

PHYSICAL ACTIVITY EXPERIENCES OF YOUNG ADULTS ATTENDING A COLLEGE
FOR NEURODIVERSE LEARNERS

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DEDICATION

This dissertation is dedicated to my husband Michael, and our three children, Everleigh, Liam and Eiley. You are my home, my heart, my everything. Keeners never say die!

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...

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ABSTRACT

ELIZABETH KEENER

PHYSICAL ACTIVITY EXPERIENCES OF YOUNG ADULTS ATTENDING A COLLEGE FOR NEURODIVERSE LEARNERS

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Neurodiversity is a term used to describe a broad spectrum of learning differences (LD) including attention deficit hyper-activity disorder (ADHD), autism spectrum disorder (ASD) and Asperger's syndrome, dyslexia, dyspraxia, dyscalculia, and other social, psychological, or processing differences (Griffin & Pollack, 2009). Neurodiversity is not a diagnosis but is instead a concept inspired by the idea that the long-standing cultural norms that define disability limit our understanding of the vastness of human experience (Shapiro, 1994). Defined under neurodiversity, these conditions are not disorders, but are differences in experiencing and processing physical, social, and cultural environments (Griffin & Pollack, 2009). The larger neurotypical cultural environment limits access and promotes stigmatization of neurodiverse individuals (Griffin & Pollack, 2009), which creates challenges for people who identify as having a neurodiversity. These challenges contribute to low physical activity (PA) participation, and negative perceptions of health, wellness, and quality of life among neurodiverse individuals (Hamm & Yun, 2019; Smith et al., 2019; Yang et al., 2013).

Transition to college can exacerbate barriers to PA for neurodiverse young adults. To date, very little research exists on the PA experiences of neurodiverse young adults attending institutions of higher education (IHE). A few IHEs designed for neurodiverse learners are unique institutions that utilize evidence-based strategies to promote academic and personal success which can have an influence on PA participation in this population. The purpose of this study is

to explore PA experiences of neurodiverse young adults and factors that contribute to participation in PA.

Ten college students from an IHE for neurodiverse learners (IHENL) were recruited through purposive sampling. Through in-person interviews and focus groups, PA experiences of neurodiverse young adults were explored. Bioecological systems theory [BST; Bronfenbrenner, 2000], and interpretive phenomenological analysis (IPA) were used as the theoretical framework to interpret the interview data. Three overarching themes were identified and described: 1) Development of PA; 2) PA, Sport, and the College Experience; and 3) Systems of Support and PA. Additionally, suggestions for improving PA offerings through fitness and recreation are also described.

TABLE OF CONTENTS

DEDICATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT.....	iv
LIST OF TABLES	x
LIST OF FIGURES	xi
I. INTRODUCTION.....	1
Neurodiversity.....	1
Post-Secondary Education and Neurodiverse Students	2
Physical Activity and Neurodiversity	4
Problem and Purpose Statement	4
Theoretical and Methodological Underpinnings	5
Bronfenbrenner’s Bioecological Systems Theory	5
Definitions.....	8
Research Questions	10
Delimitations	10
Limitations	11
II. LITERATURE REVIEW	12
Search Method	12
Search Results	14
PA as an Intervention for Neurodiverse Young Adults	14
Perceptions, Barriers, and Facilitators to PA Participation for Neurodiverse Young Adults	19

Limitations	22
Conclusion	23
III. METHOD	24
Research Design.....	24
Pilot Study.....	25
Pilot Study Participants.....	26
Data Collection and Analysis.....	26
Pilot Study Results	28
A Seat at the Table: Providing PA Opportunities for Neurodiverse Students	28
Breaking Down Barriers: Using Innovative and Non-Traditional Approaches to Encourage Females and Underrepresented Students	29
Pride: School and Community Pride Through the Development of Competitive and Intercollegiate Sport Opportunities	30
Pilot Study Conclusion	31
Participants.....	31
Data Analysis	33
Rationale for Inclusion Criteria	33
Protection of Human Subjects	34
Data Collection	35
Interview Guide	35
Recruitment.....	36
Flyer	37
Flyer Response Email	37

Email Recruitment	37
Interview Procedures	38
Focus Group Procedures	39
Researcher Journal	39
Researcher Role	40
Data Analysis	40
Interpretive Phenomenological Analysis	40
Trustworthiness	42
IV. RESULTS	45
Development of PA Habits	45
Childhood PA.....	46
Health and Wellness	49
PA, Sport, and the College Experience.....	51
Positive Social Interactions Through PA	51
Intercollegiate Sport.....	54
Systems of Support and PA	57
Accessible Facilities.....	57
Supported PA	58
Institutional Support.....	62
V. DISCUSSION	66
Discussion of Findings Specific to Each Research Question	66
PA Preferences and Habits of Neurodiverse Young Adults Attending IHEs	66
How IHEs Can Improve PA Offerings?	78

Creating Opportunities for Recreational and Competitive PA without Skill Prerequisites ...	81
Additional Noteworthy Findings	83
Implications.....	85
Limitations	85
Conclusion	87
REFERENCES	88
APPENDICES	
A. Semi Structured Interview Guide.....	104
B. Recruitment E-mail	107
C. Recruitment Flyer.....	108

LIST OF TABLES

1.	Participant Demographic Information and Pseudonyms	33
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LIST OF FIGURES

1.	Diagram of Systems Surrounding Neurodiverse College Students Attending an IHENL	7
2.	Diagram of Systems Surrounding Neurodiverse College Students Attending an IHENL	25
3.	Diagram of the Stages of Occupational Socialization	27
4.	Diagram of the IPA Data Evaluation Process	43
5.	Diagram of Individual and Social Systems	67
6.	Diagram of Individual, Support, and Community Systems	73
7.	Diagram of Individual, Community and Policy Systems	78

CHAPTER I

INTRODUCTION

Neurodiversity

Neurodiversity is a term used to describe a broad spectrum of learning differences (LD) including attention deficit hyper-activity disorder (ADHD), autism spectrum disorder (ASD) and Asperger's syndrome, dyslexia, dyspraxia, dyscalculia, and other social, psychological, or processing differences (Griffin & Pollack, 2009). Neurodiversity is not a diagnosis but is instead a concept inspired by the idea that the long-standing cultural norms that define disability limit our understanding of the vastness of human experience (Shapiro, 1994). Drawing upon the outcomes of the disability movement, as well as the oppressive and limited scope of the previously accepted medical model of disability, the neurodiversity movement has created a paradigm shift that calls into question accepted social mores about what constitutes normal human functioning (Griffin & Pollack, 2009). Specifically, the discourse of the neurodiversity movement challenges long held beliefs about the human body and what constitutes normal functioning, which render an individual pitiable, and in accordance with social norms in need of charitable endowment. Concerning neurodiversity, these conditions are not disorders, but are differences in experiencing and processing physical, social, and cultural environments (Griffin & Pollack, 2009). The larger neurotypical cultural environment limits access and promotes stigmatization of neurodiverse individuals (Griffin & Pollack, 2009). This creates challenges for people who identify as being neurodiverse, such as, difficulty navigating social situations with peers and social or cultural hierarchies (Jurgens, 2020). These challenges contribute to low physical activity (PA) participation, and negative perceptions of health, wellness, and quality of

life among neurodiverse individuals (Hamm & Yun, 2017; Smith et al., 2019; Yang et al., 2013).

Post-Secondary Education and Neurodiverse Students

Some attributes of LDs experienced by neurodiverse adults will improve over time. For example, some adults with ASD may experience fewer maladaptive behaviors (Shattuck et al., 2007); and adults with ADHD may experience less hyperactivity (Mick et al., 2004). However, many attributes such as inattention, sensory processing disorders, and difficulty with tasks that require executive functioning and social reciprocity persist into adulthood (Robertson & Ne'eman, 2008; Shattuck et al., 2007). In addition, some neurodiverse adults, particularly those with ASD, struggle with navigating novel settings and interactions with people as they can conflict with the individual's restricted ideas or sensory needs (Causton-Theoharis et al., 2009; Kapp et al., 2011). Further, neurodiverse adults often transition to post-secondary education at institutions of higher education (IHEs) from an environment in which they had access to significant support from schools and parents. For example, the Individuals with Disabilities Education Improvement Act (Albrecht; 2006) stipulates that all children will be provided with a free and appropriate public education that will be made available in the least restrictive environment (i.e., a setting where the student can receive the supports, they need while maximizing learning outcomes). Children found to be eligible will also receive an individualized education program (IEP) outlining specific educational needs and services that will be provided. Also under IDEA, parents play an active role in the development of the IEP, and while it is appropriate to include the child with a disability also, the parents have the final say as to the appropriateness of services and supports. Not all individuals with LDs qualify for services under IDEA but are able to receive support through other federal pathways such as Section 504 of the

Rehabilitation Act, and the Americans with Disabilities Act (ADA). Services provided under Section 504, and ADA extend beyond PK-12 education to post-secondary education, employment, and community settings. However, the scope of accommodations available outside of PK-12 under these laws is much more limited and more difficulty to access for adults attempting to access accommodations for the first time on their own.

As adults attending an IHE, many neurodiverse individuals must self-advocate for services and supports on their own which contributes to difficulty managing the demands of college life (Kapp et al., 2011; Robertson & Ne'eman, 2008; Zolyomi et al., 2018). Thus, a need exists for fostering an inclusive campus community that promotes acceptance and meaningful participation in post-secondary education settings (Gobbo & Shmulsky, 2016; Robertson, 2009; Roberston & Ne'eman, 2008).

In recognition of the unique needs of neurodiverse individuals, IHEs have taken steps to improve resources and inclusivity on college campuses. However, many large IHEs have large class sizes with minimal instructor contact, and smaller IHEs may not have funding for resources that will foster success in neurodiverse students (Kapp et al., 2008). Since the 1980s, IHEs that are designed to provide support and services exclusively for neurodiverse individuals have emerged across the United States. These institutions employ a myriad of evidence-based instructional and social supports to meet the needs of neurodiverse college students. Some examples are, individualized counseling services, on campus support staff, smaller class sizes, and access to assistive tools and technology. In doing so, these IHEs can mitigate challenges in accessing academic and social environments while leveraging the unique talents possessed by neurodiverse individuals to support successful completion of post-secondary education and foster the development of skills for supporting self-advocacy and transitioning to the workforce. This

post-secondary education setting provides a unique opportunity to understand how neurodiverse individuals navigate emerging adulthood. Of particular importance is how neurodiverse adults' experiences shape their intentions toward participating in PA and maintaining health.

Physical Activity and Neurodiversity

Attending an IHE can contribute to the development of self-identity for young adults. Being an undergraduate student at an IHE presents opportunities for experiences beyond pursuit of a degree such as opportunities for involvement in social or cultural clubs, and recreation and leisure activities, and is often a pathway to personal development (Blumenkrantz & Goldstein, 2014; Kaufman, 2014). Along with personal development, many young adults attending IHEs begin to develop health habits that include diet and PA participation habits (Downes, 2015).

Research on the PA preferences and habits of neurodiverse individuals indicates that PA in this population, is limited to individual activities due to the social demands implicit in other types of sporting or leisure activities (Arnell et al., 2018; Pan & Frey, 2006). In fact, it is not the complexity of the social situation, or an inborn aversion to social situations that deters neurodiverse individuals from seeking out and participating in group PA, but rather a lack of programming that provides necessary supports to allow a neurodiverse individual to develop appropriate social, emotional, and communicative skills, and participate fully (Causton-Theoharis et al., 2009; Robertson, 2009).

Problem and Purpose Statement

As a result of the neurodiversity movement, neurodivergent individuals, and an awareness of the attributes associated with their respective conditions, have become more visible in the larger cultural context. With that, so too has the understanding that previously accepted methods within educational institutions are not adequate to meet the needs of a vastly diverse

population of learners. IHEs can potentially provide opportunities for development of self-identity for neurodivergent students but are challenged to meet the needs of neurodiverse learners (Clouder et al., 2020; Robertson & Ne’eman, 2008). The benefits of PA participation are well documented; however, there is a lack of research to inform best practices for developing programs that will support development of lasting PA habits in neurodiverse young adults.

To date, very little research exists on the PA experiences of neurodiverse young adults attending IHEs, including IHEs designed specifically for neurodiverse learners that utilize evidence-based strategies to promote academic and personal success, which include health-related fitness promotion strategies. Understanding of these strategies and how they are presented could be applied at IHEs to develop quality PA programs and interventions for neurodiverse young adults. The current study is important to the field of adapted physical activity because it adds to a previously underrepresented area of research regarding neurodiverse individuals, and provides valuable insight that can inform the development of PA programs for neurodiverse learners at the postsecondary level. The purpose of this study was to explore PA experiences of neurodiverse young adults and factors that contribute to participation in PA.

Theoretical and Methodological Underpinnings

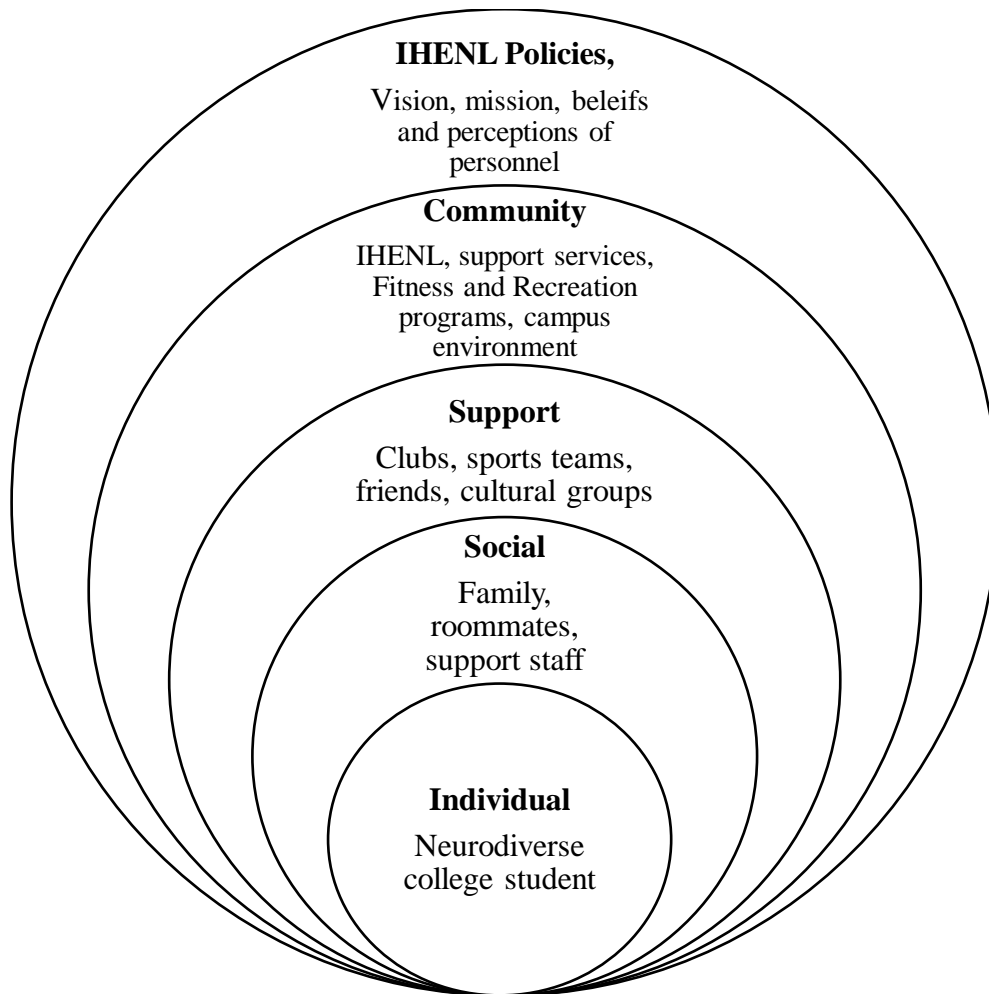
Bronfenbrenner’s Bioecological Systems Theory

The bioecological systems theory (BST) is an iteration of Bronfenbrenner’s ecological systems theory, which posited that an individual is the product of the environment in which they are brought up (Bronfenbrenner, 1999). A key component of human development missing in Bronfenbrenner’s original theory was the role of the individual in interacting within the environment (Bronfenbrenner, 1999). BST can be used as a framework to build understanding of the complex interconnections between the individual and the systems in which they are

involved over time. The original focus of BST was to explore the interplay between these systems and how they influence child development. However, BST has been applied in a wide range of contexts to describe how the environment influences development, such as employment, mental health, medical settings, disability studies, sport participation, and physical activity (Bone, 2015; Deng & Paul, 2018; Giles-Corti & Donovan, 2002; Halsall et al., 2018; Högman et al., 2020). Figure 1 illustrates the application of BST to the current study.

Figure 1

Diagram of Systems Surrounding Neurodiverse College Students Attending an IHENL



Note: Adapted from Exploring how children's relationships and environment interact to help them thrive by Center for Child and Family Well-Being, 2021 (<https://ccfwb.uw.edu/about-us/the-bioecological-model/>)

According to Bone (2015), the purpose of research based on Bronfenbrenner's BST is to identify and illuminate the interconnectedness of an individual and the layers of systems surrounding them (Bone, 2015; Bronfenbrenner, 2000). No individual will interact with systems the same way; therefore in lieu of deductive reasoning, it is critical that research conducted in

BST be geared toward discovery of meaning derived from the individual experiences across systems, as well as identification patterns of experiences across participants (Bone, 2015; Bronfenbrenner, 2000). As such, the current study utilized qualitative interview methods followed by evaluation of the data using interpretive phenomenological analysis (IPA) to examine the unique experiences of individual participants (Smith et al., 2009). This allowed for a robust, multi-faceted interpretation of the data, as well as flexibility in contextualizing the findings within a broader social, political, and cultural landscape (Spiers & Riley, 2019).

