a substitute teacher in PE class who was "overall rude as heck" and "power-thirsty." When probed further, Nerf shared that this substitute just bossed everyone around and yelled the whole time he was there. Aurachi shared his perceptions of teachers: "Without a good teacher, only bad things can come out of a bad teacher, like hatred. They get angry, and then the next [thing] you know, they quit." None of these participants reported parents as a source of negativity in their PE and PA experiences.

Environmental influences

Environmental influences were defined as physical or instructional factors related to participant PE and PA environments. These influences were further broken down into learning environments and modalities, and sensory experiences.

Learning environments and modalities that led to positive experiences included adjustable variables such as specific equipment, which allowed students to be more successful. Participants described games they enjoyed with modified rules and equipment within the larger context of the game or activity in the class. Everlast described a modified baseball game: "you have a really big plastic bat and these foam balls, and they were really big too…and then there were no outs so you could hit it as small or as hard as you want." Nerf shared his preferred classroom setup as one in which the activities were more game-oriented rather than straightforward exercises,

> There's this thing called stations that I absolutely adore. So, it's a set of activities that we have to do. While we're at that station for a set amount of time, and then afterwards we simply just go when the timer goes off, off we go to the next station, and we keep doing this until we made our full circle. (Nerf)

Instructional delivery was also an important factor that motivated participant engagement in PE settings. Participants preferred teachers who gave additional information and support to games that were being played in the class. Aurachi shared that they preferred teachers who "not only explain the rules but also specify how they [the class] play it as a

team." Hermione also discussed teachers who were good at organizing activities, providing quality instructions, and clearly explaining all the rules. She shared that someone who is "not the best PE teacher would be someone who just kinda, like, throws some balls out and says 'do whatever you guys want.'" Differentiated instruction and opportunities to get to know the activity beforehand were also helpful. Emily described that her teacher provided information ahead of time to reduce anxiety: "They would give me a sheet saying what the game's about."

There was also a desire to try activities that were not readily available for participants in their community or school-based setting. Some participants mentioned exotic activities that required a lot of equipment. Aurachi mentioned wanting to try Olympic events such as speed ice skating and speed biking. Everlast excitedly talked about water skiing, jet skiing, and snowboarding. Emily also shared that "water skiing sounds really fun." Johnny included swimming, an activity that did not require as much expensive equipment. Integrating technology into PA experiences was also a motivating factor for participants in this study. Emily described how she plays Nintendo Wii's Just Dance game to stay active, while Nerf mentioned he uses a VR headset to engage in PA at home.

Regarding class size, there was no consensus on whether participants preferred classes with more or fewer peers. When it came to physical location, there was a tendency for participants to prefer being outside for better equipment and sensory reasons. Everlast shared that he preferred playing basketball outside because of "better basketball hoops." Hermione also advocated for being outside: "I like just being in a bigger space, it feels more open… It doesn't feel like you'll get trampled." Aurachi felt that outside was a safer experience than being on the gym floor: "You have a high possibility of mistakenly slipping on the smooth floor and getting a floor burn, which is the most, very, umm, it's the biggest pain you'll ever feel." For some participants, being in the gym was too noisy of an environment. Everlast stated, "It's just so loud with all the things bumping, like all the balls going psh psh psh." Hunter also shared that it was nice to be outside because you could "take your mask off" and be able to breathe. However, a preference for outdoors was not the consensus. Bright was particularly vocal about their temperature preferences, describing the "blazing heat in the summer…[and] frigid cold in the winter" and preferring to be inside. Nerf shared that the wind was a source of frustration for him: "One thing that annoyed me during ultimate Frisbee was being outside and when the wind would push my Frisbee." Emily supported these statements: "I don't like when it's too hot or windy." Aurachi was thorough in discussing specific surfaces, stating a strong preference for the grass. They cited safety issues: "Because the blacktop, that's concrete…yeah, you may get a little muddy but might as well do that instead of getting blood on you." Emily also shared that the indoor environment "felt more control[led] and less chaotic," when describing the space she preferred for activities. Tina shared similar sentiments and preferred to be "inside with her class instead of outside." But when pressed, she could not specifically articulate why this was the case other than "it felt better."

Negative environmental experiences in PE or PA occurred when participants did not like the type of activity they were engaging in, or sensory inputs from the physical environment. Johnny shared that he would like to have options when it came to activities and not be "forced to do a sport" or to continue doing an activity when it carried on for too long. Hermione also expressed her desire for control over her course schedule: "I just wish you could fill out a survey at the beginning of the year saying my first choice of what time I would like [PE] is this, my second choice, and third choice…and I wish they would take that into consideration."

Participants reported that there were many fears and anxieties around participation in PA and PE experiences. Emily shared one of her concerns about participating in front of

peers: "Like, my teacher will say something, and I'll be like, [gasp] what if I make a mistake, like, what if I look bad." In addition to fears regarding peers, many other fears stemmed from the environment. Other negative experiences were rooted in fears of falling or hurting themselves during PA. Everlast shared, "One time I hurt my ankle and fell on my tailbone." Prior injuries or fear of future injuries made individuals nervous when playing some games or participating in activities. Individuals were not only afraid of certain environmental factors, but of specific activities. Certain recreational pursuits were avoided due to prior injury, or fear of injury. Nerf shared, "One thing I did give a try was skateboarding. I ended up ditching that after like a few months because I kept falling." Tina also elaborated on her aversion to biking: "I'm afraid to fall still." Certain equipment, such as basketballs, was also a source of fear. Tina shared, "I'm afraid of the balls, but I'm becoming brave."