Definitions

1. Attention deficit hyper-activity disorder (ADHD): A persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development (American Psychiatric Association, 2013). This condition is considered part of the neurodiversity spectrum.
2. Autism spectrum disorder (ASD): Persistent deficits in social communication and social interaction across multiple contexts, and restricted and repetitive behaviors, actions, or interests. ASD may or may not present with a comorbid intellectual deficit (American Psychiatric Association, 2013). This condition is considered part of the neurodiversity spectrum.
3. Institution of higher education (IHE): a college or university that provides post-secondary education.
4. Institution of higher education for neurodiverse students (IHENL): a college or university that caters exclusively to the needs of students with a broad range of learning differences enrolled in post-secondary education.

5. Intellectual Disability (ID): ID involves problems with general mental abilities that affect functioning in intellectual functioning, and adaptive functioning (American Psychiatric Association, 2013). This condition is considered part of the neurodiversity spectrum.
6. Learning difference (LD): A term that refers to the diverse ways individuals learn, and the rates at which they learn. LDs consider individual learning motivators; learner aspirations, interests, experience, and cultural background; and individual students' strengths and needs (Learning Disabilities Association, 2008).
7. Specific learning disability (SLD): A neurodevelopmental disorder that inhibits the ability to learn or use specific academic skills (e.g., reading, writing, or arithmetic), which are the foundations for other academic learning (American Psychiatric Association, 2013). This condition is considered part of the neurodiversity spectrum.
8. Mental illness: A general term for health conditions involving changes in emotion, thinking or behavior, or a combination of these, that are associated with distress and/or problems functioning in social, work or family activities (American Psychiatric Association, 2013). This condition is considered part of the neurodiversity spectrum.
9. Neurodiversity: Differences in experiencing and processing physical, social, and cultural environments (Griffin & Pollack, 2009). The term neurodiversity, can apply to individuals with ASD, ADHD, SLD, ID, processing disorders (PD), or mental illnesses.
10. Physical activity (PA): Any bodily movement resulting in energy expenditure (Sirard & Pate, 2001)

11. Post-secondary education: An education or training program that follows secondary school.
12. Processing disorder (PD): Any disorder in which the brain has difficulty receiving and responding to information that comes through the senses (Miller et al., 2014).
This condition is considered part of the neurodiversity spectrum.
13. Young adult: A young adult is defined in this research as ages 18-24 years, which is the age of majority in the United States (considered an adult) up to the average age of graduation from a 4 year IHE. The age at which individuals are deemed to be old enough to make life decisions.
14. Fitness and Recreation Department: A department in an IHE that provides fitness and recreation programs and services to students.

Research Questions

With the intention of informing best practices for promoting PA participation, and health and wellness of neurodiverse young adults in IHEs, the following research questions were explored through this study:

- R1: What are the PA preferences and habits of neurodiverse young adults attending IHENLs?
- R2: What are the fitness and recreation program attributes that contribute to or detract from PA participation?
- R3: How can IHEs better serve neurodiverse students in their fitness and recreation programs?

Delimitations

This study was subject to the following delimitations:

1. Participants in this study were young adults ages 18-24 years of age.

2. Participants in this study identified as being “neurodiverse,” beyond being an individual with ASD, ADHD, ID, LD, mental health disorder, or a PD.
3. Participants in this study attend an IHENL.
4. Participants participate in PA programs through fitness and recreation at the post-secondary institution.
5. The sample size for this study was 10.
6. The study consisted of each participant completing a 1:1 semi-structured interview, followed by a 60-90-minute focus group.
7. The principal investigator (PI) conducted the semi-structured interviews.
8. The PI conducted two to three focus groups inclusive of five to six participants per group. The focus groups will support member checking efforts.
9. During interviews and focus groups, the PI took notes regarding participant behavior and affect, as well as any occurrences that may have an influence on response.
10. The interviews were recorded and transcribed, and the data were evaluated using a process of interpretive phenomenological analysis.

Limitations

This study consists of IPA of interview data. This type of qualitative research is subject to the following limitations:

1. Knowledge derived from this study may not be generalizable because the meaning is interpreted by the researcher.
2. The participant sample will be heterogeneous.
3. Interpretation of the data is subject to researcher bias.

CHAPTER II

LITERATURE REVIEW

The purpose of this review of literature was to identify (a) the strategies and interventions that promote PA participation among neurodiverse young adults, and (b) the facilitators and barriers to PA participation for neurodiverse young adults. The following review of the literature describes the breadth of the available research, while also establishing the necessity to further investigate PA participation in this population.

Search Method

Potentially relevant articles, published between 2011 and August 2021 were located through electronic searches of databases, hand searches of key peer-reviewed journals, and hand searches of reference lists from reviews of the literature identified in the literature search. Articles were considered relevant to the review if they met the following criteria: (1) published between January 2011 and May 2021; (2) published in peer reviewed, English language journals; (3) participants in the study included individuals between the ages of 18-24 years; and (4) PA interventions, strategies, or best practices for neurodiverse individuals and/or perceptions, preferences, barriers, or facilitators of PA for neurodiverse individuals are described in the findings. It should be noted that studies were not excluded if they utilized a broader age range; however, that range must have included participants in the target age range. Articles were excluded from the review of literature if: (a) the age range of the participants in the study did not include individuals 18-24 years of age; (b) the article did not describe PA interventions or strategies for neurodiverse young adults, or did not include perceptions, preferences, or facilitators and barriers for PA participation among neurodiverse young adults; (c) the article was not published between January 2011 and May 2021; (d) the article was not published in a peer

reviewed English language journal; or (e) the article was a review of literature or meta-analysis. If a review of literature or meta-analysis was identified in the search and was related to the research topic, it was not kept as part of the total number of identified articles in the search; however, the references within the published review of literature or meta-analysis were reviewed to identify potential articles for the current review.

While the term neurodiversity encompasses a broad range of learning differences, very few research efforts have focused on these differences collectively. Instead, what is known about “neurodiverse” individuals is often based on condition-specific or disability-specific research efforts. Furthermore, despite the broadness of the LDs encapsulated by the term neurodiversity, the term is more frequently associated with ASD. In light of this, an initial search was conducted to identify the most effective search terms, which resulted in the following search strategy.

Searches of relevant databases were conducted using the search strategy “neurodiversity OR neurodiverse OR autism OR autistic OR attention deficit disorder OR learning disability AND young adults OR college students AND physical activity OR exercise OR sport or fitness or recreation.” Databases searched were ScienceDirect, Medline, EBSCO, and SportDiscuss. Using this search strategy, 238 articles were identified, of which only 46 articles were determined to be potentially relevant to the research topic after a title review. Three articles in the search results were reviews of literature, of which two were determined to be relevant to the research topic. A hand search of the reference lists for those two reviews of literature yielded one article to be included in the abstract review ($n = 47$).

To ensure this review of the literature included all possible literature related to the research topic, the PI also conducted a hand search of key adapted physical activity journals, which are known for the inclusion of articles on individuals with neurodiversities, and/or PA for

individuals with disabilities. These journals were *Autism*, *Journal of Autism and Developmental Disorders* (JADD), and *Adapted Physical Activity Quarterly* (APAQ). A search of the table of contents for the journals, published between 2011 to 2021, resulted in six additional articles for inclusion in the abstract review ($n = 52$).

Search Results

After reviewing the abstracts of all 52 selected articles, a total of 25 articles were excluded from the review of literature. The remaining 27 articles related to the research topic were reviewed in full. Two overarching categories were identified in the resulting literature. They were (a) PA as an intervention for neurodiverse young adults, and (b) perceptions, barriers, and facilitators to PA participation for neurodiverse young adults. The following is a summary of available literature related to the research topic organized according to these overarching categories.

PA as an Intervention for Neurodiverse Young Adults

Of the 27 articles, 13 were related to PA as an intervention or strategy is associated with improved outcomes for neurodiverse young adults. PA participation was shown to be associated with better mental health, decrease maladaptive behaviors, improve mood, and decrease impulsivity (Spratt et al., 2018). Abramovitch et al. (2013) investigated PA participation in 30 adult participants with a diagnosis of ADHD. Participants were given a self-report questionnaire and asked to identify PA frequency and intensity, as well as their experiences and challenges with ADHD such as, intrusive thoughts, impulsivity, and worry. The researchers organized the participants into two groups based on their PA participation levels (i.e., high PA and low PA). The authors indicated that individuals who reported higher PA had less intrusive thoughts,

impulsiveness, and worry. These findings support further investigation into PA participation to improve attributes of ADHD (Abramovitch et al., 2013).

Building upon the findings of Abramovitch et al. (2013), Fritz & O'Connor (2016) sought to determine the effects of a single 20-min bout of moderate-intensity leg cycling on attention, hyperactivity, mood, and motivation to complete cognitive tasks. Participants in this study were 32 men, aged 18-32 years, with self-reported ADHD or similar attributes. Authors reported that a 20-min bout of moderate-intensity exercise enhanced motivation to complete cognitive tasks; increased energy; and reduced confusion, fatigue, and depression (Fritz & O'Connor, 2016).

One study in the review examined a community-based youth program. Messiah et al. (2019) examined the effects participation in Fit2Play community park-based youth program designed to improve and maintain measures of health-related fitness for children and youth with ID. Participants were children of color with ID, aged 3-22 years. A repeated measures design was used to track components of health-related fitness correlates (i.e., body mass index, blood pressure, fitness testing scores, and health and wellness) over 2 years. Messiah et al. (2019) found that access to structured programs focused on health and wellness can improve cardiovascular health in youth with intellectual disability.

Unlike the previous study, most of the articles in this category ($n = 8$) examined PA interventions for individuals with ASD. These studies were designed to address PA given that individuals with ASD are at greater risk of obesity and development of disease due to inactivity (Hallett, 2019); and that the attributes of ASD can impede access to PA programs and activities (Hillier et al., 2020). Several strategies to improve access to PA and health related physical fitness were identified in this literature.

A single case study conducted in by Messiah et al. (2019) sought to compare PA levels in adults with ASD when using in-person and technology delivered praise. Technology delivered praise allowed for independence while participating in PA when compared to in-person praise. Technology-delivered praise was purported to increase independence because it was more easily thinned overtime, as well as easily applied to novel PA environments (Savage et al., 2018). These findings are consistent with research in other areas on reinforcement as a strategy to increase time engaged in PA for neurodiverse individuals (LaLonde et al., 2014; Todd et al., 2010). Additionally, the findings support the necessity of not only providing reinforcement, but also developing autonomy and self-management skills to plan and engage in PA independently.

Research utilizing technology-mediated strategies for neurodiverse individuals to improve access to and participation in PA documents how the use of technology can increase independence and autonomy to participate in PA. In their 2018 study, Bassette et al. (2018) examined the effects of a multi-component behavioral intervention (i.e., the Exercise Buddy app), that included a system of reducing prompts, gradually increasing performance criteria, and a schedule of reinforcement delivered through a personal electronic device (i.e., an Apple iPad mini) to teach four exercises to three adolescents with ASD. Using these intervention strategies, participants learned functional fitness skills and generalized that learning to novel fitness environments. Like the findings of Savage et al. (2018), the findings of this study document that technology, such as the use of apps on an iPad or iPhone, can increase independence for individuals with ASD.

In addition to increased independence, Savage et al. (2018) reported that the use of technology allowed for generalization to fitness environments wherein the participants engaged in PA alongside neurotypical peers, which can in-turn increase skill development and motivation

to participate in PA (Bassette et al., 2018). Providing opportunities for individuals with ASD to participate in PA alongside neurotypical peers can improve health outcomes and foster continued participation in PA (Bassette et al., 2018; Messiah et al., 2019; Todd et al., 2018). To that end, Todd et al. (2018) investigated health outcomes during a peer-mediated PA program for college students with ASD. The authors reported improved health outcomes, and increased self-esteem and enjoyment for college students with ASD when provided with PA opportunities with their neurotypical peers.

Building off previous research that identified technology-delivered interventions as effective strategies for individuals with ASD, Kim et al. (2020) developed a mobile version of a walking game (i.e., PuzzleWalk) to increase PA in adults with ASD. During the development of the app, considerations were taken by the researchers to account for attributes of ASD experienced by the participants, such as the need for reinforcement, the need to complete tasks, and preference for pictures and videos. The app allowed for up to 5 minutes of puzzle-solving time to the user each day, based on steps accumulated. That is, throughout the day the participant's walking steps are converted to puzzle-solving time (1 step = 1 second). The more steps a user took, the more puzzle-solving time allowed. The participants walking and puzzle scores were reported on a leader board in real time so that they could see their progress compared to other users. The top three users received a monetary reward every month. It was found that, while using the app, the participants were able to increase and maintain time engaged in walking. These findings add to a body of literature identifying technology as an effective strategy for individuals with ASD.

In addition to technology-based interventions, sport interventions were identified in the review ($n = 3$) and included swimming, golf, and soccer interventions to improve health

outcomes for young adults with ASD (Barak et al., 2019; Pimenta et al., 2016; Shanok et al., 2019). Sport participation has been shown to increase confidence, health, and social development for neurodiverse individuals (McConkey & Menke, 2020; Ryan et al., 2018). For example, a soccer intervention developed for adults with ASD and ID resulted in improvements in skill development and measures of health-related fitness (Barak et al., 2019). Such findings are critical as neurodiverse individuals, particularly those with ASD or ID, have fewer opportunities to participate in sport compared to individuals without disabilities (Duquette et al., 2016; Must et al., 2015).

In a similar study, Pimenta et al. (2016) examined the feasibility of an aquatics program for individuals with ASD. It was found that individuals with ASD can participate successfully in an aquatics program and develop swim skills when provided instructional supports, such as simplified verbal instructions and demonstrations. Additionally, the researchers reported that the pool environment was conducive to successful participation for individuals with ASD because it has clearly demarcated boundaries, and participation does not require equipment that could be distracting (Pimenta et al., 2016).

In another intervention study, Shanok et al. (2019) implemented a golf intervention for individuals with ASD, aged 6-24 years. In addition to key golf skills, the researchers incorporated learning objectives focused on key attributes of ASD including expressive and receptive communication skills, regulatory skills, motor skills, and social skills during each session. The researchers implemented a 6-week, 12-lesson golf program (i.e., The Ernie Els #GameON Autism™), which incorporated golf-related skill and life skills (e.g., social and communicative skills relevant for individuals with ASD) in each of the 12 lessons (Shanok et al., 2019). It was found that the golf program was effective in improving motor skills and life skills

for individuals with ASD when presented with appropriate supports further supporting the use of PA approaches to improve outcomes for individuals with ASD.

While the research on PA as an intervention for neurodiverse individuals is limited, it does provide evidence of the health, social, and psychological benefits of PA participation for neurodiverse individuals. Articles referenced here also document the efficacy of PA and sports programs as a strategy for promoting PA participation, particularly when presented with appropriate supports. As presented, the findings of this research are relevant to the current study because they provide evidence that PA interventions improve outcomes for neurodiverse individuals as well as a framework of best practices that can be applied to the development of PA programs and interventions for neurodiverse young adults.

Perceptions, Barriers, and Facilitators to PA Participation for Neurodiverse Young Adults

It is well established that neurodiverse adults have less access to PA opportunities than neurotypical peers due to barriers imposed by social and cognitive attributes that are not supported in neurotypical environments (Blagrove et al., 2021; Hillier et al., 2020). Additionally, neurodiverse individuals may experience poor perceptions of health and wellness and poor quality of life as the result of a lack of access to PA (e.g., Hamm & Yun, 2019; Hillier et al., 2020). In this portion of the review of literature, several studies ($n = 9$) were identified that describe the perceptions, barriers, and facilitators of PA for neurodiverse young adults. These studies document important social factors that should be considered when developing PA programs for neurodiverse young adults.

Stanish et al. (2015) examined direct reports from adolescents with and without ASD (ages 13-21 years) about their PA enjoyment, perceived barriers, and beliefs. The authors used a questionnaire to examine participants' perceptions about PA. According to the authors,

adolescents with ASD reported that they enjoy PA like walking and participating in “gym class” (i.e., physical education). Of the participants with ASD, 59% said they enjoy participating in sports or exercise, as compared to the 75% of individuals without ASD. When asked about how they would spend their free time, 25% of the participants with ASD responded they would prefer to participate in sport or exercise while the remaining 75% responded they would rather do “something else;” though the participants with ASD also reported that they feel they need to participate in more PA than they are currently engaged. Barriers reported by the participants were lack of time and fear of injury. A lack of time has been similarly reported by neurotypical peers (i.e., lack of time due to schoolwork, employment, extracurricular activities, and family responsibilities) when questioned. The researchers postulated that individuals with ASD may have additional demands on their time associated with therapy and/or medical appointments. A preference for sedentary activities, such as watching TV were also reported and interpreted as a barrier by the authors. To mitigate the effects of these barriers, the authors suggest interventions are needed to not only increase access, but also to foster enjoyment and success while participating in PA. Some possible strategies described in the study are to offer a choice of activities, individualize instruction, and provide necessary supports (Stanish et al., 2015). Like the findings of Stanish et al. (2015), fear of injury has been reported in other similar studies with individuals with ASD or their caregivers or teachers (e.g., Ayvazoglu et al., 2015; Columa et al., 2017). The available literature indicates that a fear of getting hurt during PA could be partly attributed to overprotective parents and/or service providers. Additionally, as the complexity of PA sport opportunities increases in adolescence, it is possible that insecurity related to engaging in these activities, using the equipment, and following the rules of the games

may also contribute to the fear of injury being a barrier to PA participation among adolescents with ASD (Stanish et al., 2015).

Related to choice in activity, Hamm and Yun (2018) found that autonomy to select activities and competence to complete activities contributed significantly to motivation to participate in PA for individuals with ASD (Hamm & Yun, 2018). Within the study, the authors used self-determination theory as a framework to develop and administer a survey to 143 young adults with ASD regarding their motivational process to engage in PA. As a result, Hamm and Yun (2018) suggested that using self-determination theory as a theoretical framework to inform instructional strategies in PA will inherently lead to improved outcomes due to increased autonomy.

Parent and caregiver perceptions of PA can also have a significant influence on PA participation among individuals with ASD (Buchanan et al., 2017; Nichols et al., 2019). Buchanan et al. (2017) identified that positive parent perceptions were associated with increased PA participation in their adult children with ASD. The parents in this study further reported that community factors played a major role in the PA of their adult children. Community PA opportunities that were most often taken advantage of were safe walking paths and sidewalks, as well as local health/fitness centers where adults with ASD could access fitness equipment and training. Additionally, local health/fitness centers provided an opportunity for families to participate in supported PA together, leading to increased PA participation among adults with ASD (Buchanan et al., 2017).

In a similar study, Nichols et al. (2019) interviewed the parents of adult children on the autism spectrum with intent to examine their perspective of PA participation, facilitators, and barriers. The adult children were all 18 years or older. Like the findings of Buchanan et al.

(2017), parent perceptions were found to be a significant influence on PA participation in adults with ASD (Nichols et al., 2019). Beyond parent perceptions of PA influencing participation, Nichols et al. also acknowledged that the transition out of secondary education often results in a decrease in PA participation (Howlin & Moss, 2012) even though their findings did not support this supposition. The authors suggest that this is due to the recruitment process they employed (participants were recruited from a community day program and Special Olympics), which resulted in a population with a proclivity to participate in PA. This finding suggests that adults with ASD can participate successfully in PA when provided with appropriate support at home and/or when accessible PA programs are available within their community (Nichols et al., 2019).

The research described in this section provides insight into factors that influence or hinder PA participation for neurodiverse young adults. The research reviewed within this chapter indicates that PA participation is influenced by (a) support from parents or caregivers, (b) activities designed to foster success, (c) the use of appropriate supports within PA programming, and (d) the availability and accessibility of PA programs within local communities. Knowledge of these factors as well as the perceptions of neurodiverse individuals toward PA participation will enrich the development of the interview guide for the current study and lend credence to the interpretation of the resulting data.

Limitations

A review of the quality of the articles identified was not conducted, and therefore, while several articles were identified through this search, evidence of sound research strategies and psychometric properties are not reported. Additionally, only articles published in the last 10 years were included, and therefore research relevant to the research objectives of the review that occurred before the search parameters were not included.

Conclusion

Most of the literature that was identified during this review involved young adults with ASD or ADHD. While neurodiversity includes these conditions, the term is meant to encapsulate a broad range of cognitive processing abilities. As such, the literature available and presented in this chapter on PA experiences and habits among neurodiverse individuals is condition specific. Further, while PA programs are emerging at IHEs, there is currently a lack of evidence supporting PA experiences and interventions for neurodiverse populations specifically in post-secondary education. As such, this review served to highlight the need for research to be conducted at the post-secondary level that considers the entirety of neurodiversity in programming.

Collectively the literature compiled during this review provides insight into the perceptions of neurodiverse young adults toward PA. It also provides evidence for strategies that will foster PA participation for neurodiverse adults. Although this information should be considered when developing and implementing PA programs in school and community contexts, noticeably missing from this review is literature that considers the spectrum of intellectual functioning encapsulated by the term neurodiversity. In keeping with the aim of the neurodiversity movement, the conditions associated with neurodiversity should be valued for the unique perspectives and abilities possessed by those who identify as neurodiverse and be viewed as an opportunity to evolve current practices in educational, community, and health contexts.

CHAPTER III

METHOD

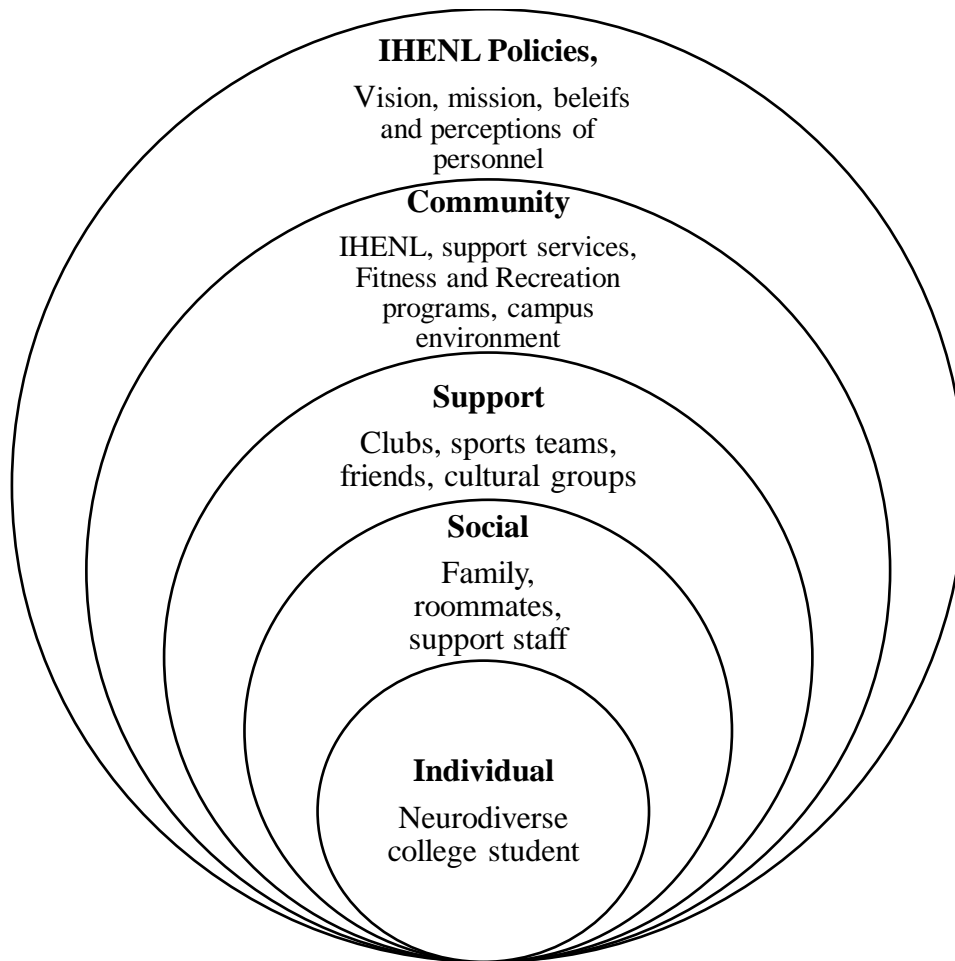
The purpose of this chapter was to elucidate the research design and methodologies being employed in the current study (i.e., an exploration of the PA experiences of neurodiverse young adults and factors that contributing to participation in PA). The chapter is organized into six sections the delineate the following: (a) the research design; (b) details of the pilot study; (c) discussion of participants; (d) data collection procedures including interview guide development, interview procedures and focus group procedures; (e) the researcher's role; and (f) data analysis.

Research Design

This study was developed using hermeneutic phenomenology informed by BST of Bronfenbrenner to examine the individual PA experiences of participants. More specifically, in this study, BST was used as a framework to explore the interactions between neurodiverse young adults and the political, social, and cultural systems at an IHENL. By applying BST as a framework in this study, the researcher conceptualized the development of PA participation at an IHENL with the neurodiverse young adult as the central perspective. Through their perspective, the researcher identified components of the policies and practices employed by the IHENL that had the greatest impact on development of PA habits for neurodiverse young adults. To illustrate the systems at play in the IHENL, the systems described by Bronfenbrenner (1999) have been adapted for this study and are depicted in Figure 2.

Figure 2

Diagram of Systems Surrounding Neurodiverse College Students Attending an IHENL



Note. Adapted from Exploring how children's relationships and environment interact to help them thrive by Center for Child and Family Well-Being, 2021 (<https://ccfwb.uw.edu/about-us/the-bioecological-model/>)

Pilot Study

Prior to embarking on the current study, a pilot study was conducted to test out the methodology and ensure that the planned methods and concepts are compatible upon delivery (Kim, 2011). More specifically, the pilot study was conducted to address three aims. First, the

pilot study provided an opportunity for the PI to develop expertise in developing a semi-structured interview guide. Second, the pilot study provided an opportunity for the PI to practice semi-structured interview techniques and analyze qualitative data. Third, and finally, the pilot study sought the perspective of personnel involved in the development of programs in the fitness and recreation department at the IHENL for neurodiverse students to identify questions and thematic areas central to the development of an effective interview guide for the current study.

Pilot Study Participants

Participants in this study were personnel ($N = 7$) from various levels of administration and student programming at the IHENL. All the participants influence programs and services provided to neurodiverse students in the Fitness and Recreation Department at the IHENL. Participation included an individual interview that was approximately 1 hour in duration, followed by a focus group session after the initial interview. The focus group was conducted approximately 2 weeks after the interviews and was conducted to confirm the validity of researcher interpretations. All interviews and the focus group were recorded and transcribed to facilitate data analysis.

Data Collection and Analysis

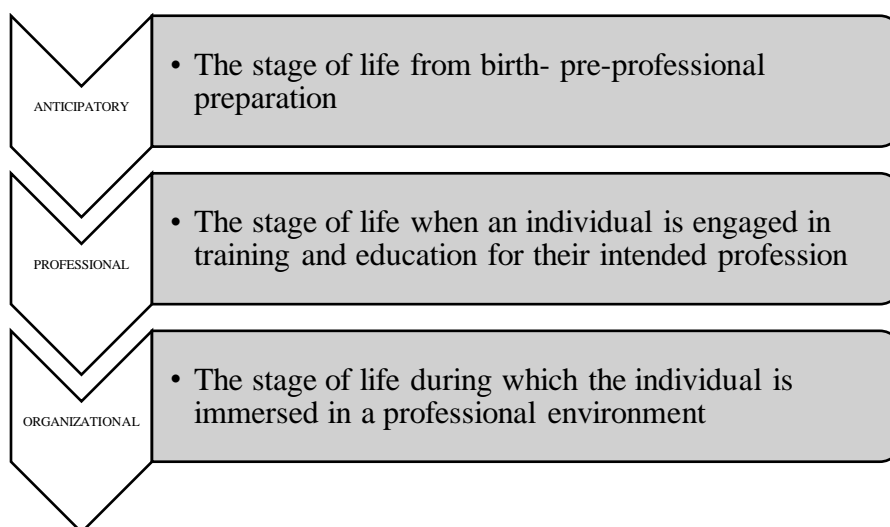
To better understand the factors contributing to the development and implementation of PA programs designed to meet the needs of neurodiverse young adults in a post-secondary education setting, semi-structured interviews were conducted with the Fitness and Recreation Department personnel, school administration, and student support personnel at the IHENL. These factors included but were not limited to the professional preparation of the personnel as well as their perceptions of what is critically important to consider when developing and implementing PA programming that supports neurodiverse adults. Following the semi-structured

interviews, a focus group with all participants was conducted to member check and enrich the findings. The findings of this pilot study were used to inform the development of the methods, including interview guide, employed in the current study.

To examine the professional preparation of the personnel developing and implementing PA programming for the neurodiverse students, participants were interviewed using questions framed around the occupational socialization theory (Lawson, 1986; Richards et al., 2013). Occupational socialization theory describes stages in the development of professionals. They are (a) anticipatory/acculturation, which is the stage of life from birth- pre-professional preparation; (b) professional preparation, which is the life stage during which the individual is engaged in training and education for their intended profession; and (c) organizational socialization, which is the stage of life during which the individual is immersed in a professional environment (Lawson, 1986; Richards et al., 2013). An overview of the components of occupational socialization is provided in Figure 3.

Figure 3

Stages of Occupational Socialization



Data collected through the semi-structured interviews and focus group session were analyzed using IPA design, which allowed themes to be identified by the PI. To facilitate analysis of the data and the development of a rich description the phenomena, all sessions were recorded and transcribed verbatim. The IPA process for data analysis also employed the five-step process for inductive thematic analysis described by Smith & Osborn, 2015 and advocated for by Spiers and Riley (2019).

Pilot Study Results

The interviews and focus group data provided insight into the professional development of the personnel employed at the IHENL; however, the data most relevant to the current study were drawn from discussion of organizational socialization. The participants identified the vision and mission of the IHENL as a unifying factor, which guides policies and practices across administrative and programming levels. Three themes were identified in the data that aligned under organizational socialization and are relevant to the development of this study. They are focused on providing PA opportunities for neurodiverse students, breaking down barriers, and school and community pride developed through PA opportunities.

A Seat at the Table: Providing PA Opportunities for Neurodiverse Students

Participants in the pilot study describe their school vision and mission encapsulated by their school slogan (i.e., “The Life Abundant”) as the touchstone on which they develop their programs and services, including PA and fitness and recreation programs. The perceptions of the personnel interviewed were that many of the students attending the IHENL have not had the opportunity to participate meaningfully in sports or PA. Therefore, it was incumbent upon the personnel developing programs related to fitness and recreation to not only create meaningful programming, but also to empower students to advocate for themselves, their health, and their

opportunities to be physically active. Strategies that were employed within programming by the personnel were establishing and upholding a community around sports and activity; taking steps to develop positive self-image, such as professional dress on game days; and providing opportunities for successful participation in sport through activities like intramural (e.g., kickball) and intercollegiate sport offerings. These strategies, coupled with the mission of the IHENL, provided opportunities for students to feel connected to a larger community, which in turn developed student confidence. In this study, seeking the perspective of the students accessing the PA programs and activities at the IHENL may serve to validate and enrich the current Fitness and Recreation Department program offerings.

Breaking Down Barriers: Using Innovative and Non-Traditional Approaches to Encourage Females and Underrepresented Students

A common response from the participants was that there were significantly more male students participating in programs through the Fitness and Recreation Department than female students. One explanation provided by the participants for this discrepancy is the fact that males are diagnosed with some developmental disorders such as ASD and ADHD more frequently than females. While the prevailing literature supports this, the participants were also mindful of the optics of their programs and communicated how they were actively taking steps to attract female students as well as underrepresented students (e.g., students who are more heavily impacted by their condition, students from ethnic minorities, etc.). For example, participants in the pilot study suggested that students attending the IHENL (males and females) have not had the opportunity to visualize themselves participating in sport or PA. They also suggested that female students may limit their participation due to social conditioning in some of the activities available at Fitness and Recreation Center, such as flag football, strength training, or basketball, thus compounding

the barrier to participation. The personnel in the IHENL Fitness and Recreation Department shared how they are taking steps to provide opportunities for socially attributed “female” activities such as yoga and dance, as well as thinking outside the box to provide non-traditional activities that would be attractive to students across a broader range of skills and abilities. Kickball, for example, is one of the most popular activities offered at the school due to participation from both faculty and students and was described by one participant as “baseball with a big ball, and a big bat” —implying that the physical components of kickball are easily acquired and executed and are therefore appealing to a broader audience. Additionally, the Fitness and Recreation Department personnel described providing a diverse collection of activities such as a water balloon toss competition, a morning walking program, and e-sports; with the possibility of adding horseback riding. A key directive of the current proposed study is to determine how these efforts are perceived by the students, as well as empower students to voice their PA preferences.

Pride: School and Community Pride Through the Development of Competitive and Intercollegiate Sport Opportunities

As communicated through the interviews and focus group, a goal of the Fitness and Recreation Department is to develop their intramural and intercollegiate sports programs. It is the belief of the pilot study participants that part of their mission in providing opportunity for “the life abundant” is to offer the students opportunities that are available at traditional colleges and universities. Within the fitness and recreation program, this includes providing opportunities for intercollegiate sports. Currently, the school is planning to introduce golf and cross country running as intercollegiate sport offerings. A major concern expressed by the pilot study participants was that, as the sports were introduced, that an appropriate coaching and training

infrastructure would be implemented that would be effective in training the students athletes at the collegiate level. The participants expressed how great care is being taken to ensure that these barriers are fully addressed before delving into intercollegiate sports with traditional schools so that their students can compete successfully. If this could be accomplished, the pilot study participants felt that it would give the students a sense of pride to represent their school as well as strengthen their connection to the community. In the current study, the participants (i.e., IHENL students) were asked to discuss the sports programs currently offered and those proposed, which may validate the beliefs and concerns of the Fitness and Recreation personnel.

Pilot Study Conclusion

Through conducting this pilot study, the PI was able to practice developing a semi-structured interview guide as well as gain skills in conducting qualitative interviews and focus groups. The pilot study also aided the PI in the development of the interview guide that were used in this research. For example, utilizing the perceptions of the Fitness and Recreation Department personnel, the PI was able to develop questions that account for the perceived barriers and facilitators as well as the IHENL culture that may support PA promotion for the neurodiverse student population. Finally, the pilot study allowed the PI to identify thematic areas as well as current practices that provide a framework for the design of the current study. Building on what was learned from the findings of the pilot study, the current study explored the PA experiences of neurodiverse young adults attending the IHENL as well as the factors that contribute to their PA participation.