Discussion

The purpose of this qualitative study was to explore the PE and PA experiences of students on the autism spectrum aged 13-18 years old. This study is the first to use interviews to relay first-hand accounts of teens on the spectrum engaging in PA and PE in the United States. Data taken from participant interviews most directly interacted with Bronfenbrenner's (1977) socio-ecological model at level a), interpersonal barriers. This level encapsulates attitudes and behaviors of the individuals. Level b), institutional barriers, and level c), community barriers, also interacted with participant data, but not as critically as level a). During data analysis, this socio-ecological model was most prevalent during Braun and Clarke's (2006) step four, reviewing themes for meaning. As themes naturally emerged from coded data, cross referencing with Gyurcsik et al. (2006)'s five types of barriers provided the outline for generating themes. Two themes captured what most affects these participants' experiences in PE and PA: interpersonal and environmental influences.

The results from this study yield similar results to previous studies on similar populations. Blagrave (2017), and Yessick (2018), reported common findings including the influence of peers (i.e., as sources of encouragement or fear of bully perpetrator) and the influence of sensory inputs, such as weather and noise. The themes of bullying and sensory issues as well as the theme "fear of injury" were reported by Healy and colleagues (2013) which was also shared by the participants in this study. Being victimized by bullies, a common experience found across similar studies (Blagrave, 2017; Healy, 2013; Yessick, 2018) in the United States, is a shared theme with Jachyra et al. (2021), who studied a population group of similar age range (14–18) in Canada. Lastly, the desire to have options and autonomy in PE and PA was reported as part of the conditional participation model of Arnell et al. (2018).

This study also aimed to answer three sub-questions related to the main research question. Sub-question (a), what are the experiences of this population in PE? Experiences are mostly positive with six participants saying they generally enjoyed PE but are inherently dependent on the interpersonal and environmental factors outside the individuals' control. Sub-question (b) asked, 'What are the experiences of this population in community-based PA?' This question yielded similar results to sub-question (a). These experiences were both positive and negative, and largely dependent on several interpersonal and environmental factors. In contrast to the subtheme (a), five participants disliked individualized PA experiences due to limited opportunities to socialize and engage with peers. Additionally, interpersonal factors could both negatively and positively influence activity engagement. As found in previous studies, sensory experiences heavily influenced participant engagement in PE and PA settings as reported by all nine participants. Sub-question (c), what could teachers and peers do differently to improve or better facilitate PE and PA experiences for individuals on the autism spectrum? After receiving feedback directly from teenagers on the

autism spectrum that are currently engaging in PA and are in general PE settings, the authors have the following suggestions for stakeholders interested in improving these experiences.

First, all nine participants reported that consistent classroom management and organization made for a more positive environment. Modifiable variables included the instructional modalities, physical location, classroom culture, and protocols a teacher created; these influenced how participants interacted with their peers. Participants preferred differentiated instruction, including the use of stations. Block (2016) recommended using differentiated instruction methods such as peer tutors, start and stop signals, a universal design for learning, the establishment of class rules, and adjustments to the size and nature of the group to help accommodate students with disabilities like autism. Participants also enjoyed modifications to activity rules and equipment. Consideration of the six S's, size, sound, surface, speed, support, and switches, (Block 2016), when modifying equipment reduced sensory overload and promoted maximum success and reduced anxiety around tasks and activities in various activity settings.

Additionally, seven participants in this study suggested that visual supports would be helpful for students receiving instructions and learning novel tasks or games. Visual supports, go beyond written instructions and include images or videos for the activity not only benefit individuals on the autism spectrum, but neurotypical peers as well (Block 2016). Fittipaldi-Wert and Mowling (2009), suggested using visual supports to help provide a predictable and organized environment. This approach appeals to the processing strengths of students with autism or of any student who processes visual information more effectively than verbal instruction. Specific examples of visual supports include the use of activity schedules, task cards, and visual warning devices like clocks. Combining visual supports with verbal instructions and physical demonstrations provides students with multiple ways to understand what is expected of them (Block 2016).

Furthermore, procedural improvements for facilitating an inclusive classroom setting include preparing peers without disabilities for social acceptance. Eight participants explicitly mentioned being the victim of bullying from peers as an adverse experience in PE. Peer rejection creates real barriers and inhibits the ability of students with disabilities to achieve independence, academic success, and their life goals. This can have powerful, far-reaching, long-term implications on the development of the individual with the disability (Block 2016). Preparing classmates to view peers with disabilities in a positive manner and effectively interact with them in PE may help mitigate any negative effects peers have and promote more positive ones. Specific methods of preparing peers for social acceptance include discussing the specific individual who will be included, how and why they may act differently, and what students can do to support this peer. The use of peer tutors can also be a powerful tool for inclusion (Jenkinson et al., 2013).