Participants

Participants for this study were students ($N = 10$) from an IHENL that specializes in education for neurodiverse learners in Florida. The school has 455 undergraduate students, all

with documented LDs (LD, ADHD, ASD, etc.). The average class size is 12-15 students. Participants were recruited using purposive sampling using e-mail, flyers and word of mouth. Recruitment through e-mail was facilitated by the staff and administration at the IHENL to ensure that only students with the requisite skills to participate in the study were selected. Flyers were handed out by the PI in the Fitness and Recreation building and posted in residence halls and around the Fitness and Recreation building. Participants met the following inclusion criteria: (a) young adults aged 18 to 24 years, (b) self-identified as being an individual who is neurodivergent, (c) enrolled as a current student at the IHENL, and (d) had previously participated in or were currently participating in programs provided in the Fitness and Recreation center at the IHENL. Participants who signed up to be in the study reported that they did so by responding to the e-mail request, or through the flyer presented in-person by the PI. The participant information is presented in Table 1.

Table 1**Participant Demographic Information and Pseudonyms**

Gender Identity	Pseudonym	Age	College Status	Neurodiversity Identification	Youth Athlete
F	Jill	20	Sophomore	Yes: Learning Disability	Yes
F	Anne	19	Freshman	Yes: Asperger's	No
F	Jennifer	20	Sophomore	Yes: ADHD	Yes
F	Allison	19	Freshman	Yes: Not Specified	No
M	Andrew	20	Sophomore	Yes: Asperger's	No
M	Mark	23	Junior	Yes: ADHD	Yes
M	John	24	Junior	Yes: ADHD/CP	Yes
M	William	21	Junior	Yes: Dyscalculia	Yes
M	Cameron	21	Junior	Yes: Dysgraphia	No
M	David	21	Junior	Yes: Not specified	Yes

Data Analysis

Initial in-person interviews were conducted on the IHENL campus. The semi-structured interview guide developed for this research was used to guide the conversation with the participants about physical activity experiences from childhood to young adulthood, as well as their experiences while attending the IHENL. After reviewing the transcripts and identifying initial themes, the PI conducted a follow-up focus group to member check the data and enrich the findings.

Rationale for Inclusion Criteria

While young adulthood has been referenced in the literature as a period spanning ages 16-35 years, the intention of the PI was to examine years when young adults are attending IHEs

for academic and professional development. Current statistics indicate that the average age of college students in the US is 21.8 years of age (Hanson, 2021). It was important to the relevance and purpose of this research that the upper range of the age inclusion criteria neither fell too far below or above the average age of post-secondary students in the United States. Additionally, the participants were asked to speak for themselves, and therefore it was necessary that they be at least the age of majority in the United States (i.e., 18 years of age). As such, young adults in this study were defined as individuals aged 18 to 24 years.

Specifying that participants self-identify as a neurodivergent individual served to indicate that the participant can reflect on self and experiences; and were likely able to participate meaningfully in the research. Furthermore, by specifying that participants had or currently utilize the programs and services provided in the Fitness and Recreation Department at the IHENL, it was ensured that the participants had experiences with the PA programs and would be able to speak directly to how the services provided by the IHENL influenced PA participation and development of health habits. It is worth noting that participants enrolled at the IHENL cooperating in this research may have access to individualized supports and services that may not be available at traditional IHEs. It was the intention of the PI to interpret the experiences of the participants regarding the strategies and supports put in place at the IHENL and understand how this influences access to PA participation for neurodivergent young adults enrolled at such an institution.

Protection of Human Subjects

To support the neurodiverse individuals' autonomy to choose whether they participated in the current study, the participants in this study were no younger than 18 years old, which is the age of legal majority in the United States. In addition, the participants were recruited from a

post-secondary education setting where it was understood they have the capacity to comprehend the objectives and expectations of the study and make independent decisions. The participants were also recommended by support staff who believed the prospective participants possessed the capacity to comprehend the objectives and expectations of the study. Finally, consent materials that met the requirements of the Texas Woman's University (TWU) Institutional Review Board (IRB) were used to ensure criteria for ethical concerns had been met.

Data Collection

Interview Guide

Data for this study was collected through interviews and focus groups that were guided by a semi-structured interview guide. Semi-structured interview guides are a line of questions that guide the conversation with the participants and elicit responses that relate to the research objectives (Longhurst, 2003; Smith & Osborn, 2015). For the current study, the semi-structured interview guide was framed by BST (Bronfenbrenner, 2000) and developed by the PI, who is a doctoral candidate in the field of Adapted PA, with input from the secondary researcher (SI), who is a professor of Adapted PA.

The questions for the interview guide were informed by *The Interview Protocol Refinement Framework* (Castillo-Montoya, 2016), which is a four-step process for developing and refining a semi-structured interview protocol. *The Interview Protocol Refinement Framework* (Castillo-Montoya, 2016) has been modified for this study with changes to the fourth phase. The four phases described in the process are listed and described below.

Phase 1: Align interview questions to research questions: Use a matrix to map interview questions onto research questions.

Phase 2: Construct an inquiry-based conversation: Develop an interview protocol that has (a) interview questions written differently from research questions, (b) is organized like a conversation, (c) has a variety of questions, and (d) includes follow-up and prompt questions.

Phase 3 Receive feedback on interview protocol: Using a rubric, seek feedback from professionals in the field on structure, length, writing style, comprehension, and content.

Phase 4: Piloting the interview protocol: The refined protocol was piloted with a small sample of participants to check for efficacy to answer the research questions. Additionally, participants were asked additional questions about the clarity of the interview protocol and suggestions for additional questions for the interview script.

In lieu of piloting the interview protocol, the PI received feedback from three faculty from other IHEs who are known to have expertise in the methodology, or in conducting PA research with neurodiverse young adults, for content validation and feedback before conducting the interviews with participants (Healy et al., 2013). Additionally, feedback from faculty who identify as neurodivergent was also sought and included in the development of the interview protocol. Questions for the interview guide were also informed by the results of a pilot study conducted with personnel involved in the development and implementation of fitness and recreation programming at the IHENL, which included personnel who identify as neurodiverse.

Recruitment

With support from the administration at the IHENL, participants were recruited using flyers describing the study that were posted in the fitness and recreation building. Participants were also recruited via an e-mail, sent on behalf of the PI, by the support staff at the IHENL to students known to participate in the Fitness and Recreation programs. In accordance with research policies and procedures at TWU, approval from the IRB was obtained before

commencing research activities, including recruitment of participants from the IHENL. All participants signed a consent form indicating their approval to be included as a participant in this research. Life coaches at the IHENL were also able to assist in ensuring the recruitment materials reached potential participants that met the inclusion criteria. Multiple means of recruitment were used; however, most participants ($N = 8$) were recruited from inside the fitness and recreation building using the flyers. An overview of the recruitment materials is provided below.

Flyer

The flyer provided an overview of the purpose, methods, and inclusion criteria involved in the study. It also outlined potential benefits and risks, which were explained to the participant in greater detail in the PI response to the potential participants. The flyer also included the benefits of contributing to an underrepresented area of research, and the potential to influence policies and program development in physical education in PK-12 schools, in recreational programs, and in PA programs at the post-secondary level. Additionally, the flyer contained the e-mail contact information of the PI.

Flyer Response E-mail

Potential participants who respond to the flyer received an e-mail response from the PI that included the following: (a) a detailed description of the purpose, methods, inclusion criteria, benefits, risks, and commitment requirements; (b) a link to a participant information Google Form for potential participants to submit information on age, enrollment status, and neurodiversity identity; (c) an informed consent form for the client to review; and (d) contact information for the PI.

E-mail Recruitment

With assistance from the administration at the IHENL, a recruitment e-mail was sent to potential participants who were identified by the PI as a student who participates in the fitness and recreation programming. The recruitment e-mail included the following: (a) a detailed description of the purpose, methods, inclusion criteria, benefits, risks, and commitment requirements; (b) a link to a participant information Google Form for potential participants to submit information on age, enrollment status, and neurodiversity identity; (c) an informed consent form for the client to review; and (d) contact information for the PI.

Interview Procedures

Individual interviews were 60-90 minutes in length and conducted face-to-face with each participant using the semi-structured interview guide. Interview sessions were audio recorded, transcribed, and evaluated using interpretive phenomenological analysis. Interviews took place on the IHENL campus at a location with few distractions and which was mutually agreed upon by the PI and participant. Allowing the participant some autonomy in selecting the area for the interview ensured the comfort of the participant when engaged in the interview conversation (Elwood & Martin, 2000). Possible venues for the interview session, which had been approved and made available by the IHENL administration, included but were not limited to a private office in the Fitness and Recreation Department, a private office in the administration building, or a study room in the library. At the beginning of the interview, the PI reviewed the consent information with the participant and clarified any information or answered any questions posed by the participant about the purpose or procedures of the study. During this time, the PI also reminded the participant that the interview session would be recorded for later transcription and analysis. After the participant verbally indicated understanding of the purpose of the study, the PI obtained a signature of consent from the participant. Interviews were intended to take place face-

to-face on the IHENL campus; however, if it became necessary to conduct interviews via video conferencing (e.g., restrictions are put in place to hinder the spread of COVID-19), that option was made available to participants. The PI was prepared to conduct interviews through video conferencing, if necessary, following the guidelines set for by the TWU IRB.

Focus Group Procedures

Following the interviews, focus group sessions with all participants were conducted to expand on responses and findings identified through the interviews as well as to member check participant responses. Attrition was an issue when scheduling the focus groups. As a result of the 10 participants, only four participants responded to the focus group invitation. Two focus groups were conducted with two participants in each group. The focus group was 60 minutes in length. The PI facilitated a collaborative discussion with the focus group to obtain the participants feedback to compliment and expand upon findings from the interviews through the addition of perceptions and experiences from members of the focus group as well as generating ideas that can serve as a foundation for building effective PA programs for neurodiverse young adults.

Researcher Journal

While interviewing the participants and conducting focus group, the researcher maintained written descriptions of every interview and the focus group. The researcher journal provided opportunity for the researcher to be reflective about what was observed and learned in each interview and focus group session. The researcher journal recorded: (a) the day, time, and location of the interview or focus group; (b) nonverbal responses to include gestures, changes in tone of voice or emotion that occur; (c) specific terms, phrases or insider language (Sunstein & Chiseri-Strater, 2011) shared during the interviews and focus group session; and (d) any

interruptions that occurred during the interview or focus group (e.g., participant receives a phone call that temporarily disrupts interview).

Researcher Role

Before engaging in the research process, the PI openly acknowledged biases to ensure it is clear how the researchers' opinions and experiences influence interpretation of the data (Elo et al., 2014). Additionally, the PI accepted biases and experiences as the lens through which the PI interpreted what participants said. During the individual interviews the PI's role was to facilitate a conversation with the participants using the semi-structured interview guide. During the interviews the PI took notes on participant responses, as well as participant behaviors, and significant or interesting artifacts that enriched the interpretation of the data (Smith & Osborn, 2015). After the individual interviews, small groups of participants ($N = 5$) discussed the PI's interpretations of the participants' experiences discussed during the individual interviews. The PI facilitated a collaborative conversation that served to support member checking efforts as well as generate ideas for promoting PA for neurodiverse students at IHEs. Collectively these strategies added to the fidelity and transferability of the research process.

Data Analysis

Interpretive Phenomenological Analysis

The purpose of this study was to explore PA experiences of neurodiverse young adults attending an IHENL and factors that contribute to participation in PA. To accomplish this, it was necessary to seek the perspective of neurodiverse young adults, which was done through the individual semi-structured interviews and focus group interviews. Data collected through the semi-structured interviews and focus group sessions was analyzed using IPA methods, which facilitated detailed examinations of personal lived experiences as well as the identification of

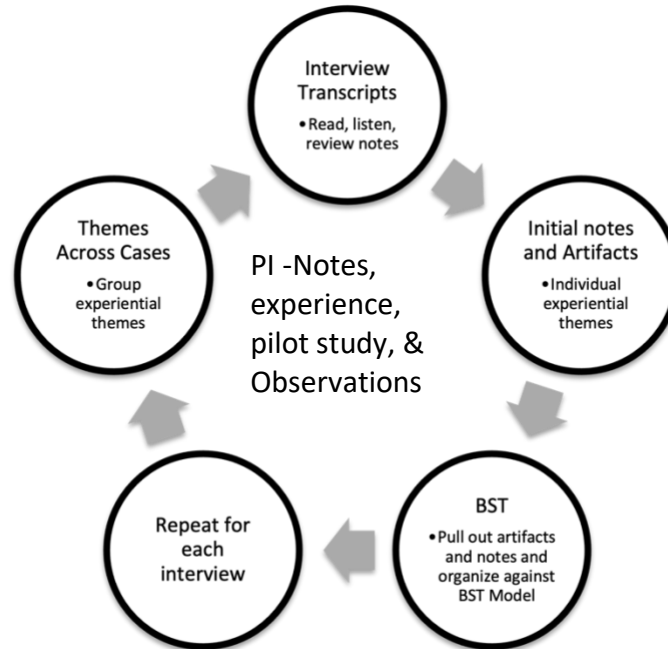
patterns across participants. To facilitate analysis of the data and the development of a rich description of the phenomena, all sessions were recorded and transcribed verbatim. The IPA process for data analysis also included a four-step process based on Smith and Osborn (2015). The steps that were used for this process are listed below and depicted in Figure 4.

1. **Read and re-read the transcript:** In order to become familiar with the data, the transcripts were read and re-read multiple times to gain comprehensive knowledge of the data. Additionally, the PI re-listened to the interviews while commuting to and from work to become immersed in the interviews. During this phase of analysis written and voice notes were taken on what was significant or interesting in the information provided in the interview (Smith & Osborn, 2015).
2. **Revisit the Transcript:** Once the initial notes were taken, the transcript was revisited through reading and listening. Emerging themes were identified, and initial notes were collapsed into short phrases or words that embodied the quality of what was found in the interviews. Significant quotation artifacts were also identified.
3. **Connecting Themes:** Artifacts and notes were aligned with systems described in the BST model. Potential individual experiential themes were listed and connections between themes were identified.
4. **Repeat the process with other data in the set:** Once the transcript of the first participant was completed, the themes from this case and the BST model were used to orient the analysis of subsequent data. Throughout this process the PI was mindful of maintaining flexibility in interpreting the data.

5. Identify overarching themes and subthemes: The collective artifacts and experiential themes at each system level of BST were condensed into 3 overarching themes and subthemes.

Figure 4

IPA Data Analysis



Note. Interview data analysis process informed by PI background experiences, pilot study data, and observations during 1:1 interviews. Based on process described by Smith and Osborn (2015).

Trustworthiness

Multiple qualitative research strategies were used in this study to develop trustworthiness in the understanding of the PA experiences of neurodiverse young adults. The use of several methods of collecting and evaluating data led to robust multi-dimensional results. Three criteria

of trustworthiness were used to seek authenticity in the findings—credibility, transferability, and confirmability.

To increase the credibility of the findings, triangulation, peer debriefing and member checking strategies were employed (Glaser & Strauss, 1965). Data from the interviews, focus groups, and researcher journal were analyzed in answering the research questions. In addition, peer debriefing was used in this current study with experts in the field of adapted physical activity assisting the PI with reviewing the data and fulfilling her researcher responsibilities during the entire research process. Member checking was also used to increase the creditability as well as validity of the study findings (Cutcliffe & McKenna, 1999). Following the interview process, the interviews were transcribed verbatim and analyzed following the process recommended by Smith and Osborn, 2015, which supported accurate interpretation and thematic analysis. These findings were shared with the participants during the focus groups in order to member check the findings; that is, to compliment and expand upon initial findings from the interviews as well as provide an opportunity for participants to provide additional perceptions and experiences during the focus group. Transferability was addressed through robust descriptions of the participants, their lived experiences in PA, and their perspectives on factors that contribute to participation in PA. This critical information along with systematic coding of the data contributed to the transferability of the current study.

To increase the confirmability of the study, or affirmation of the PI's observations of the phenomena under study, the PI aimed to acknowledge and accept researcher bias. The PI engaged in a process of bracketing to identify ideas, biases, and experiences that contribute to the PI's interpretation of the data (Elo et al., 2014). The aim of IPA research is to examine unique lived experiences of individuals (Smith & Osborn, 2015) The researcher's unique perspective

enriches the interpretation of the data therefore, through identifying the researcher perspective and experiences the reader has a clear understanding of the lens through which the PI interprets the data (Reiners, 2012). This unique feature of IPA lends to the overall purpose of this research, (i.e., to examine the unique lived experiences of physical activity of neurodiverse young adults at an IHENL).

CHAPTER IV

RESULTS

The purpose of this study was to examine the physical activity experiences of young adults attending an IHENL. To this end, individual in-person interviews were conducted with 10 participants recruited from an IHENL in Florida. Following the in-person interviews, participants were invited to participate in a focus group, conducted via Zoom video conferencing, to member check themes identified by the PI and obtain additional information from participants that would add to the richness of the findings. Using the format described by Smith and Osborn, 2015, and using BST (Bronfenbrenner, 2000) as a framework, the transcripts of both the individual interviews and focus group sessions were evaluated. The PI identified initial codes in the data and then combined codes into themes. Three overarching themes were identified in the interview data: (a) Development of PA Habits; (b) PA, Sport and the College Experience; and (c) Systems of Support and PA. In this chapter, the themes and the corresponding subthemes are presented with artifacts from the participant's responses.

Development of PA Habits

For the theme of development of PA habits, participants described the childhood sport and PA experiences that influenced their current participation, and the individual factors that influence current PA participation. This theme is inclusive of two subthemes: (a) Childhood PA, and (b) Health and Wellness. The social level of BST is comprised of the people that the participant has consistent contact with and includes family and peers. To understand the influence of interactions at this level and how they influence PA participation, the participants were asked questions about the influence of family members and roommates. All participants

($N = 10$) were living away from their parents' home, as all participants reported either living with roommates or on their own. Two participants had family living in the state; however, all the participants ($N = 10$) reported that their parents were not involved in influencing day-to-day life decisions, including PA participation. Nine of the 10 participants lived with roommates and reported that their roommates did not influence their PA participation; nor did current PA participation seem to be directly influenced by recent peer or family intervention. Rather, current PA participation appears to be influenced by the PA habits established in childhood and by the participants' knowledge of the importance of PA for improving and maintaining health.

Childhood PA

Participants ($n = 9$) reported that during childhood their parents or caregivers were integral in influencing participation in PA by exposing them to PA opportunities and encouraging and supporting their participation. The participants engaged in a multitude of sport and leisure PA in childhood including, but not limited to, bowling, skydiving, swimming, basketball, football, soccer, wrestling, dance, snow skiing, and various martial arts. Only one participant, Anne, stated that PA was not important to her growing up, "I guess I wasn't into that stuff much growing up." While Anne did state that PA was not important, and she did not engage in many activities with her family as a child, she did share, "when I was little, I would play kickball with my uncle."

All participants identified a specific family member who influenced their PA participation. Mark spoke proudly about his father being a role model because he had been a college athlete, "My dad, for sure. He played lacrosse at University of Maryland." Another participant, David, described the influence of his father on getting him interested in running, "I

discovered my love for running with my dad.” In addition to fathers, other family members identified were mothers, uncles, and siblings.

Participant responses point to exposure to PA at an early age as a major factor in their PA participation as an adult. In fact, when asked if there was anything else he would like to share at the conclusion of the interview, Mark stated, “I feel like if you’re exposed to physical activity at a really young age, you’ll be doing it for a long time.” The responses of the participants with a strong PA background ($n = 9$) seem to reinforce this statement.

Another important factor shared was the social impact of PA during childhood PA experiences. For example, John participated in football and track and field as a child. He noted that while he enjoyed those experiences, he stated he had some “disagreements with people” during participation. He went on to share that as he grew older, he “enjoyed individual activities...I started learning that I liked [individual] sports, that I can kind of focus on myself, rather than focus on a team, because I like focusing on my own goals.” John enjoyed his team experiences, but as he got older, he wanted to have more autonomy over what he did for PA.

Allison also shared the negative influence of social experiences on her PA participation. She described experiencing bullying during PA, and insecurities about performing at the same level as her peers as factors that influenced her participation in sports.

I was bullied a lot when I was younger, so I tended to distance myself from people a lot... most sports include a lot of people... I ended up kind of starting to get out of it as I got older and just drawing all the time, because I didn’t feel comfortable being around people. So that was a big reason why I kind of stopped doing sports for a while.

These comments highlighted how social interaction influenced the type and frequency of participation in PA. Allison experienced bullying, which compounded the social barriers of her

neurodivergent condition and led to her avoidance of certain PA experiences that included interaction with people. In turn, she did not develop physical performance skills that would influence participation in meaningful PA into adulthood.

Conversely, some participants ($n = 3$) described social interactions during childhood PA experiences as having a positive influence on their development of PA habits, as well as their development of social skills, such as cooperation, collaboration, and leadership. For example, Jill, a multi-sport athlete discussed the support she got from coaches and teammates. When speaking/answering questions about her reasons for participating in sports, she commented, “hearing [validation] from not only just my parents—you expect to hear that from parents—hearing that from coaches or people that don’t necessarily have to say those things helped keep me keep going.” Similarly, David described his childhood sports experiences as important to his development of leadership skills:

I was a team captain, and I volunteered for leadership academies from different school districts in my area... we did team building activities. I went to elementary schools, and we helped serve food in the cafeteria. We’d spend a day with the kids, did recess and stuff with them, just talked to them, read books with them. I was involved with the sports community and volunteering to do good things.

These early experiences, whether positive or negative, directly influenced the type and frequency of PA participation in emerging adulthood. In fact, upon leaving their family home to live on their own, some participants ($n = 5$) continued engaging in the PA opportunities like those they were introduced to in childhood and adolescence (e.g., continuing to participate in cross country running because they were introduced to it as a child by their father). The

participant responses highlight the importance of exposure to PA early and often in childhood, as well as the role of parents and caregivers in shaping PA habits.

Health and Wellness

It is evident in the participant responses that those with a strong background in sports participation in childhood ($n = 9$) recognize the benefits of PA to improve their physical conditioning for improved participation in sports. However, all participants ($N = 10$) mentioned the health-related benefits of PA and sought out ways to be more active. This is evident in participant comments about their motivation to participate in PA such as those of Andrew, a second semester sophomore who identifies as having Asperger's syndrome, who shared, "This will sound really weird, but I'm trying to avoid diabetes really." Similarly, Anne was concerned with developing strength and maintaining her health, "Well, I probably need to get more exercise and improve my upper body strength. This is why I signed up for the physical training appointments." Additionally, both Anne and Andrew stated that they did not want to be a "couch potato." Another participant, Cameron, also wanted to improve his health and shared, "I got tired of looking the way I did in the last three months, so I decided to lose 25 pounds, because last semester I did not exercise whatsoever." Collectively, the participants were aware of the health-related benefits of PA and chose to engage in PA to improve or maintain their overall health.

In addition to maintaining or improving overall health, the participants indicated that they participated in PA as a means of managing the effects of their neurodiverse condition. Not all participants chose to disclose their specific diagnoses, but some ($n = 4$) reported that PA mitigated the effects of their diagnosed conditions by increasing focus, decreasing stress, and having a calming effect. For example, Jennifer, a sophomore with ADHD stated, "it [PA] helps me fight ADHD. It helps keeping my mind clear. When I don't work out, my mind is fuzzy, and

I have trouble focusing.” During his interview, Mark described having high energy because of ADHD remarking, “[ADHD] always influences me to be a little more energetic than everybody.” He shared that increased energy influenced his decision to participate in many sport and recreation activities.

Other participants described mental health and wellness as central to their PA participation. For example, Jill, a sophomore who identifies as having a learning disability, stated that “physical [activity], sports, or even just working out is how I deal with my stress. On days I don’t do anything active, I’m either in my head too much, or I’m really stressed out and short with people.” She went on to say:

I like my schedules. So, if I do something every day, every week, I know that’s one thing in my life that isn’t going to change, but it also helps me focus in class. So, my mind isn’t completely wandering all over the place.

John also recognized the effect of PA on his overall mental health and wellness. He commented, “I think it’s important because I realize it helps a lot with mental health...if I don’t work out for a long period of time, I don’t feel very confident nor do I feel very emotionally stable.” Similarly, David, a running enthusiast and former cross-country athlete, shared:

Just in general, physical activity is good for your brain. It’s good for your whole internal body and yourself. To me it’s a destressor... if I’m mentally stressed or just overwhelmed about something, I just go and run. Because it just releases all those negative things from your mind and you’re just completely clear after a run.

The statements made by these participants highlight the potential need for individuals with neurodiverse conditions to engage in PA to alleviate some of the difficulties associated with their neurodiverse condition, such as attending behaviors, executive functioning, emotional well-

being, and mental health. Collectively, the participants have knowledge of the benefits of PA and actively seek opportunities that benefit their health and overall well-being.

PA, Sport, and the College Experience

In addition to the development of PA knowledge and habits as an influence on their PA participation, several of the participants in this study ($n = 5$) shared how they perceived sport and PA to be an integral part of the college experience and valuable to their social development during their college years. Described under this theme are the subthemes of: (a) Positive Social Interactions through PA and (b) Intercollegiate Sports.

Positive Social Interactions Through PA

In general, the participants lived on or near campus with roommates ($n = 9$). However, only two of the 10 participants said that they are friends with their roommates and spend time with them socially. In fact, only one participant engaged in PA opportunities through Fitness and Recreation with his roommate. The other participants ($n = 9$) reported seeking out PA on their own or with their self-selected social groups, including significant others (boyfriend or girlfriend). The participants also reported that access to the Fitness and Recreation programs and facilities, and participation in the programs, have helped them cultivate friendships.

For many of the participants ($n = 5$), the gym and Fitness and Recreation programs provided a social space to meet up with friends to work out, take classes, and participate in or watch sports. David shared, that in the gym, he and his friends work out together and “support each other.” Andrew shared his participation in the basketball club “I was honestly recommended by a [friend]..and it was pretty fun, so I kept doing it,” and his participation in the recreational kickball program with his friends against staff from the IHENL “[Kickball] reminded me of the kickball games I used to play when I was really younger [with friends] and

also the fact that they were faculty so... it was funny to see them out there.” Another participant, William, who spoke at length about his negative high school experience and general dislike of people, shared how he had been able to develop a successful social life around the gym and while working out. His comments highlight how important the PA spaces are to him at the IHENL, “a bunch of my friends come here. Emotionally I am happy at the gym.” These comments from the participants indicate that engagement in programs at the IHENL Fitness and Recreation Center is not only beneficial for maintaining health, but also provides opportunities to engage with friends in a non-academic setting. Additionally, the Fitness and Recreation programs provided an opportunity for students to engage with friends when they attended Fitness and Recreation events as spectators and engaged in sport appreciation (i.e., understanding and valuing of sport).

Participation as a spectator is linked to increase the observer’s sense of well-being and may entice some to participate (Inoue et al., 2018; Weed et al., 2015). During the visit to the IHENL, the PI had an opportunity to attend the weekly kickball game. Students were assigned to teams with assistance from the Fitness and Recreation staff. The game occurred in the evening on a well-manicured field on campus. The staff refereed and supported student participation in the games (e.g., standing near the home plate watching to make sure the pitch/roll of the ball toward home plate stayed within 1 foot of the left and right side of the base as well as within the 1-foot zone that extends above the plate, standing in the outfield calling balls fair or foul, and retrieving balls kicked over the fence). The students participating in the game were highly engaged and demonstrated varying levels of skill. Aside from good natured ribbing about missed kicks or runners being tagged out before making it to the home plate because they did not run faster than the player who had the ball, the students were very supportive of their teammates and

the players on the other team (e.g., giving each other high fives, cheering on teammates, clapping, and jumping when someone did well). It was also noted by the PI during the game that it was well attended for a weeknight activity. The bleachers were full, and there were several students congregating in small groups near the sidelines. While spectators were observed cheering for the players, others were huddled on the bleachers around Bluetooth stereos, playing their favorite music and chatting enthusiastically. Other students were observed congregating in groups and flirtatiously chasing each other around the sidelines. It appeared that kickball is an enjoyable social experience for both the students who played the game and the students who participated as spectators.

All the participants ($N = 10$) reported becoming aware of activities through weekly e-mails from the Fitness and Recreation Department. Jill stated, “I’ve never really had an issue with getting out and being active, but they’re really good at putting out different sports for us to go do.” The participants reported that the e-mails enticed students to either watch or participate in various activities. For example, Allison, a freshman who mentioned in her interview that she has previously struggled with insecurity and being bullied, recounted excitedly that she watched her friend play pickleball through Fitness and Recreation. Allison shared, “My friend wanted me to come watch him play [pickleball]... It was interesting! I might think about trying to do some of that in the future, pick a fun sport.” Jennifer shared a similar sentiment when she thoughtfully described why she enjoys watching her friends participate at sporting events, “I can’t even explain it. So, it’s really just the joy I see in others that makes me want to go.” Based on data from participant interviews and PI observations, it appears that participating in, and watching PA is a rewarding social experience for students attending the IHENL.

For many college students, the social opportunities and community ethos that comes from participating as an athlete or supporting a school's sports team is an important part of the college experience. While the IHENL does not currently belong to a sports division or conference, the Fitness and Recreation and IHENL administration are cognizant of the positive social experiences surrounding intercollegiate athletics, and the IHENL is beginning to build more competitive athletic opportunities for students.

Intercollegiate Sport

During the pilot study, the IHENL President and the Fitness and Recreation staff shared that the IHENL has recently undertaken initiatives to participate in intercollegiate sports. At the time of this study, the IHENL intercollegiate sport offerings included golf, cross country, and basketball with documented plans to further expand the competitive sport offerings in the future. While visiting the IHENL campus for data collection purposes, the PI attended the first men's and women's intercollegiate basketball games. The IHENL does not currently have a gymnasium suitable for host sporting events and seating spectators, and therefore uses a local recreation center for intercollegiate competitions. Despite this off-campus location, the PI observed that the game was well attended by both students and staff. Like the kickball game, the PI documented students congregated around the sidelines excitedly chatting with their friends and the players as they warmed up for the game against a team from a neighboring university. Regardless of the score, the crowd from the IHENL remained enthusiastic and engaged throughout the game. Spectator games and a "senior night" ceremony, where the senior athletes were recognized lovingly by their coaches and given awards, occurred during half-time of the game. During the in-person interviews the participants were asked by the PI about the potential meaning for the school and to students to have competitive intercollegiate sports available.

Overall, the participants shared their belief that adding/having intercollegiate sport at the IHENL is a “good idea” because it provides a collegiate experience in line with what they might experience if they were to attend a traditional college. Cameron said, “I think it’s very important to solidify the idea that we are a normal college... We’re not just handing out degrees if you pay.” Other participants were enthusiastic about having the opportunity to be represented through competitive sport. Allison was thoughtful in her response when she stated “I don’t see a lot of representation for diverse students. That would be really cool to see something like that. Yeah, we’d get to do something finally. That’s awesome.” Jill, who participates on the IHENL’s women’s basketball team, discussed how the team came about and what it means to have the opportunity to participate:

I was known as the girl that played basketball with the guys. I met the coaches one day and they said, “Why don’t we just make a team?” And ever since then, it sort of gave me something to look forward to. I like being able to know that I have a team to back me up.

I can back them up. But I get to improve my skills every time I’m on the court.

Through the focus group conversations, it was clarified that many of the members of the school’s basketball team had never been a part of a team before, and some had not played basketball before attending the IHENL. To the participants this is both a positive and negative situation for the IHENL. Mark stated:

I’ve talked to [some people], they’re like, ‘Oh, I’ve never actually even participated in any sports like this.’ And the fact that [the IHENL is] a small community and they offer that to those individuals. I feel like the fact that they just offer them is pretty cool. It gives students a chance that maybe they didn’t experience in private school or high school.

Some participants ($n = 5$), while generally supportive of the idea of expanding to intercollegiate sport, expressed concern that perhaps the school does not have the means to draw the kind of athletic talent necessary to meet the level of competition that they might encounter playing against other colleges. For example, William stated,

We're such a small school, so the teams take anyone they can get, because they can't afford to turn anyone down anyway. So, our teams aren't basketball players... They're just people who wanted to play... The other schools they'd be playing against, they are bigger and can afford to turn people down. So those are real basketball players.

Regardless of these concerns, the participants indicated that they were confident that a successful intercollegiate athletic program is possible in the future. Upon taking a moment to consider his answer, Cameron stated emphatically,

If you have a student population that has been kind of stereotyped their entire lives, at least separated, being called the other... I was in a couple of special ed classes myself... and it ended up being very degrading to be away from the normal population. And here, 'we're all kinds of messed up...' We're different, we can't compete [the same way] with normal people' it's definitely a good thing and I hope they keep going with that... to be competitive with other teams from real colleges, I feel like that would be the right thing to have.

John also remained positive when he said "Overall, I think it's great. I just think it could take a while before the foundation is set. I think that [the IHENL] is heading in a great direction right now with it." The participants recognize the value of having sports opportunities at the school that are more competitive and intercollegiate. Providing these opportunities would promote visibility of the school and provide sport participation opportunities for students who

may not have had that opportunity previously. However, the students recognize that it will take time to build these programs to a competitive level.

Systems of Support and PA

Systems of Support and PA was the third theme that resonated throughout the interviews. The IHENL is designed to maximize the success of its students through academic and individual support services that meet each student's needs. One research question being investigated in this study was how those supports are implemented in a PA setting and perceptions of the students toward that support. The participants described support at different levels within the context of the IHENL, which resulted in three subthemes: (a) accessible facilities, (b) supported PA, and (c) IHENL support.

Accessible Facilities

The Fitness and Recreation gym facility and the accompanying outdoor venues were located within walking distance of the residence halls, with most of the participants ($n = 9$) living in these residence halls. It was mentioned by participants ($n = 3$) that the availability of the facilities, and that those facilities are free of charge enables them to participate in PA. For example, Anne said, "Well, I know they definitely support and encourage folks with the gym here [because] it's free access," and John said, "[They] give free sessions... So, I figured just grab the opportunity while I can." William said "[It's great] to have a free gym like this." Cameron stated, "Just the fact that they have the equipment, and I can come in anytime they're open and work out." Additionally, Participant Cameron remarked about the minimal traffic through the facility allowing him to work out at his own pace without distractions: "Usually most of the time, it's not that busy in here. Not that I ever had any issues with any other people. It's just kind of nice to be one of the only people in here." These comments from participants suggest

that the fact that the facilities are close, have space, and are free of charge contributes to their PA engagement.