Further instructional and programming suggestions from the authors are included. Although there are uncontrollable variables like the weather, there are factors such as location, instructional methods, and social climates that parents and teachers should prepare for to positively influence the experiences of these individuals. Providing instruction to individuals on the autism spectrum in PE settings and engaging them in PA with a one-size-fits-all approach may prove challenging due to sensory needs, activity levels, and limited activity preferences. General and special educators must be prepared with a variety of evidence-based practices and instructional strategies to engage and educate students diagnosed with autism (Flannery & Wisner-Carlson, 2020). A study exploring the experiences and perceptions of physical educators regarding teaching children on the autism spectrum found that physical educators expressed the importance of developing meaningful relationships with children on the autism spectrum, stating it was a key factor in their

success (McNamara et al., 2022). To that end, we recommend that teachers and parents directly engage with those on the autism spectrum in meaningful ways to understand their needs. Listening to the voices of those whose experiences need improvement is a vital step in promoting positive PE and PA experiences. Promoting positive PE and PA experiences for adolescents on the autism spectrum is an integral step to not only receiving the health benefits and improved quality of life but fostering a lifelong enjoyment and engagement in PA.

Limitations

There are several limitations to this study which should be noted. Because the inclusion criteria for this study necessitated expressive verbal capabilities, those without expressive verbal capabilities were excluded from the study. Future studies should aim to capture the experiences of those with limited expressive verbal language. An additional limitation to this study was the use of online video calls as a medium for interviews. Asking individuals with communication difficulties about their experiences is inherently challenging; the depths of responses may be limited. Although the questions were screened for clarity by three authors and an adult on the autism spectrum, there were still several participants who responded with simple yes or no answers to some questions, even after multiple probing attempts to gain a deeper response. Providing additional ways to express opinions and thoughts, such as drawing, demonstrating, or selecting prompts or pictures for responses may increase the amount of information that can be gathered. Additionally, allowing parents or caregivers to "chime in" during a second round of interviews, or conducting joint or family interviews may help engage those on the autism spectrum in a way that facilitates the sharing of more information around specific research questions. Furthermore, in our study, participants were largely Caucasian, minority voices may have different experiences in PE and PA. As such, future work should aim to incorporate a wider cultural perspective of participation for individuals on the autism spectrum.

Finally, participants in this study were all from Northern California, a space with ample opportunities to engage in a multitude of different types of PA not always readily available to all populations. Future studies should aim to capture a broader experience and a larger sample size to gain more comprehensive insight of the experiences of this population. Future scholars should examine the applications of alternative instructional practices, including classroom modifications, to improve the PE and PA experiences of individuals on the autism spectrum with specific regard to factors influencing sensory feedback and peer–teacher relationships.

Perspectives

Understanding the experiences of teenagers and young adults on the autism spectrum in PE and PA enriches current knowledge and adds to the body of research that can improve engagement and health outcomes for this population. These first-hand perspectives provide more information for both researchers and practitioners regarding perspectives of individuals on the autism spectrum. This information should be considered when planning programs and instruction for classes in settings where this population is present. Additionally, we demonstrated from our study, that with some accommodations (e.g., providing question schedules ahead of time and choosing an interview modality that best serves them), individuals on the autism spectrum should be included in the research narrative and are capable even during adolescence of sharing meaningful insight to their experiences.

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Appendix A

Interview Schedule:

1. How do you define 'physical activity' or 'being physically active'? For example: what happens to your body when you participate in physical activity? How do you know you are being physically active?
2. Do you consider your experiences in physical activity as being generally positive or negative?
   a. If you like it, can you tell me some reasons why?
   b. If you don't like it, can you tell me some reasons why?
3. Do you consider your experiences in physical education as being generally positive or negative?
   a. If you like it, can you tell me some reasons why?
   b. If you don't like it, can you tell me some reasons why?

4. Do you think being physically active is important?
5. What has been your favorite day of physical education class so far and why? What activities do you like/dislike? Why?
6. What could be done to make physical education more enjoyable? Teacher? Classmates (amount as well)? Location? Time of day?
7. What do you think makes someone a good PE teacher?
8. During PE class, do you prefer being inside (in the gym) or outside (on the blacktop or grass)?
9. What have you learned during your physical education classes? Are you using any of these skills outside of class?
10. Are there any physical activities you want to try but have not had the chance to?
11. Do you play on any sports teams? Do you participate in any routine activities when you are not in PE class? (ie: go swimming 2 times a week)
12. Do you prefer being outside (bike rides, walks, other games) or spending time indoors (playing video games, etc.)

a. On average, how many hours a day do you spend outside? (It's okay to estimate).
b. On average, how many hours a day do you spend indoors playing video games, watching tv, playing with your phone etc.?

13. Would you describe your family as an active family or an inactive family? Why/why not?
14. Of all the people you know, who do you think helps you be the most active? (family, friends, teachers?)
15. Your name is not recorded for this study, would you like to make up a name for yourself for have us make one for you?