Supported PA

All the participants ($N = 10$) discussed the personnel in Fitness and Recreation as a major influence on their participation in PA through Fitness and Recreation. For example, Jill who is an experienced athlete stated of the personnel “they let me do my own thing, but they are there if you need help,” Andrew appreciated demonstrations of equipment and reminders.

[Personnel] supports me by knowing I'm not really athletic or stuff like that, but he doesn't really discourage me by it. He just lets me go my own pace and he shows me what to do, and then if I forget something, he will do the exercise, and I'll remember in the back of my head, it's like, ‘Oh yeah, it's that thing.’

Anne said, “At first, I felt a little awkward. Folks are in there seem pretty strong, [but] folks have been pretty supportive.” William and John spoke about the engaging weightlifting competitions put on by one of the trainers. The participants' responses indicate that the personnel at the IHENL provide support or create programming for students based on their needs and skill level. The bespoke approach to programming allows students to become more confident to participate in PA and increases the likelihood that they will insert PA into their weekly routines

Collectively the participants shared that feeling confident participating in the activities was important to them, and that knowing that support was readily available from the Fitness and Recreation staff was influential in their decision to participate in PA. All participants ($N = 10$) reported that they tried or are interested in trying new PA now that they are on their own/at college. Additionally, all of the participants have utilized the Fitness and Recreation programs and facilities with support from IHENL staff. Participants felt that the staff in the Fitness and

Recreation Department provide valuable support and motivation for PA participation by making themselves available to instruct students on how to utilize equipment appropriately in a manner that fosters confidence and reduces fear of judgement. In doing so, the participants reported feeling empowered to seek out additional PA opportunities through Fitness and Recreation. Allison spoke about her lack of confidence and willingness to participate in fitness activities in a gym setting prior to attending the IHENL because of fear of judgement, but now felt she had access to an environment where she feels confident to try new things and participate in PA to improve her health:

I was very worried when I came here that I would be... I didn't even know how to get on the treadmill and make it work. I was worried that they were going to say stuff about that or just kind of judge me, but they were really open to me coming and really just amazing...I've been wanting to get better and just be more active for a while, but I wasn't ever able to do that because I didn't feel comfortable being around people, and I didn't know of a situation where I could go to the gym and understand the gym equipment without having someone helping me and knowing how to not hurt myself.

Similarly, Anne shared some insecurity going to use the fitness room because she did not have any prior experiences. Anne disclosed being homeschooled and that, in the past, her parents had been "kind of controlling," which contributed to her having little background in PA before coming to the IHENL. Since enrolling at the IHENL, Anne, who expressed an interest in developing her upper body strength, reported she had been taking fitness classes through Fitness and Recreation, "At first, I felt a little awkward. Folks in there seem pretty strong. I'll just say I'm a work in progress and try not to think too much into it... Folks have been pretty

supportive.” She went on to say that she would not feel as comfortable trying to access a gym in the community.

Andrew also shared having a limited background in structured sport participation while growing up. His father’s military background led to an active childhood, during which his father taught him important skills like how to run and encouraged trying new things. He reported that “there are sometimes I feel like I [can’t]...I’m not really athletic [but I] go at my own pace and [staff] shows me what to do...if I forget something, he’d do the exercise, so I’ll remember in the back of my head, like, “Oh yeah, it’s that thing.” The PI clarified that this description meant that the staff provides a demonstration to help him understand how to do the activity.

Other participants also discussed the supportive culture of the school and the supportive environment in fitness and recreation as a major factor contributing to their decision to participate in PA through Fitness and Recreation. David spoke about how the staff were always checking in with him and other students, encouraging them, and inviting them to participate in activities, “The trainers here are great and they’re always asking ‘Oh, are you going to do this fitness class?’ ... and ‘do you want to join?’ I’m glad that they’re asking.” Jill, who is experienced at working out and participating in sports, feels confident in her abilities in the fitness center, and stated “They offer help if you would like it...they watch you to make sure you’re not doing anything to hurt yourself...if you’re having a bad day and you just want to work on one specific thing, you can.” Emphasizing that the Fitness and Recreation staff let her control her own workout, while also being present to support her, staff in Fitness and Recreation have been observed by students going beyond their responsibilities and are supportive of the students’ academic progress and well-being. Mark spoke enthusiastically about the supportive staff, “They would ask students, ‘Hey, are your classes good?’ ‘Are you doing good?’” So, they would always

make sure that your academics are always doing okay.” It is clear from the responses from the participants, as well as the responses from personnel during the pilot study, that the staff involved in the development of programs for Fitness and Recreation take great care in selecting and implementing programs for the students. The perceived support in PA expressed by the participants was also observed by the PI during her visit to the IHENL wherein she observed multiple instances where staff checked in with students, invited them to try out new offerings, and encouraged them to participate in on-going programs.

The participants ($n = 9$) were most emphatic in their responses about support from the personal trainer who works in the fitness room. In addition to being a graduate of the IHENL, the personal trainer has been successful in body building competitions and has earned personal training certifications. William, a participant who made multiple mentions of his aversion to being around people, seemed to lighten and temper attitude when talking about his friends and the staff at Fitness and Recreation. In particular, he mentioned the personal trainer and how he was not only creative in setting up engaging activities for the participants, and supportive of their performance, he also goes above and beyond his role as staff member. William recounted with an ardent countenance that when the elevators broke during move-in day at the dormitories, the trainer gave up his free time to help new students carry their belongings upstairs.

While we’re talking about [him] I want to mention, when it was move-in day, the elevators were broken. I have a mini fridge, and I’m on the third floor. [He] heard that the elevators were broken from someone, and he ran over there, and he helped the people all day. I don’t know if you know about that.

Other responses about the trainer highlighted his encouragement, and student-centered approach. For example, William said, “He’s super encouraging. I can’t even count how many times I

wanted to give up, and he got a rep or two out of me;” Jennifer stated, “He’s ADHD too, and so he’s helped me figure out exercises that helps through my life. He’s super great;” and John said, “[He is] a very good motivator because he’s been in numerous bodybuilding competitions, so [he knows] the amount of prep that goes into it, the amount of dieting that goes into it, is very rigorous sometimes.” The trainer has also organized weightlifting competitions that some of the more skilled participants were excited about participating in. The trainer described these efforts to PI in conversations during the research visit, and were verified by students such as William who stated

Next weekend, there’s a little fitness competition [the trainer] does... First place would get 10 points, then 9, and then under that. And at the end they’re all tied together, and the winner wins. They’re doing this again with 12 events.

Additionally, John said, it is worth mentioning that the PI asked participants during the focus groups if it was meaningful that the trainer was also a graduate of the IHENL. While they valued the fact that trainer was a graduate, the participants indicated that it was more meaningful that he was just a “really good guy.” John did however share that it is personally encouraging to him that the trainer has “been where he’s been and walked in his shoes,” because it made him feel like “he gets it.”

Institutional Support

A unique feature of the IHENL service delivery, when compared to traditional colleges and universities, is that the IHENL is specifically designed to provide accommodations and modifications that meet individual student needs for academic, social, and behavioral development. During the pilot study the faculty and staff stated during the pilot study and during conversations while the PI was on the IHENL campus that they are well trained to support

students with diverse learning needs while striving to create meaningful post-secondary educational experience.

A key finding from this research is that students feel that they are “accepted” and treated with “empathy” across the IHENL, which affords them the opportunity to be independently successful, particularly in academics. For example, Allison, who has struggled with mental health issues in recent years, reflected upon her decision to attend this IHENL instead of a traditional college and said, “So I just thought coming here to learn about myself, learn how to learn, was really necessary at that point in time.” Similarly, Jennifer struggled in K-12 education with being bullied by peers and teachers and her decision to attend the IHENL was made when she arrived on campus and observed the empathy from both students and staff, which was something she had not previously experienced.

The empathy. My mom and I were in this cafe, and we saw a student who had a physical disability and some students stood up and said, “oh no, we'll get a drink for you.” They brought the drink over and I thought I belong here. This is where I belong. The empathy of just that one student handing a drink. I don't know why that hit me so hard, but it did.

Comments from the participants suggest that the opportunity to “learn how to learn” is something that students attending this IHENL may not have had an opportunity to develop in their K-12 experiences. For example, William was untrusting of his teachers in high school and said:

I would not feel comfortable going to office hours with any of my high school teachers... high school is a bunch of classes you had to take. So, I would go there, and I wouldn't even know what I had to know, so I wouldn't ask the right questions. Here, it's more

like... I think college is easier than high school. That's just how I'm feeling. I know what I don't know, so I can get help.

Allison added to the sentiment as she referenced struggles in school and her determination to go to the IHENL to take control of her learning. "I just thought [it was important to] come here to learn about myself, learn how to learn, that sort of thing, was really necessary at that point in time." Similarly, Cameron stated, "here, they kind of taught me how to learn sort of deal," when speaking about accommodations provided by the IHENL to support his academic success compared to what was available previously.

Participants shared how having access to supports made them feel empowered to seek new experiences or challenges, including PA. This was highlighted in the comments from Cameron, a humanities major with an emphasis in philosophy who struggled to be successful in high school due to lack of support and understanding of his dysgraphia and other processing disorders. He shared:

I had a lot of problems [when I was a kid] with transitions, going from one thing to another...I just couldn't do it. I had problems, and fits, and stuff like that...and then, when I got to high school, I still had those issues, but as things got a lot harder with my learning differences and with just going to a mainstream high school, it just kind of was draining on me, with the anxiety and depression...Towards the end of high school I was not writing at all, not even typing. Here, they kind of taught me how to learn and sort of deal. So now, I feel like I could do [traditional] college should I decide to.

Cameron went on to indicate that his anxiety and stress due to his processing differences made exercise low on his list of priorities; "So I really didn't want to work out, even though I knew that it was beneficial to do so." In further expanding on his experiences, Cameron stated:

I don't know if there's a correlation between neurodivergence and a lack of fitness. I don't know if there's no correlation or if it's a positive or negative correlation. I just know that when I was struggling in school, I didn't want to exercise because I'm struggling at school. So, it seems like the people who exercise regularly tend to have that, either they don't care as much on schoolwork, or they have it on lock.

Echoing these sentiments Mark stated that he chose this IHENL because he “suck[s] at school” but he felt that the accommodations provided by the IHENL have allowed him to be successful and that having support for academics frees him up to pursue other interests, such as PA. He said, “Supports help you get your work done, and then you can go to rec at 4:30. But the support system [at the IHENL], I would say makes it easier for students and me to attend sports.” Mark's comments about the IHENL's support system suggest that when students are provided with supports that allow them to access their academic environment successfully, it creates space in the lives of the students for the pursuit of other interests such as sports, leisure and recreational physical activities.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the PA experiences of young adults attending a college for neurodiverse learners, including (a) identifying the PA preferences and habits of neurodiverse young adults attending IHEs, (b) examining the fitness and recreation program attributes that contribute or detract from PA, and (c) identifying how IHEs can better serve neurodiverse students in their fitness and recreation programs. Based on the findings, it appears the systems present at the IHENL allowed the students to participate meaningfully in a college experience not accessible to them on traditional college campuses. The layers of support at the IHENL afford opportunities for developing academic skills, as well as independent living skills and social skills. For many students it is also an opportunity to try new things, including PA. In this chapter, the research questions were addressed through discussion of how the participants develop PA participation habits, how sport and PA offerings contribute to PA participation; and how IHEs can improve PA offerings for neurodiverse learners.

Discussion of Findings Specific to Each Research Question

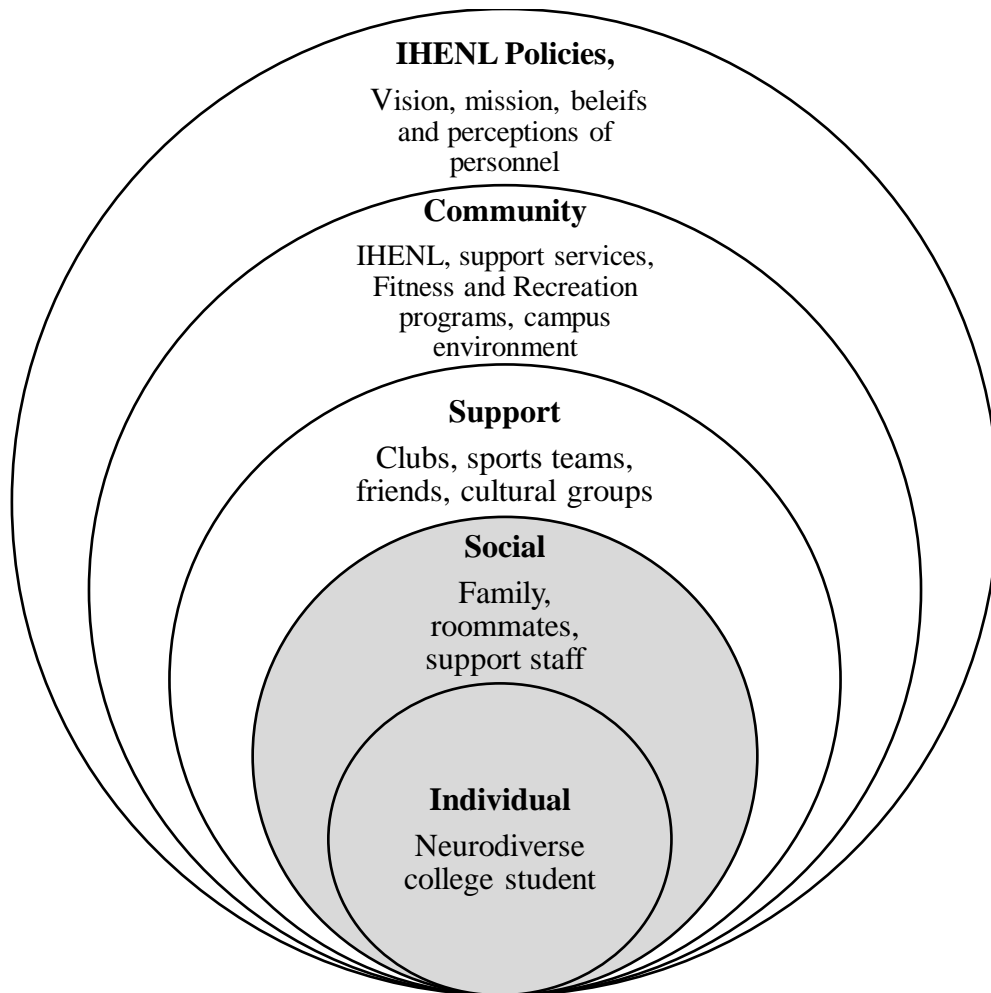
PA Preferences and Habits of Neurodiverse Young Adults Attending IHEs

According to the participants, their current PA participation was influenced by PA experiences in childhood, usually supported by a parent or caregiver, and their individual needs for health and wellness. Utilizing the reconceptualized BST used for this study, the system the neurodiverse individuals are interacting with related to development of PA habits and establishment of PA preferences begins in the Social System (see Figure 5). Development of PA habits resulting from parent and caregiver supported PA experiences (e.g., sport and leisure

activities), and the attributes of health and wellness related to neurodivergent conditions are discussed in this section.

Figure 5

Systems Influencing PA for Neurodiverse College Students Attending an IHENL



Note. Adapted from Exploring how children's relationships and environment interact to help them thrive by Center for Child and Family Well-Being, 2021 (<https://ccfwb.uw.edu/about-us/the-bioecological-model/>)

The features of the social system are family, roommates, and immediate support staff. It was determined through the interviews and focus group that while nine of the 10 participants live with roommates, few included their roommates in their social circle of friends. Additionally, though there are support staff available at the IHENL to provide more frequent individual support, none of the participants in this study utilized this type of support. Support from family was not found to be a factor influencing current PA; however, it was determined to be most influential to development of PA habits when provided during childhood and adolescence. Participants who were encouraged into sport or PA by a family member were more likely to continue to seek PA into early adulthood, and most ($n = 9$) could point to a parent or caregiver who influenced them to participate in physical activities as a child.

Parental influence on childhood PA is well documented. More specifically, previous studies have found that parental modeling and participation in PA is a significant factor contributing to levels of PA in children (Hutchens & Lee, 2018; Kohl & Hobbs, 1998; Tammelin et al., 2003; Trost et al., 2003). In an integrative review, Hutchens and Lee (2018) identified parental modeling of PA as parent practice that show the greatest promise for influencing childhood PA. The findings from the current study reinforce this, as a majority of participants ($n = 6$), not only described a family member as an influence, but also described participating in PA *with* their family members (e.g., running with their father working out in a garage gym with grandfather, playing kickball with an uncle), and shared how their parent participated in PA (e.g., Mark noted his father played college lacrosse, and Andrew noted his father's engagement in physical training in the military).

Some participants ($n = 4$), however, did not mention parental modeling of PA as an important factor in their PA development. In this study, Participants Jennifer, and Jill who are

regular participants in PA and sport, did not state that they participated with, or observed their parents being physically active. Rather it was the encouragement and commitment to accessing opportunities for PA provided by their parents that was much more enduring into emerging adulthood. This finding suggests that multidimensional factors influence PA for children to include not only parental modeling, but also childhood perceptions of self-efficacy (e.g., Allison), social emotional factors (e.g., William, Cameron, and Jennifer), and environmental factors (e.g., Mark and David). This is in keeping with findings from Trost et al. (2003), who found that parents who are informed about the importance of PA and encourage their children to be active, but are not regularly engaged in PA, can be just as effective in promoting lifelong PA participation as parents who are regularly engaged in PA.

Unlike childhood PA experiences, which are centered around school physical education, sport, and family, a young adults' pursuit of PA seems to be centered around personal physical health, mental health, and social benefits. The participants understood the benefit of being active and staying healthy. Even when they were unsure of how to utilize the equipment, as was the case for participants Allison and Andrew, the participants in this study actively sought opportunities to be physically active in the Fitness and Recreation gym space to benefit their health. This finding is encouraging given that individuals with neurodivergent conditions may experience barriers to PA that can contribute to increased risks for secondary disabilities and mortality (Cook et al., 2015; Garcia-Pastor et al., 2019; Thompson et al., 2022) In fact, studies such as the work of Garcia-Pastor et al. (2019) show that the PA levels of individuals with ASD are low compared to individuals without ASD, and continue to decline into adulthood, though there is little evidence as to why. Responses from participants in this study seem to indicate that an environment in which supports are available to address academic, social, and emotional

needs, such as those that are available at the IHENL, leave space for pursuit of PA for general fitness and social benefits. It is possible that the provision of PA opportunities in conjunction with individualized supports may enable young adults to begin or maintain PA participation.

In addition to improving physical health, participants also discussed how PA is beneficial for alleviating the effects of their neurodivergent conditions, such as ADHD and LD. Physical activity participation can be beneficial for improving executive function, concentration, mood, and mental health in children and adolescents with neurodivergent conditions, particularly ADHD and LD (Benzing et al., 2018; Ziereis & Jansen, 2015). Such benefits were reported by the participants ($n = 4$) in the current study, who described the necessity of using PA to maintain their mental health and mitigate the effects of their condition (e.g., ADHD).

Current research on ADHD suggests that adults with ADHD may differ from children in that there is a lack surveillance of their behaviors. For example, children with a diagnosis of ADHD are often monitored by parents, teachers, and behavior staff at a school. For adults, however, the behavioral expectations in environments such as workplaces or IHEs pose a challenge (Baverstock & Finlay, 2003). At the IHENL, a key feature of the supports provided involved identifying student strengths and assisting them in establishing routines. Participants ($n = 2$) mentioned that the IHENL helped them “learn how to learn,” which was verified during the focus group session to mean that students are given tools and strategies to identify areas where they need support as well as capitalize on their strengths to develop coping strategies and routines that work. When asked about how the IHENL helps him learn how to learn, John explained:

You have to take a strengths quiz, and then you get five strengths. [Then] throughout the semester you work on those five strengths and find out what you can do good with them

and find out what might be some challenges... [that] really helped. [The IHENL] really helped me on an academic level. They proved to me that I'm able to like do well academically. I've never gotten straight A's until I've gone to [the IHENL].

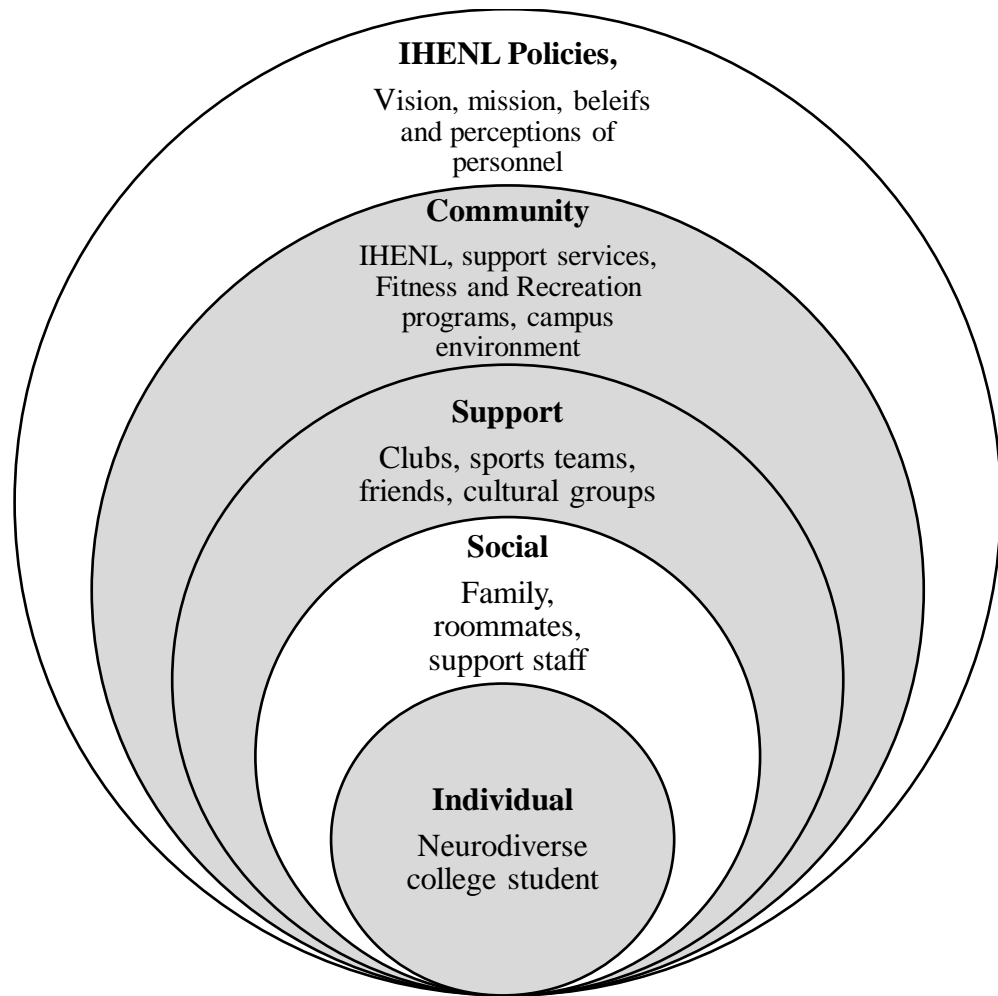
Mark and Cameron both described these supports as a major reason why they can take time to focus on PA like sports or fitness. Additionally, for some of the participants it was critical to include scheduling PA as part of those routines to ensure focus and mental health. This finding highlights the benefit of a structure such as that present at the IHENL, where young adults who may lack the requisite skills to be successful, are given resources and training to take ownership of their own behavior which can be applied to a multitude of environments and contexts including PA. Implementation of these resources and training is consistent with the work of Parker and Boutelle (2009), who examined the efficacy of executive function coaching (i.e., self-management skills, organization, time-management, planning, studying) for college students with learning disabilities and ADHD. Through qualitative research, Parker and Boutelle documented how executive function coaching helped students with ADHD and learning disabilities achieve critical competencies for goal achievement processes (2009). Over time, the participating students were also able to reflect and apply strategies themselves, resulting in the ability to set goals and successfully follow through (Parker & Boutelle, 2009). The findings described by Parker and Boutelle (2009) are similar to the current study with participants sharing how the IHENL helped them learn how to learn, or achieve control over executive functioning. This self-determination also contributes to intrinsic motivation needed to be successful in academic or other settings, such as PA settings (Field et al., 2003)

Because of the size of the school and the way resources are allocated, all sport, fitness, and PA programming as well as intercollegiate sports are overseen by personnel in the Fitness

and Recreation Department. Attributes of the Fitness and Recreation program that contributed to engagement in PA for students were the: a) use of instructional strategies for neurodiverse learners, b) cultivation of a non-judgmental environment, and c) inclusion of neurodiverse personnel. These features enabled students from all PA backgrounds to participate in meaningful PA experiences. The interaction between the individual and the support and community systems at the IHENL are depicted in Figure 6 and outlined in this section.

Figure 6

Diagram of Systems Surrounding Neurodiverse College Students Attending an IHENL



Note. Adapted from Exploring how children's relationships and environment interact to help them thrive by Center for Child and Family Well-Being, 2021 (<https://ccfwb.uw.edu/about-us/the-bioecological-model/>)

An important attribute of the IHENL that facilitated participation in PA was access—access to quality equipment and convenient access to fitness facilities are environmental factors associated with PA among adults (Glasgow et al., 2021; Wendel-Vos et al., 2007). The Fitness and Recreation gym facility and the accompanying outdoor venues were located within walking

distance of the residence halls, with most of the participants ($n = 9$) living in these residence halls. It was mentioned by participants ($n = 3$) that the availability of the facilities, and the fact that those facilities are free of charge allowed them to participate in PA.

This finding is supported by the work of Glasgow et al. (2021), who examined the utility of university fitness facilities and compared environmental and psychological factors that contribute to their use. The authors reported that the most important factors influencing participation of university fitness centers were psychological, and included previous PA experiences, and value orientations around PA (Glasgow et al., 2021). However, some environmental factors also contributed to utilization of a fitness facility on a university campus. Specifically related to the findings in this study, the authors found that convenience and monetary reasons influenced utilization of fitness facilities. The authors hypothesize that the fact that the annual fee for utilizing the fitness facility at the university where the study was conducted may entice students to use the facility to justify the charge included in their tuition (Glasgow et al., 2021). The PI did not verify whether the facilities at the IHENL were free or if the fee is included in tuition. However, the participants indicate that they use the fitness facility because it is close, and is at least, no *additional* charge to them, unlike other facilities they could access in the community.

Participant Cameron described the fact that the fitness center was quiet and not crowded as reasons he likes working out in the fitness facility at the IHENL. Contrary to this finding, Glasgow et al. (2021) used perceived “crowdedness” as a predictor for weekly attendance, but found this factor had no significance. It is possible that individuals with certain neurodivergent conditions would find “crowdedness” to be more significant, but more research is needed to verify this hypothesis.

The Fitness and Recreation Department implemented programs that were engaging to the unique student population such as kickball, self-defense, yoga, and various non-competitive club sports. Enrollment in the IHENL and its corresponding Fitness and Recreation Department programs afforded students access to personnel and programming that were tailored to address the concerns of its neurodivergent student population. The supports implemented from the administration down to the Fitness and Recreation personnel created an opportunity for students to meaningfully engage with, and flourish in contexts they may not have been successful in prior to attending the IHENL. A key feature of the IHENL Fitness and Recreation programs was the ability of personnel such as staff, coaches, and trainers to understand the unique learning needs of neurodiverse populations and employ strategies that increased access and engagement of neurodiverse students. Researchers have identified strategies to facilitate successful college transition for teens and young adults with LD including selecting IHEs with small class sizes (Skinner & Lindstrom, 2003). Other researchers have documented that individuals with LD prefer content to be delivered in audio or visual format (Heiman & Precel, 2003). During the visit to the IHENL campus the PI observed these strategies being used including in an introductory fitness class at the fitness and recreation facility, where the class size was small (10-15 students) and instruction was aided by the instructor drawing diagrams and writing out key terms on a nearby whiteboard. Checks for understanding and verbal teaching cues associated with key terms were also observed. IHENL personnel were consistently observed giving demonstrations and clear concise feedback as the participants were performing an activity. These strategies were corroborated by the participants during the interviews.

Worth mentioning is the fact that the participants who did not have a strong background in PA or sport participation emphasized how the Fitness and Recreation personnel created a

“judgement free” space where students felt like they are free to try new activities, ask questions, and make mistakes without being subject to ridicule from personnel or students. Social supports, such as those described by the participants in this study, were examined in relation to self-determination and PA by George et al (2013). In the George et al. study, social support was related to fulfillment of psychological needs such as relatedness, competence, and autonomy — all of which were described by participants in the current study. For example, Allison said:

I was very worried when I came here that I would be... I didn't even know how to get on the treadmill and make it work. I was worried that they were going to say stuff about that or just kind of judge me, but they were really open to me coming and really just amazing'...I've been wanting to get better and just be more active for a while, but I wasn't ever able to do that because I didn't feel comfortable.

Allison's sentiments highlight how the personnel provided support by making students feel comfortable and confident to access fitness equipment. Furthermore, the authors found that social support was related to perceptions of competence to participate in PA; thus creating a positive feedback loop in which the neurodivergent individual who receives social-support to be physically active, sets out to participate in PA, receives social support during PA, engages in PA successfully, and then continues to participate in PA (George et al., 2013).

These findings are important given that some participants recounted experiences of bullying or social exclusion around PA. Mentioned in the pilot study and observed during the campus visit, the Fitness and Recreation personnel avoided exclusionary practices when selecting teams for recreation activities, such as kickball. This was also a common practice when recruiting individuals to play on the competitive teams. While open participation regardless of skill level may have some negative implications for developing competitive sport teams, it does

cultivate a community of acceptance, which increased PA participation among neurodiverse students attending the IHENL. Social acceptance is defined by Devine (2004) as equal status, reciprocity, and inclusion among participants. Devine (2004), who examined the role of inclusive leisure contexts and acceptance of people with disabilities, described how access to leisure activities connected participants to their peers and their community. Furthermore, when steps were taken to ensure an inclusive environment similar to that described in their study, access to PA fostered a sense of acceptance and influenced continued participation in PA (Devine, 2004).

Specific to the Fitness and Recreation personnel, some participants pointed to the fact that the personal trainer is neurodivergent himself, and how that increased their comfort in seeking PA support from him. Seeing themselves reflected in the person providing support was highlighted in the comments of participants such as Jennifer who said, “He's ADHD too, and so he's helped me figure out exercises that helps through my life.” Similarly, John said of working with the trainer, “it is fun to see someone who like I talk to, and someone who has walked a similar path that I walked down.” Research on inclusion of racial minorities, LGBTQ, and individuals with disabilities in various contexts such as communities, higher education, media, and competitive sport suggests that visibility is a crucial component to fostering inclusion (Kolotouchkina et al., 2020; Lord et al., 2014; Waling & Roffee, 2018). Consistent with the literature, the visibility of a personal trainer who identified as neurodiverse provided the IHENL students with an opportunity to see themselves in a broader range of contexts (e.g., being a skilled mover in a variety of PA), and confidence to participate in a broader range of PA experiences (Lord et al., 2014; Waling & Roffee, 2018). It should be noted, however, that two of the three participants who discussed the neurodivergent identity of the trainer were not present

during the focus group sessions, therefore the full impact of this finding was not further elaborated on during the focus group session.

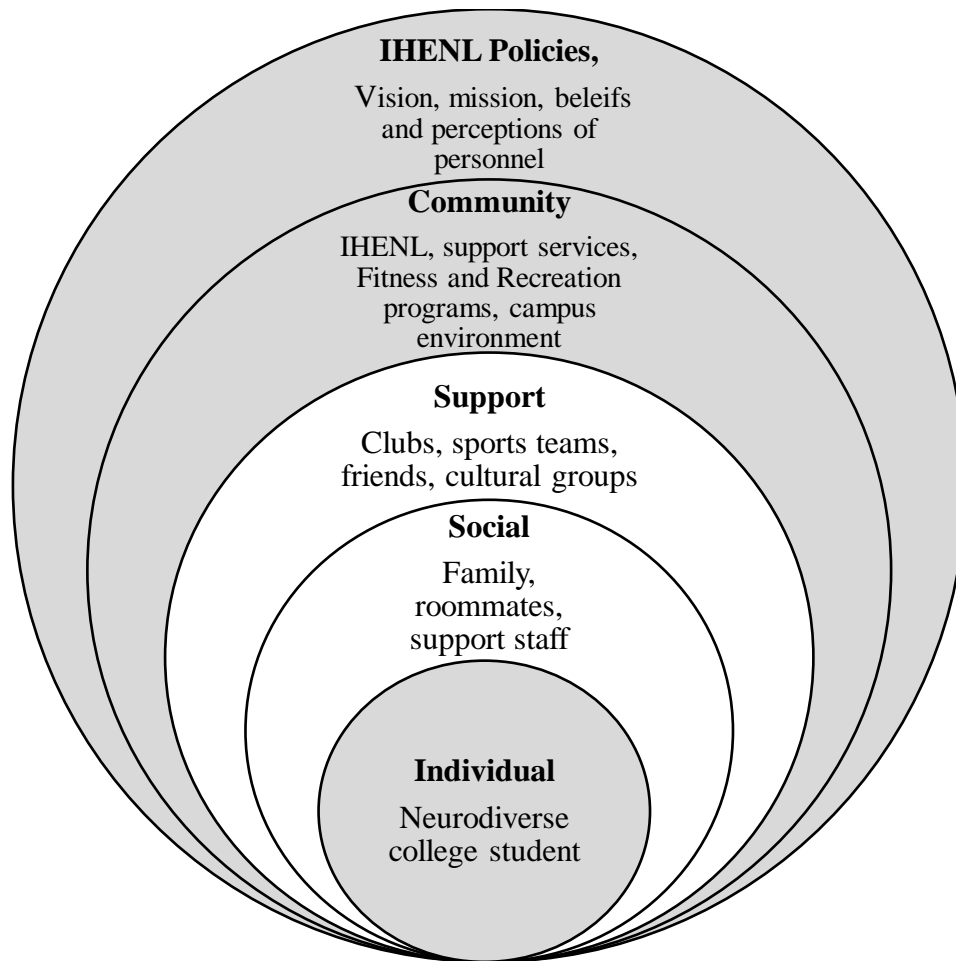
The coaches, trainers, and staff in Fitness and Recreation were a significant factor contributing to participation of neurodiverse students in PA. Through instructional support, encouragement, and mindful selection and implementation for programs, students at the IHENL viewed PA as an accessible endeavor. The attributes of the personnel and the strategies they used to engage students in PA can be emulated by traditional IHEs to improve PA offerings and increase engagement of neurodiverse students in fitness and recreation programs.

How IHEs Can Improve PA Offerings?

The final research question examined participant responses to determine how IHEs can better serve neurodiverse students in their fitness and recreation programming. Collectively the responses from the participants in this study highlight some key attributes that may be applied to traditional IHE Fitness and Recreation programs to improve access and meaningful PA participation for neurodiverse students. The interaction between the individual with policy and community levels of BST are presented in Figure 7 and outlined in these sections with suggestions based on the participant responses in this study for bolstering participation in PA by neurodiverse college students attending traditional IHEs.

Figure 7

Systems Surrounding Neurodiverse College Students Attending an IHENL



Note. Adapted from Exploring how children's relationships and environment interact to help them thrive by Center for Child and Family Well-Being, 2021 (<https://ccfwb.uw.edu/about-us/the-bioecological-model/>)

The participants emphasized the role of personnel in supporting and encouraging PA including how the personnel structured the environment, the teaching strategies used, the prompts and reminders provided, and the unique programming provided. To that end, IHEs should consider providing training and professional development for Fitness and Recreation staff

on supporting the needs of neurodiverse students specific to teaching styles and instructional strategies. Neurodiverse conditions experienced by the participants pose different challenges depending on the individual and the idiosyncrasies of their neurodiverse condition. For example, all participants experienced some degree of academic, social, and/or physical barriers, but all in varying combinations and degrees of significance. Notwithstanding, it was emphasized by the participants that direct and indirect support from personnel in Fitness and Recreation played an important role in their motivation, comfort, and confidence to participate in PA. Furthermore, the administration at the IHENL confirmed that all Fitness and Recreation personnel receive training and professional development on addressing the needs of neurodiverse students.

Research on professional development for faculty and staff at IHEs that address neurodiverse college students in PA specifically is missing from the literature. However, the feasibility of implementing such a training program specific to the needs of neurodiverse young adults in PA is supported by previous studies on self-determination theory (SDT), autonomy and motivational processes of individuals with ASD and LD (Edmunds et al., 2008; George et al., 2013; Hamm & Yun, 2018, Kusurkar & Croiset, 2015; Shen et al., 2009). Hamm and Yun (2018) suggest that practitioners can positively influence a PA environment and better suit it to the needs of individuals with ASD through the use of various teaching styles (Hamm & Yun, 2018). Further, SDT-based teaching strategies, such as autonomy support and small group teaching (Edmunds et al., 2008; Kusurkar & Croiset, 2015; Shen et al., 2009), which were observed by the PI and mentioned by the participants, have been shown to be effective in gradually increasing independence, and decreasing in external demands for neurodiverse adults (Kusurkar & Croiset, 2015; Shen et al., 2009). Specific to exercise programming, Edmund et al. (2008) suggested that

autonomy-support strategies, environment design, and interpersonal involvement provided by exercise leaders can positively influence exercise class participants.

Personnel knowledge of neurodiverse conditions, and teaching styles appropriate for neurodiverse learners can increase engagement in PA. Considering the findings of previous studies focused on improving motivation and perceptions of PA through personnel support, it follows that training and professional development targeting teaching styles for fitness and recreation personnel could improve engagement of neurodiverse students PA.

Creating Opportunities for Recreational and Competitive PA Without Skill Prerequisites

A second suggestion that was identified from this study's findings was that IHEs create opportunities for recreation and competitive PA that incorporate autonomy support strategies (Edmunds et al., 2008; Kusurkar & Croiset, 2015; Shen et al., 2009) and that recruitment for these activities is not based primarily on skill. The participants in this study had different PA backgrounds, some participants were experienced athletes while others had limited background in PA. They all mentioned how the supports provided by the IHENL allowed them to achieve academically and create space in their lives to pursue other interests and try new things, including PA. Participants like Andrew, Anne, and Allison mentioned interest in trying new PA such as pickleball, basketball club, and signing up for personal training. On the other hand, members are not recruited based on skill and many members of the sports teams, have no background in the sport they are participating in.

Comments from participants highlight the importance of providing PA opportunities to neurodiverse young adults with few to no skill prerequisites. While open participation regardless of skill level may have some negative implications for developing competitive sport teams, as was discussed by participants during the interviews, it leaves open the possibility that

neurodiverse students may be able to try and excel at new PA opportunities finally available to them in the IHENL or at IHEs that provide the aforementioned supports and foster a culture of acceptance.

These findings are significant considering that research shows that adults with neurodiverse conditions may have experienced early and/or continued barriers to PA resulting in less positive attitudes toward PA, and less behavioral control, and ease of performing PA as adults (Hillier et al., 2020). In addition, youth with ASD exhibit lower levels of PA engagement, and experience disparities in access to and engagement in extracurricular activities when compared to their peers without ASD (Pan & Frey, 2006). The authors suggested that emphasis on individual and dual activities for individuals with ASD may be preferable given the cognitive, social, and behavioral demands of team activities. This recommendation was suggested by the participants, who preferred swimming, martial arts, hiking or walking, and dance over team sports; and is reflected in PA offerings currently available and popular at the IHENL. However, the findings from this study also indicate individuals with neurodiverse conditions, including ASD, may be more inclined to participate in team sports when appropriate supports are available, demands for performance are low, and demands in academic and personal spheres are lessened. IHEs that are seeking to improve engagement of neurodiverse students should provide opportunities for students to participate in activities that are supported by personnel who have the requisite knowledge to address the needs of neurodiverse learners in PA. In addition, both traditional and non-traditional, and team, dual, and individual sport and activity offerings that are not based on athletic skill should also be considered. By offering teams sports under these conditions, individuals with neurodiverse conditions have an opportunity to feel included

through feeling confident to contribute and holding a valued role on a sports team (Spencer-Cavaliere & Watkinson, 2010).

The last suggestion for IHE's is to actively recruit and employ neurodiverse individuals in PA positions such as in Fitness and Recreation. Many of the participants in this study ($n = 6$) have a strong background in athletics and fitness. The IHENL does not currently have a degree path related to PA, but some of the participants ($n = 2$) said they might consider it if it were available. The impact of the personal trainer, as discussed, and the other neurodiverse employee and students working for Fitness and Recreation lends itself to the feasibility of success of neurodiverse individuals in PA careers. Furthermore, while not clearly defined in this study due to participant attrition during the focus groups, visibility of individuals in PA as role models for neurodiverse students, and incorporation of their perspectives into development of programs could increase engagement of neurodiverse students in PA (Kamberidou et al., 2019; McCall 2016).

Additional Noteworthy Findings

While not aligned with any of the research questions that guided this study, it was apparent from the data that the student felt empowered to seek PA or sport because the accommodations and personal support provided helped them be successful academically, which therefore made room to pursue other interests including PA. Creating space in the lives of neurodiverse students to participate in PA at an IHE begins at the policy level and is shaped by the administration's perceptions of its neurodiverse students. This finding is supported by data for Theme 3 regarding intuitional support. At the IHENL, addressing the needs of neurodiverse students by empowering students to take ownership of their own lives and teaching students to learn how to learn is encompassed by their mission statement. During the pilot study, the

personnel spoke about their commitment to serving the individual needs of their students. The personnel repeatedly pointed to the commitment and support of their university president as a major source of motivation for their own commitment to student success aligned under the school's slogan, "The Life Abundant." In the interviews conducted with student participants in this study, most ($n = 9$) were not aware of what the school slogan was, but when it was explained to them by the PI, the students collectively agreed that the personnel at the school are living up to the slogan, by providing them with opportunities to flourish academically and socially and move toward productive independent lives. The culture of the IHENL is one that normalizes support; therefore, the students' needs are not perceived as "exceptional" or "other," but are normal extensions of the college experience. Participant Cameron, a student who struggled with dysgraphia and other sensory processing issues that significantly impacted his success in high school said:

Yeah, teachers here are fantastic, very supportive, very understanding. A lot of stuff that is considered extra help in other places, it's just built into the class, so it doesn't feel like I'm any different than any other student here... there's counseling, there's a writing center which I used to use all the time to figure out how to properly do essays. Nowadays, I kind of just do it and I'm pretty good at that. Ironically, my teachers tell me I'm one of the better writers that they know.

Mark also stated, "Supports help you get your work done, and then you can go to rec at 4:30." These comments emphasize that to improve PA programs for neurodiverse students at a traditional IHE, administration should provide training and resources to support the needs of neurodiverse students in all settings. However, increasing availability of resources and training alone may not be enough to create a culture that normalizes support and allows neurodiverse

students to engage meaningfully in their academic environment. Ultimately, great care should be taken to cultivate an environment that values collaboration and mentorship (Cary et al., 2020).

Implications

The PI sought the perspective of neurodiverse young adults attending a college for neurodiverse learners regarding their PA experiences. The three research questions guiding this study were: (1) What are the PA preferences and habits of neurodiverse young adults attending IHEs?; (2) What are the fitness and recreation program attributes that contribute to or detract from PA participation?; and (3) How can IHEs better serve neurodiverse students in their fitness and recreation programs? Collectively, the responses from the participants chronicle PA experiences from childhood through emerging adulthood and emphasize critical elements in development that lead to current PA participation including childhood PA participation, and availability of supports in academic and PA environments. While IHEs are not able to impact the childhood experiences of their students, the findings do have implications for traditional IHEs and should inform how fitness and recreation programs are structured to engage neurodiverse students. Furthermore, this study highlights the ability of neurodiverse young adults to speak on their own behalf about their experiences with PA and the need for IHEs to seek out and honor neurodiverse student voice when creating programs. Finally, it is essential that IHEs normalize support for neurodiverse students to cultivate an environment of inclusion and acceptance. In doing so, neurodiverse young adults can create space in their lives to participate in meaningful PA.

Limitations

There are three main limitations to this research. The first, while it was the intention of the PI to look at how practices implemented at IHENLs can be applied to traditional IHEs to

improve programs for neurodiverse students, it should be noted that there are very few IHENLs in the United States, and that this study only examined one IHENL. It is possible the structure and implementation of programs at another IHENL would yield different responses and themes.

The second limitation has to do with the recruitment process. Recruitment materials were disseminated to students at the IHENL via e-mail; however, most recruitment occurred from flyers around the Fitness and Recreation facility. This can have the following confounding affects: (1) The students who are accessing services through Fitness and Recreation are more likely to be successfully accessing their academic environments. There may be a portion of the student population at the IHENL who are not able to successfully access PA and whose perspectives were not included in this study; and (2) The second research question for this study was intended to look at what facilitates and detracts from PA participation. The participants did not identify what “detracts” from participation in their responses and their review of the facilities, programs, and personnel were overwhelmingly positive. This could be due to the fact that participants were only recruited from Fitness and Recreation and therefore, the participants were successfully engaging in PA on a regular basis. Participants recruited from other means might not have that same experience and may have more to contribute with regard to deterrents to PA.

Lastly, attrition became an issue in the final stages of the study. Only four of the 10 participants responded to the focus group invitation. The original intention was to enrich the findings through conversations with the participants; however, because of the low numbers, the sessions served to member check the data only, and certain information from the interviews (i.e., the role of neurodivergent personnel, and trends in participant preferences for certain types of PA) were not evaluated fully. It was suggested by the personnel that this could be due to

participant anxiety over engaging with video conference software. Future, studies utilizing strategies similar to this one should employ alternative means of verifying interview data, and/or ensure the focus groups occur in person, shortly after the in- person interviews.

Conclusion

This study is one of an emerging body of research that considers neurocognitive differences and learning differences under the umbrella of neurodiversity. It is also the only study currently known to examine PA experiences of neurodiverse young adult college students. Using BST to inform development of an interview tool and interpretation of interview data, the PI was able to identify factors that influence PA participation including attributes of the systems present at an IHENL. The levels of support implemented at the IHENL are represented at the policy level but influence how the individual interacts with the community, support and social systems and create an ecology in which neurodiverse students can develop wholistically, including with PA. An unexpected yet critically important finding from this study is how provision and normalization of supports for neurodiverse students as part of an inclusive IHE culture can enable neurodiverse students to thrive in environments and contexts not previously accessible, including PA. While more research is needed that considers the perspective of neurodiverse college students specific to PA, the findings in this study serve to inform how traditional IHEs could provide Fitness and Recreation programs that are more inclusive of all students, including neurodiverse students.

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APPENDIX A

SEMI-STRUCTURED INTERVIEW GUIDE FRAMED BY BIOECOLOGICAL SYSTEMS

THEORY

R1: What are the PA preferences and habits of neurodiverse young adults attending IHENLs?		
R2: What are the fitness and recreation program attributes that contribute to or detract from PA participation?		
R3: How can IHEs better serve neurodiverse students in their fitness and recreation programs?		
System	Question	Research Question
Individual	Age	D
	College status- Are you a Freshman, Sophomore, Junior, Senior?	D
	Neurodiversity identity- Do you identify as being neurodiverse?	D
	Gender identity: Do you identify as male, female, transgender, or non-binary?	D
	Can you share with me a bit about where you grew up?	D
	Tell me about your family dynamics growing up Parents, siblings etc.	R1
	Were you physically active as a child? Tell me about that	R1
	Did being neurodivergent influence your participation in PA or sports as a child?	R1
	Were there any people in your life who influenced your participation in PA?	R1
	Is being physically active important to you now? Tell me why	R1
	Do you feel that you that you are physically active? Getting the recommended minutes of PA each week?	R1
	Do you feel that being neurodiverse influences how physically active you are now?	R1

Social	Where do you live currently?	D
	Tell me about your current living situation.	D
	1. Do you live on campus?	
	2. Do you live with roommates?	
	3. Tell me about your relationship with them	
Support	Tell me about your interactions with your family now that you are living on your own.	R1
	4. Do they live nearby? Do you do activities together?	
	Tell me about the groups, teams, clubs or faith-based organizations you are currently involved in.	R1
	5. Is PA a part of your participation in those groups?	
	Tell me about the other people you interact with on campus	R1/R2
	6. Do you interact with a significant other, life skills staff, faculty, etc.?	
	7. How do they feel about physical activity?	
	Do the life skills staff, faculty or coaches influence you to participate in PA? How so?	R2
	What activities do you participate in at the Fitness and Recreation center?	R2
	1. Do you engage in those activities alone or with other people?	
Community	2. Why did you choose that activity or activities?	
	What helps you continue to attend programs at the Fitness and Recreation center?	R2
	How do the supports available at the school encourage or limit PA?	R2
	Tell me about the staff in the fitness and recreation department. Do you feel like they meet your needs in the PA settings that you participate in?	R3
	Describe a time that the staff, faculty, or coaches at the school encouraged your participation in PA How did you feel?	R3
	Can you describe a time you felt discouraged from being physically active or engaging in programs at Fitness and Recreation?	R3

	Are you currently involved with any of the campus sports team? Tell me about that What does that participation mean to you?	R2
	Do you attend sporting events at the school as a spectator? Why?	R2
	Are there any programs or activities that you would like to participate in that are not currently offered? Tell me why you would like to have those available to you.	R3
Policy	What is your understanding of the school slogan? 1. What does that mean to you?	D
	The school is planning to expand competitive sport programs and even include intercollegiate sports. Even if you do not participate, what would sport programs mean to you? 2. How would it effect your ideas about your school? 3. How would it effect your ideas about yourself?	R3
	Do you feel that the school values PA participation? 4. Why or why not?	R3
	What could the school do to encourage you to be more physically active?	R3
	Is there anything else you would like to share with me about your PA experiences, or your PA experiences at the school?	R1,2,3
	Thank you for your time!	

NOTE: Protocol developed using modified version of The Interview Protocol Refinement Framework (Montoya, 2016)

APPENDIX B

IRB APPROVAL



Texas Woman's University
Institutional Review Board (IRB)

irb@twu.edu

<https://www.twu.edu/institutional-review-board-irb/>

January 31, 2022

Elizabeth Keener
Health Promotion & Kinesiology

Re: Initial - IRB-FY2022-175 Physical Activity Experiences of Young Adults Attending a College for Neurodiverse Learners

Dear Elizabeth Keener,

The above referenced study has been reviewed and approved using expedited review procedures on January 31, 2022 by the TWU IRB - Denton operating under FWA00000178.

Note that any modifications to this study must be submitted for IRB review prior to their implementation, including the submission of any agency approval letters, changes in research personnel, and any changes in study procedures or instruments. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All modification requests, incident reports, and requests to close the file must be submitted through Cayuse.

Approval for this study will expire on January 30, 2023. A reminder of the study expiration will be sent 45 days prior to the expiration. If the study is ongoing, you will be required to submit a renewal request. When the study is complete, a close request may be submitted to close the study file.

If you have any questions or need additional information, please email your IRB analyst at irb@twu.edu or refer to the [IRB website](#).

Sincerely,

TWU IRB - Denton

APPENDIX C

RECRUITMENT FLYER

Be a Part of Physical Activity Research!

STUDY TITLE: PHYSICAL ACTIVITY EXPERIENCES OF YOUNG ADULTS ATTENDING A COLLEGE FOR NEURODIVERSE LEARNERS

PURPOSE: The purpose of this study is to learn more about the physical activity experiences of neurodiverse young adult college students.

WHAT'S INVOLVED?

- An in-person interview with Texas Woman's University doctoral candidate Elizabeth Keener
- A focus group discussion that will be conducted over ZOOM

WHY PARTICIPATE?

- This research is intended to be published in a peer reviewed journal
- Your participation will help shape physical activity programs for neurodiverse college students
- Participation is Voluntary

Interested?

SCAN HERE!



QUESTIONS?

Contact Elizabeth Keener
ekeener1@twu.edu

There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions