

STRATEGIES TO IMPROVE PHYSICAL ACTIVITY INVOLVEMENT FOR CHILDREN
WITH EXCEPTIONALITIES: EXPLORING TEACHERS' AND PARENTS' PERCEPTIONS
AND EXPERIENCES

A Thesis Submitted to the
College of Graduate and Postdoctoral Studies
In Partial Fulfillment of the Requirements
For the Degree of a Masters in Education
In the Department of Educational Psychology and Special Education
University of Saskatchewan
Saskatoon

By

Katherine Elizabeth MacDougall

Permission to Use

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis/dissertation or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make use of material in this thesis in whole or part should be addressed to:

Head of the Department of Educational Psychology and Special Education
College of Education, University of Saskatchewan
28 Campus Drive
Saskatoon, Saskatchewan S7N 0X1

Dean
College of Graduate and Postdoctoral Studies
University of Saskatchewan
116 Thorvaldson Building, 110 Science Place
Saskatoon, Saskatchewan S7N 5C9
Canada

Abstract

In this thesis, the focus is on the specific strategies parents and educators are using to encourage children with exceptionalities, particularly children with a learning disability, intellectual disability, attention deficit hyperactivity disorder, and autism spectrum disorder, to be involved in physical activity. As defined by Caspersen et al. (1985), physical activity is any bodily movement by skeletal muscles that expends energy. Recent statistics have reported the recommended amounts of physical activity for children compared to what they are actually engaging in. The Canadian 24-hour Movement Guidelines for Children and Youth (2016) recommends that children aged 5-17 accumulate 60 minutes of physical activity per day, meaning moderate-to-vigorous physical activity involving aerobic activities, coupled with light physical activity involving a range of structured and unstructured physical activities. In comparison, a recent health report shows that only one-third of children are able to meet this recommendation (Colley et al., 2017). Further research shows that children with exceptionalities are participating in physical activity even less than children without exceptionalities, and as a result, are overweight, less physically fit, less motor proficient, fatigued, and in pain (Carlton et al., 2013; Davis et al., 2010; Frey & Chow, 2006; Frey, Stanish & Temple, 2008; Rimmer, 2005). Children with exceptionalities participating infrequently in physical activity is a major problem, as physical activity can have a key impact on the overall health and well-being of a child, designated by five health and well-being indicators: cognitive development, which includes facets such as the acquisition of reading, writing, and numeracy skills; physical health and well-being, which focuses on the absence of disease through markers such as good eating habits and having opportunities for recreational activities; social relationships, defined by the relationships that the child engages in with parents, teachers, coaches, and teachers that are close, trusted, caring, and accepting; mental and emotional health and well-being, where a child possesses characteristics such as optimism, positive self-worth, and a stability; and economic and material health and well-being, where a child has access to nutritious food, adequate housing and clothing (Canadian Institute for Health Information, 2013).

Although numerous studies demonstrate the importance of physical activity for all children, including those with exceptionalities, in relation to these five health and well-being indicators (Bell et al, 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al.

2019; Nakutin et al., 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004), there is limited current research exploring how educators and parents are engaging children with exceptionalities in physical activity (Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Walker et al., 2019). Discovering specific strategies that parents and educators are implementing on a consistent basis is a must in order to engage children with exceptionalities in physical activity and, as a result, improve their overall health and well-being.

Acknowledgements

There are a number of people who I owe insurmountable thanks to for their valuable contributions and support throughout the writing of my thesis. First, I would like to thank my thesis advisor Dr. Laureen McIntyre. For your countless discussions and revisions, as well as your patience, encouragement, knowledge, advice, and positive spirit, I am forever grateful. With your valuable insights and expertise, you pushed me as a researcher and writer, and I was able to produce a piece of work that I am truly proud of. I would also like to thank Dr. Laurie Hellsten, my committee member, for her helpful edits and suggestions.

To all of the parents and teachers who participated in interviews for my research, I am extremely thankful for your notable insights and personal stories that you shared.

Thank you to the School and Counselling Psychology program, its faculty, and my fellow classmates who supported and encouraged me throughout my time in graduate school.

Finally, I wish to thank those closest to me, my parents, sister, and husband, for their unwavering support and constant encouragement. They stood by me through it all and allowed me to achieve this goal.

Table of Contents

PERMISSION TO USE.....	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
CHAPTER 1: INTRODUCTION.....	1
Statement of Purpose.....	5
Definitions	5
Attention Deficit Hyperactivity Disorder	5
Autism Spectrum Disorder (ASD)	5
Intellectual Disability (ID)	5
Intervention.....	5
Learning Disability (LD).....	5
Physical Activity	6
Exercise	6
Moderate Activity.....	6
Vigorous Activity	6
Aerobic Activity	6
Strategy.....	6
Chapter Organization.....	6
CHAPTER 2: LITERATURE REVIEW.....	7
Children with Exceptionalities	7
Learning Disability (LD).....	7
Intellectual Disability (ID)	9
Attention Deficit Hyperactivity Disorder (ADHD).....	10
Autism Spectrum Disorder (ASD)	12
Physical Activity, Exercise, and Indicators of Children’s Health and Well-being	13
Defining Physical Activity and Exercise.....	13
Impact of Exercise on Health and Well-Being Indicators.....	15
Physical Literacy.....	15
Cognitive Development.....	16
Physical Health and Well-Being	24
Social Relationships	29
Mental and Emotional Health and Well-Being	33
Physical Activity Strategies for Children with and without Exceptionalities	41
Theories of Physical Activity Behaviour	48
Summary.....	51
CHAPTER 3: METHODOLOGY.....	54
Rationale for Qualitative Methodology.....	54
Basic Interpretive Qualitative Research	54
Participant Selection and Recruitment	57
Data Generation.....	58
Surveys	58
Interviews	59

Data Analysis.....	60
Trustworthiness	63
Credibility.....	63
Transferability	64
Dependability	64
Confirmability	65
Ethical Considerations.....	66
CHAPTER 4: RESULTS.....	67
Participants	67
"It Helps their Brain, it Helps their Body, it Helps their Mood, it Helps their Everything": Improving Children's Health and Well-Being.....	75
Cognitive Benefits of Physical Activity	75
Physical Benefits of Physical Activity	76
Social Benefits of Physical Activity	77
Mental and Emotional Benefits of Physical Activity	78
Knowing "What Makes Them Tick": Valuing Relationship.....	79
Adult and Peer Relationships	79
Understanding and Building Rapport with Each Individual Child	80
"Breaking Down Barriers": Providing Verbal Support and Feedback	81
Emphasizing Children's Achievements	82
Explaining the Benefits of Physical Activity	82
Indicating Expectation of Engagement in Physical Activity.....	83
Using Words and/or Actions to Encourage Children's Engagement.....	84
"Tapping into What They Enjoy": Finding and Promoting Physical Activities Children Enjoy.....	84
Fostering What They Love.....	84
Changing it Up	85
Providing "Different Opportunities": Improving Access to Physical Activities.....	86
Providing Opportunities for Everyone	86
Incorporating Physical Activity into the Academic Classroom	88
Providing Modifications	88
Summary.....	89
CHAPTER 5: DISCUSSION.....	91
Summary of Findings	91
Integration of Findings with Existing Literature	94
"It Helps their Brain, it Helps their Body, it Helps their Mood, it Helps their Everything": Improving Children's Health and Well-Being	95
Knowing "What Makes Them Tick": Valuing Relationship.....	97
"Breaking Down Barriers": Providing Verbal Support and Feedback	98
"Tapping into What They Enjoy": Finding and Promoting Physical Activities Children Enjoy.....	99
Providing "Different Opportunities": Improving Access to Physical Activities.....	99
Theoretical Implications	101
Strengths of Current Study	102
Limitations of Current Study.....	105
Implications for Educators, Schools, Parents, and Related Professionals.....	106

Directions for Future Research.....	107
Conclusion.....	108
Appendix A.....	110
Appendix B.....	111
Appendix C.....	116
Appendix D.....	119
REFERENCES.....	120

List of Tables

Table 4.1 Participants.....68-70

List of Figures

Figure 1.1	Children’s Health and Well-Being Indicators (CIHI, 2013)	2
Figure 2.1	Terminology	15
Figure 4.1	Themes and Subthemes	74

Chapter 1: Introduction

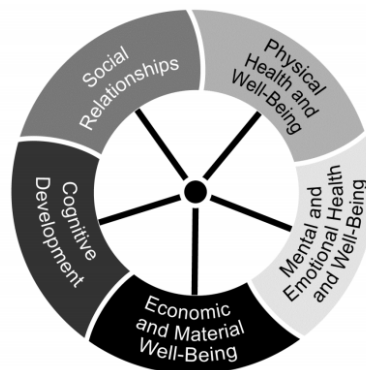
Over nine years ago, I began working at a school that specialized in supporting children with various learning disabilities, primarily dyslexia. During this time, I grew so much as a teacher. I had to continuously differentiate instruction, learn how to support children with varying disabilities and backgrounds, and understand that children and their families were coming to this school as a last resort so were often at their lowest point of self-esteem, as well as broken and frustrated. Quite quickly, I realized that children with exceptionalities require this level of support in order to be successful and I wanted to be a part of this success. From here, I transitioned into the role of learning support teacher in the public school system, as well as developed a fitness and tutoring business to support students with exceptionalities. It became very apparent to me that children with exceptionalities benefitted in numerous ways when engaged in regular physical activity. I have seen firsthand the countless benefits that physical activity has on the health and well-being of these children and believe that there are additional benefits that still may not be uncovered. I want other educators and parents to also come to recognize that physical activity in all forms is imperative for children with exceptionalities.

According to the Canadian Institute for Health Information (CIHI, 2013), there are five health and well-being indicators for children that, together, play a significant role in a child's life (see Figure 1.1). The first is cognitive development, which involves "how children perceive, think about, and gain understanding of their world" (CIHI, 2013, p. 10). Aspects of this dimension include the acquisition of age-appropriate skills, including reading, writing, and numeracy, as well as the ability to communicate needs and wants, think critically, make decisions, solve problems, and self-regulate (CIHI, 2013). The second indicator is physical health and wellbeing. This dimension begins in utero, including core aspects such as prenatal care, and then evolving to when the baby is born and includes aspects such as having a healthy weight, good eating and sleeping habits, accessing dental care, and screening for developmental, vision, and hearing problems (CIHI, 2013). As the child grows, a sense of vitality, opportunities for physical activities, and access to traditional food sources, such as whole and natural foods passed down from generation to generation, are imperative. The third dimension is social relationships and is a key health and well-being indicator for children and youth. According to the CIHI (2013), relationships with parents, peers, teachers, and coaches need to be close, trusted, warm, caring, accepting, affirming, and reciprocal in order to positively contribute to the

child's health and well-being. Opportunities must be provided to the child to develop these types of social relationships. Mental and emotional health and well-being is the fourth indicator and is multi-faceted (CIHI, 2013). This includes possessing personal characteristics, such as optimism, positive self-worth, emotional well-being and stability, as well as perceived safety and security. It also involves the ability to self-regulate. A child demonstrates this area by their ability to cope with certain challenges and stresses, and how they work towards their goals for the future. This indicator also encompasses a capacity for connectedness with other people, culture, and community (CIHI, 2013). In order to demonstrate this indicator, the child should have access to mental health treatments as well as have the opportunity to be diagnosed early, so that disorders, such as anxiety and depression, can be eliminated. The final indicator is economic and material well-being, which examines what the child has access to in terms of nutritious food, housing, and clothing. This indicator goes beyond these basics to also include access to health care, technology, and availability of physical activities, green space, and cultural activities (CIHI, 2013). For the purpose of this study, this indicator was not discussed. Numerous studies have demonstrated that different forms of moderate to vigorous physical activity can have a significant impact on a child's health and well-being, thus fulfilling each of these five dimensions (Chang et al., 2001; Gapin & Etnier, 2010; Jensen, 2000; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Yilmaz et al., 2004).

Figure 1.1

Children's Health and Well-Being Indicators (CIHI, 2013)



© Canadian Institute for Health Information. The terms of use included in this report permit reproduction of the contents of the report for non-commercial purposes.

One may be quick to assume that physical activity only focuses on the physical component of a child; however, it is important to keep in mind that a child's overall health and wellbeing consists of numerous factors. Therefore, due to widespread research indicating physical activity can have an effect on each of these components of a child, it is important that children aged 5-17 of all abilities engage in high levels of physical activity each day (Canadian 24-hour Movement Guidelines for Children and Youth, 2016). According to the latest Canadian 24-hour Movement Guidelines for Children and Youth (2016), it is recommended that children aged 5-17 accumulate 60 minutes of physical activity per day, meaning moderate-to-vigorous physical activity involving aerobic activities. In addition to this, light physical activity is also recommended each day, involving a range of structured and unstructured physical activities. It is difficult to engage all children in regular physical activity due to factors such as: high rates of obesity in children; inaccessibility, such as a lack of appropriate facilities and equipment for those with physical disabilities; lack of motivation; and lack of education, such as explaining to children and their parents the benefits of physical activity (Hwang & Kim, 2013; Koch, 2013; Mowling, et al., 2004; Ratey, 2008; Seidler, et al., 1993; Sibley & Etnier, 2003). According to Colley et al. (2017), unfortunately only one-third of children met this moderate-to-vigorous physical activity recommendation. While physical activity is key to the health and well-being of all children, in particular, physical activity has been shown to be even more essential for children with various exceptionalities (Chang et al., 2012; Gapin & Etnier, 2010; Kang et al., 2011; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Yilmaz et al., 2004). Research by Ratey (2008) demonstrated that physical activity acts as a type of medication for children with attention deficit hyperactivity disorder, perhaps not as a replacement but definitely as a complement. Ratey (2008) continued by describing areas in which children with intellectual and developmental disabilities may specifically struggle with. These include academic skills such as reading, writing, and numeracy skills, gross motor skills such as running and jumping, self-esteem such as believing in oneself to achieve certain goals, and social skills such as interacting with their peers on the playground. The author noted that physical activity does a great deal in improving each of these particular areas. However, much research continues to demonstrate that children with exceptionalities are not engaging in physical activity as frequently as other typically developing children (Carlon et al., 2013; Frey et al., 2008; Rimmer, 2005) and as a result, the prevalence of obesity is higher among these children (Chen et al., 2010). Educators and parents

are such influential people in children's lives, as well as have the knowledge that physical activity enhances a variety of these key areas of health and wellbeing in children of all abilities (Davis & Jowett, 2014; Rodrigues et al., 2018).

This leads one to ask the question which specific strategies can educators and parents implement to best encourage children, including those with exceptionalities, to be involved in physical activity? A limited number of specific strategies have been identified and studied to determine if they do, in fact, promote all children to engage in physical activity. For example, focusing on types of activities (Jensen, 2006; Mowling et al., 2004) or providing explanations as to why particular exercises are beneficial (Mowling et al., 2004; Ratey, 2008) are key strategies that can be used to promote all children to engage in physical activity. While research has been done that supports the importance of physical activity for all children (Chang et al., 2012; Fedewa & Ahn, 2001; Gapin & Etnier, 2010; Jensen, 2000; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Yilmaz et al., 2004), including those with exceptionalities, (Chang et al., 2012; Gapin & Etnier, 2010; Pastula et al., 2012; Ratey, 2008) there is limited current research exploring how educators and parents are engaging children, particularly those with exceptionalities, in physical activity (Avery, 2012; Beets et al., 2010; Bingham et al., 2010; Craig et al., 1996; Davis et al., 2010; Guidelines for School, 1997; Jensen, 2006; Koch, 2013; Mowling et al., 2004; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Rodrigues et al., 2018; Rudella & Butz, 2015; Seidler et al., 1993) and it is evident that these strategies are not proving to always be effective as children are not engaging in physical activity consistently. While this problem of children not engaging in physical activity is related to all children (Colley et al., 2017), there are studies that demonstrate children with exceptionalities participate in physical activity less frequently (Carlon et al., 2013; Frey et al., 2008; Rimmer, 2005). It's even more important that children with exceptionalities participate in physical activity as these children may have more difficulty engaging in it as frequently as typically developing children due to specific aspects such as lack of self-esteem, limited accessibility, lack of supports including trained personnel, and poor social skills (Chang et al., 2012; Gapin & Etnier, 2010; Kang et al., 2011; Davis et al., 2010; Norris & Columna, 2016; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Rimmer, 2005; Seidler et al., 1993; Yilmaz et al., 2004). Therefore, it is important to consider how parents and educators are encouraging children with exceptionalities to be more involved in physical activity using specific strategies.

Statement of Purpose

This research examined specific strategies that educators and parents used to involve children with exceptionalities, specifically Learning Disabilities, Intellectual Disabilities, Attention Deficit Hyperactivity Disorder, and Autism Spectrum Disorder, in physical activity to better support their health and well-being (Canadian Institute for Health Information, 2013). If we understand that physical activity affects numerous aspects of children's health, in particular those with exceptionalities, it is important to explore the strategies educators and parents are using to engage them. The research question that guided this study was:

What strategies have parents and educators used to engage or encourage children with exceptionalities to improve their involvement in physical activity?

Definitions

Attention Deficit Hyperactivity Disorder (ADHD)

Continuous, age-inappropriate symptoms of inattention, hyperactivity, and impulsivity that can cause difficulty in the functioning of everyday life activities (APA, 2013).

Autism Spectrum Disorder (ASD)

Significant and persistent deficits in social communication and interactive skills, as well as restricted patterns of behaviours, interests, or activities (APA, 2013).

Intellectual Disability (ID)

A neurodevelopmental disorder that advances during the developmental period and includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains (American Psychiatric Association or APA, 2013).

Intervention

Often used interchangeably with the term *strategy* and while strategies can, in turn, become interventions, an intervention is a systematic compilation of well researched or evidence based specific instructional strategies and techniques (Georgia Department of Education, 2011).

Learning Disability (LD)

Unexpected discrepancy between the child's measured ability and their actual performance in areas such as listening, speaking, reading, writing, reasoning, and mathematics (Mash & Wolfe, 2016).

Physical Activity

Any bodily movement by skeletal muscles that expends energy (Caspersen et al., 1985).

Exercise. A subcategory of physical activity; planned, structured, repetitive, and purposive in order to improve or maintain a particular component(s) of physical fitness (Caspersen et al., 1985).

Moderate Activity. These activities allow children to slightly sweat and breathe harder. Activities include bike riding, playground activities, and skating (Canadian Society for Exercise Physiology, 2019).

Vigorous Activity. These activities cause children to sweat and be ‘out of breath’. Activities include running, swimming, and rollerblading (Canadian Society for Exercise Physiology, 2019).

Aerobic Exercise. Dynamic activities that use large muscle groups, as well as significantly increase heart rate and expend energy. Examples include cycling, dancing, hiking, running, swimming and brisk walking (Canadian Society for Exercise Psychology, 2019).

Strategy

Often used interchangeably with the term *intervention*, a strategy is an instructional and behavioral practice rather than a set of prescribed instructional procedures, which are systematically implemented (Georgia Department of Education, 2011).

Chapter Organization

The remaining chapters in this thesis contain a variety of different information related to how physical activity affects children’s health and well-being, with an emphasis on those with exceptionalities. This is then followed by the central focus of implementing particular strategies which can be used to engage them in physical activity. The thesis begins with a literature review, focusing on various exceptionalities in children and how physical activity affects their overall health and well-being. This is followed by a description of the qualitative methodology, including the basic interpretative qualitative research, participation selection and recruitment, data generation and analysis, trustworthiness, and ethical considerations. Chapter four provides the results; the thoughts, perceptions, and experiences of the ten participants. The thesis concludes with a discussion, examining the strengths and limitations, the practical implications, and the directions for future research.

Chapter 2: Literature Review

The following review of the research literature examines the impact of physical activity on the health and wellbeing in all children, with a focus on those with exceptionalities. This literature review is divided into three major sections. Section one discusses the diagnostic criteria, prevalence, etiology, and assessment of learning, attention, emotional, and/or behaviour disorders relevant to the potential children under study. Section two focuses on differentiating the terms physical activity and exercise, as well as considering the impact of moderate to vigorous physical activity on the indicators of children's overall health and wellbeing and students with exceptionalities and possible strategies that can be used for children with and without exceptionalities. Finally, section three discusses research related to theories of physical activity behaviour and highlights the theory that will be used to guide this study.

Children with Exceptionalities

Numerous students today demonstrate varying social, emotional, physical, language, and academic difficulties in the classroom or have been diagnosed with a variety of exceptionalities, including those related to learning, attention, emotions and/or behaviour (Statistics Canada, 2006). An understanding of these difficulties and/or disorders is key to understanding why physical activity is essential for their development, as well as how to engage them in physical activity (Bell et al., 2019; Davis et al., 2010; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al., 2019; Nakutin & Gutierrez, 2019; Norris & Columna, 2016; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Walker et al., 2019; Wouters et al., 2019; Yilmaz et al., 2004).

Learning Disability

According to the National Center for Educational Statistics (2018), in a study completed in 2015-2016, one third of children in the United States and Canada receive special education services to aid a learning disability (LD). This is a large number, as experts struggle to identify learning disabilities in children due to their many forms and overlapping symptoms; however, this number is likely even higher as many children are undiagnosed or may not receive special education services even if they do have an LD (Learning Disabilities Association of Ontario, 2015). LD is a term used for learning difficulties that occur in the absence of other obvious conditions. According to the Learning Disabilities Association of Canada (LDAC) (2017),

children with learning disabilities have difficulty with the acquisition, organization, retention, understanding, or use of verbal and nonverbal information. Children with an LD may have difficulty with the acquisition of: (1) oral language, including listening, speaking, and understanding; (2) reading, encompassing decoding, phonetic knowledge, word recognition, and comprehension; (3) written language, focusing on spelling and written expression; and (4) mathematics, including computation and problem solving (LDAC, 2017). These skills are typically substantially below what is expected for a child's age, schooling, and intellectual ability. LD presents as having an unexpected discrepancy between the child's measured ability and their actual performance (Mash & Wolfe, 2016). For example, dyslexia is a type of LD (LDAC, 2017). Children with dyslexia are often of normal to above normal intelligence, but have significant difficulties with language, such as written output and reading abilities. In order to assist children with dyslexia in achieving their full potential, learning strategies are required (LDAC, 2017; Mash & Wolfe, 2016). These include providing the child with specific language training, focusing on phonological awareness or providing the child with tools to use, such as technology to read certain texts aloud. According to Mash and Wolfe (2016), genetics, brain function, and environmental factors can all attribute to learning disabilities; however, some of these areas are still unclear. In relation to genetics, 50% to 75% of all children with a language disorder show a family history of some type of learning disability (Mash & Wolfe, 2016). In another study by Carroll et al. (2014), overall, children with a family risk of dyslexia exhibited weaknesses in phonological processing, language and literacy, and speech production when they enter school. While it would still be beneficial to assess their cognitive abilities individually, it can be beneficial to also be informed of a child's family history (Carroll et al., 2014). In relation to brain function, children with learning disabilities have been found to demonstrate problems in the connections between brain areas rather than a problem with a specific area of the brain. In a study by Boets et al. (2013), the brains of 23 adults with dyslexia and 22 adults without dyslexia were scanned. The study examined 13 brain regions involved in language processing. In the brains of those with dyslexia, the tests revealed poor connections, and therefore faulty communication, between the auditory cortex and the area of the brain that processes language and produces speech. The poorer the connection, the worse the adult participants performed on reading and phonological tasks assigned. Finally, environmental factors, such as parental socioeconomic status and education, as well as home literacy environment, were found to be

possible contributions to a learning disability (Aro et al., 2009; Lonigan & Phillips, 2005). Not only can learning disabilities have an effect on children's learning, attention, emotions and/or behaviour, but intellectual disabilities are an additional exceptionality that can also affect these facets.

Intellectual Disability

Intellectual disability (ID) is a neurodevelopmental disorder that advances during the developmental period and includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains (APA, 2013). Three criteria must be met in order to be classified as having an intellectual disability, including: (1) deficits in intellectual functions, such as reasoning and judgment, including deciding what is right or wrong in a specific situation; (2) deficits in adaptive functioning that result in failure to meet developmental and sociocultural standards for personal independence and social responsibility, such as communicating effectively with others and independent living, such as cooking for oneself; and (3) onset of intellectual and adaptive deficits, including skills necessary to function in day to day life, such as interacting with others, during the developmental period (Mash & Wolfe, 2016). Children can be diagnosed according to four levels of severity: mild, moderate, severe, and profound. These are based on their adaptive functioning within the conceptual, social, and practical domains. For example, children with mild ID constitute the most commonly diagnosed group when classifying intellectual disability by severity (Mash & Wolfe, 2016). Children within this area often show small delays early on, such as beginning to talk at a later age or difficulty mastering tasks such as getting dressed or potty training, but often are identified during their early school years based on academic, behaviour, and social difficulties. These include low performance in subject areas, acting out, and difficulty making friends. Next, children with moderate ID are often identified earlier, usually during the preschool years, as they typically demonstrate delays in reaching developmental milestones, such as learning how to play and developing language. Children with Down syndrome often fall into this moderate level of impairment. Those with severe ID usually suffer one or more organic causes of impairment, possibly a severe head injury or extreme malnutrition. They exhibit substantial delays in developmental and physical features, such as walking, toilet training, and speech. Finally, profound ID is often identified in infancy, as there are significant developmental and biological anomalies resulting from neurological damage. They will often require lifelong care and assistance, as they often have other co-occurring

conditions (Mash & Wolfe, 2016; Purugganan, 2018). According to Purugganan (2018), ID affects approximately 1% to 3% of the population. Causes of ID are split into two categories: organic and nonorganic. Organic causes relate to the genetic and constitutional factors, such as chromosome abnormalities, single-gene conditions, and neurobiological influences, including alcohol exposure and malnutrition (Mash & Wolfe, 2016). These often lead to severe and profound ID. Nonorganic causes, all cultural-familial, include social, behavioural, and educational risk factors and are typically attributed to mild ID (Mash & Wolfe, 2016). Intellectual disabilities are not the only neurodevelopmental disorder. Attention deficit hyperactivity disorder, the most prevalent neurodevelopmental disorder in children today, can also affect children's learning, attention, emotions and/or behaviour (Feldman & Reiff, 2014; Power et al., 2017).

Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD) is characterized by consistent and age-inappropriate symptoms of inattention, such as not being able to stay focused on the speaker; hyperactivity, which could include the inability to sit still; and impulsivity, which pertains to acting before thinking, such as hitting a peer that was causing frustration (APA, 2013). These components pertaining to ADHD cause impairment in significant life activities (APA, 2013). Nine and a half percent (9.5%) of all children ages 6 to 17 years of age in the United States have been diagnosed with ADHD, and prevalence is reported to be twice as high in boys than girls (Pastor et al., 2015). In Canada, it has been reported that the prevalence of ADHD among the school-age population is 5% (Statistics Canada, 2015); however, it is difficult to determine whether ADHD is over diagnosed or under diagnosed. The disorder could be over diagnosed due to parents immediately seeking treatment with medication through physicians, or under diagnosed due to children who do not exhibit the typical symptoms not being identified (Feldman & Reiff, 2014). Although there is no known cause for ADHD, there are many possible influences and factors that may contribute to the disorder. The first highly possible cause is genetics, as numerous studies, such as those involving adoptions, twins, and specific genes, show that ADHD runs in families and is passed on through genes (Mash & Wolfe, 2016). A study completed by Faraone and Biederman (1998) demonstrated that three genes may increase the susceptibility to ADHD. These include the D4 dopamine receptor gene, the dopamine transporter gene, and the D2 dopamine receptor gene (Faraone & Biederman, 1998). Another factor that

may contribute to symptoms of ADHD is when the development of the nervous system before and after birth is compromised. These compromises include pregnancy and birth complications, exposure to certain toxins in the womb, or low birth weight (Mash & Wolfe, 2016). In a meta-analysis of 12 different studies, researchers examined the risk of very preterm and very low birth weight, as well as extremely preterm and extremely low birth weight in newborns. Researchers discovered that both of these combinations have a higher risk of ADHD; that is, 3.04 higher than the control group (Franz et al., 2018). There is also significant evidence that ADHD may be attributed to neurobiological factors. According to Curatolo et al. (2010), many structural imaging studies demonstrated differences in the brain; brains of children with ADHD were immensely smaller, as well as certain areas, such as the prefrontal cortex, basal ganglia, and cerebellum, were shown to be affected. Furthermore, emerging evidence has revealed that there is “reduced connectivity in white matter tracts” in essential brain areas (Curatolo et al., 2010, p. 1). Another major factor in ADHD is environment. In a 2005 study of 479 students in Brazil, it was discovered that family functioning was strongly associated with ADHD. Rutter et al. (1975) examined family functioning in relation to adversity events, which described specific family environment factors, including interparental discord, class, mental disorder, adoption, and criminality. Families exhibiting more dysfunction, such as violence, had 2.7 times more children with ADHD than those who functioned better (Pires et al., 2012). Finally, there has been countless controversy regarding the effects of diet, allergic reactions, and lead on ADHD. Many studies found that restricting certain foods, such as those with additives and dyes, or examining individual food recommendations, may be helpful in managing the symptoms of ADHD (Nigg et al., 2012; Schneider-Momm et al., 2018; Sharaghfarid et al., 2019). However, consuming these products does not cause ADHD. More research is required in this area. ADHD is characterized by DSM-5 (APA, 2013) as either a persistent pattern (at least six months) of inattention, hyperactivity- impulsivity, or combined. When examining inattention, six (or more) of the following symptoms must be present: fails to give close attention to details; difficulty sustaining attention in tasks or play activities; does not seem to listen when spoken to directly; does not follow through on instructions and fails to finish tasks; has difficulty organizing tasks and activities; avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort; often misplaces necessary items for tasks or activities; easily distracted by extraneous stimuli; and forgetful in daily activities (APA, 2013). With regards to the presentation of hyperactivity-

impulsivity, symptoms include: fidgeting, tapping, and squirming in seat; leaves seat when remaining seated is expected; runs about or climbs in situations where it is inappropriate; unable to engage in leisure activities quietly; acts as if driven by a motor; talks excessively; blurts out answers before a questions has been completed; difficulty waiting for their turn; and interrupts or intrudes on others (APA, 2013). Finally, when combined, children would exhibit symptoms for both inattention and hyperactivity-impulsivity. The symptoms hinder and interfere with everyday functions, such as academic performance, executive functioning, and social interactions (APA, 2013). There are no distinct physical symptoms, and the behaviour symptoms vary from child to child, often making an official diagnosis difficult (Mash & Wolfe, 2016). Furthermore, core symptoms may not always be observed within a clinical setting; therefore, the knowledge and observations of parents, educators and others are key (Feldman & Reiff, 2014; Wetterer, 2020). It may also be difficult to diagnose as other medical or psychosocial conditions may be a factor, such as sleep disorders or a type of abuse, as well as ADHD is often comorbid, presenting alongside other disorders, such as a learning disability or anxiety disorder (Feldman & Reiff, 2014; Wetterer, 2020). Feldman and Reiff (2014) recommended looking for symptoms that are severe, persistent and unexpected for the child's age or developmental level, and that there is no other appropriate explanation for the behaviour. However, children exhibiting symptoms such as inattention and difficulty with social interactions are not always diagnosed with ADHD and instead may share some similar characteristics to other disorders such as autism spectrum disorder.

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is another disorder described in the DSM-5, which is characterized by significant and persistent deficits in social communication, such as poor verbal and nonverbal communication, and interactive skills, including a lack of eye contact and facial expressions, as well as difficulties making friends (APA, 2013). It is also characterized by restricted, repetitive patterns of behaviours, interests, or activities, such as a fixation on a specific object or repetitive motor or speech utterances (APA, 2013). Children must display symptoms in both domains. Within the social communication domain, all three symptoms are required for an ASD diagnosis and include deficits in social-emotional reciprocity, deficits in nonverbal communication behaviours used for social interaction, and deficits in developing, maintaining, and understanding relationships (APA, 2013). Within the restrictive and repetitive behaviours,

there are four types of symptoms, two of which are required for an ASD diagnosis. These include: stereotyped or repetitive motor movements, use of objects, or speech; insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behaviour; highly restricted, fixated interests that are abnormal in intensity or focus; and hyperreactivity or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (APA, 2013). ASD is a spectrum disorder, meaning that its symptoms and characteristics can be displayed in many different combinations, as well as within varying degrees of severity (Mash & Wolfe, 2016; National Institute of Mental Health; 2018). While many years ago ASD was thought to be a rare disorder, it is now reported to affect 1 in 66 children in Canada (National Autism Spectrum Disorder Surveillance System (NASS) Report, 2018). Although there may be multiple causes of ASD, it is defined as a biologically based neurodevelopmental disorder (Mash & Wolfe, 2016). Genetic influences include specific chromosomal and gene disorders, family and twin studies, and susceptibility genes (Mash & Wolfe, 2016; National Institute of Mental Health; 2018). How a child interacts with or adapts to the environment can determine the developmental pathway that a child with ASD will follow (Mash & Wolfe, 2016). Differentiating between physical activity and exercise, as well as presenting the indicators of children's health and wellbeing in relation to different exceptionalities, also need to be considered. For the purposes of this literature review, the exceptionalities of LD, ID, ADHD, and ASD will be discussed as they are found to be prevalent amongst school aged children in Canada (Statistics Canada, 2006).

Physical Activity, Exercise, and Indicators of Children's Health and Wellbeing

The terms physical activity and exercise are often used simultaneously despite having some differences (Caspersen et al., 1985). In this section, these terms will be defined for further clarity throughout this research. As well, this section will discuss the impact of moderate to vigorous physical activity on the indicators of children's overall health and wellbeing, specifically cognitive, physical, social, and mental and emotional. Finally, possible strategies to engage children with and without exceptionalities in physical activity will be considered.

Defining Physical Activity and Exercise

While physical activity and exercise have many common elements and are often used interchangeably, it is important to define each separately to fully understand each term for the purpose of this research. Physical activity is defined as "any bodily movement produced by

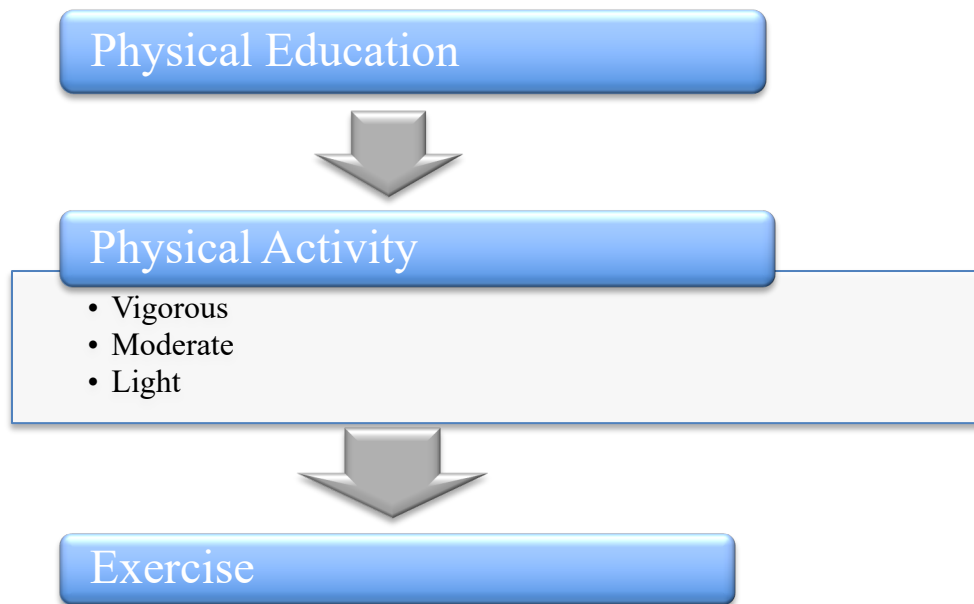
skeletal muscles that results in energy expenditure” (Caspersen et al., 1985, p. 126). Physical activity is performed in order to sustain life and the type of physical activity will vary from person to person. Physical activity includes exercise, as well as other activities, such as playing, working, active transportation, household chores, and other recreational activities (World Health Organization or WHO, 2019). Exercise, on the other hand, is a type and subcategory of physical activity that is “planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is an objective” (Caspersen et al., 1985, p. 128; WHO, 2019). For example, sports such as soccer and football, as well as conditioning, such as weight training, are all forms of exercise. Both physical activity and exercise involve bodily movement via skeletal muscles, result in energy expenditure that varies from low to high and are positively correlated with physical fitness (Caspersen et al., 1985).

In relation to both physical activity and exercise, it is of importance to also address and define the term physical education. According to Johnson and Turner (2016), the first definition of physical education presents as a class or series of classes as a component of the K-12 school curricula that specifically work to have students become physically educated. However, Johnson and Turner (2016) challenged this definition, stating that it is one that is simply used in “everyday communications” when referring to physical education as a class (p. 10). Instead, they proposed that a second definition of physical education be used: that physical education is defined as a process or an occurrence. It is important to recognize that physical education can occur in many different places and in the presence of many different people (Johnson & Turner, 2016). While this research referred to meeting the Society of Health and Physical Educators (SHAPE) America National Standards for K-12 Physical Education, many of these standards are similar to the five health and well-being indicators established by the Canadian Institute for Health Information, such as physical education not only including the *physical* aspect, but also stressing the importance of addressing components such as the social and emotional well-being of the child too (SHAPE America, 2018).

For the purpose of this research, the term *physical activity* will be used throughout. When the child engages in physical activity, it may involve exercise, but it could be any activity that involves bodily movement and that promotes being active and getting moving (Caspersen et al., 1985). In this research, physical education will be used as the umbrella term over physical activity, followed by exercise (see Figure 2.1).

Figure 2.1

Terminology



Impact of Physical Activity on Health and Well-Being Indicators. This sub-section examined the impact of moderate to vigorous physical activity on the indicators of children’s overall health and well-being, with a focus on students with exceptionalities. The indicators of children’s overall health and well-being discussed in relation to physical activity include cognitive development, physical health and well-being, social relationships, and mental and emotional health and well-being (CIHI, 2013). However, after completing my research, let’s first consider what is physical literacy, its importance in getting people involved or engaged in physical activity, and why it is vital for educators to foster its development in their students, as it seems like a more encompassing term than physical activity, given the strategies mentioned by both parents and teachers.

Physical Literacy. Physical literacy, or “the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life” (The International Physical Literacy Association, 2017), is viewed not as a state that is eventually reached and then persists onward, but instead is viewed as a journey that is unique to each individual. Physical literacy is vital in getting children to participate in physical activity as the key components of motivation, confidence, competence, knowledge, and

understanding will more likely keep them engaged. As an educator or a parent, their role is in supporting children to provide experiences that enable them to make individual progress. In order to do this, the two most important components of physical literacy, motivation and confidence, must be fostered to ensure the adoption of physical activity as a key element for the rest of their lives. It is important to note that physical literacy cannot be taught; rather, educators and parents can plan, guide, and support the child's involvement in experiences that are rewarding, meaningful, and develop self-esteem and self-respect (Whitehead, 2013).

Cognitive Development. The health and well-being indicator with the largest amount of demonstrated research in relation to physical activity, including children with and without exceptionalities, is cognitive development (Chang et al., 2012; Gapin & Etnier, 2010; Nakutin et al., 2019; Pastula et al., 2012; Ratey, 2008). Database searches of Sage Journals, ProQuest, Research Gate, and CRKN Oxford University Press, years 1990 to 2021, were used, focusing in on the key search terms physical activity, cognition, exceptionalities, children, learning disabilities, intellectual disabilities, ADHD, and autism resulted in research articles focused on cognitive development and physical activity. Additional studies were also located within studies that were found through these databases and keywords used. The following five research studies from the United States and Taiwan that considered children with exceptionalities should be looked at in more detail since they provided relevant information pertaining to the topic, were considered current research as they were completed in the last 15 years, and included the four different exceptionalities that this research focused on. One of the leading experts in recognizing the importance of regular physical activity for both adults and children, and its benefit on brain function in children is John J. Ratey, a well-known doctor of medicine in psychiatry, and a professor at Harvard Medical School (Ratey, n.d.). In Ratey's book *Spark* (2008), he presented a case study on Naperville Central High School in Chicago, which started a fitness program called Zero Hour PE to frame his review and discussion of current research literature. Ratey (2008) described how he developed a fitness regime in which a group of freshman students, who were academically low particularly in reading, participated in an hour of vigorous, aerobic activity before school began. The program focused on teaching fitness instead of sports, hoping that students would develop lessons that would serve them in creating long-lasting, healthy lifestyles, fostering this idea of physical literacy. They were required to elevate their heart rate and have it stay between 80 to 90 percent of their maximum heart rate. As evidenced by student scores on

the Nelson-Denny reading test (Brown et al., 1993) taken at both the start and end of the school semester, this group of students improved their reading and comprehension by 17 percent compared to the other students who opted to sleep in and take standard physical education. Ratey (2008) considered the positive results of this practice example with his own research in neuroscience. He referred to a study completed by Cotman and Engesser-Cesar (2002) that stressed that physical activity promotes biological changes that encourage brain cells to bind together, and, in order for the brain to learn, these connections must be made. One of Ratey's (2008) well-known quotes from his book *Spark* that emphasized the importance of exercise in learning stated "Exercise provides an unparalleled stimulus, creating an environment in which the brain is ready, willing, and able to learn" (p.10). Ratey (2008) continued on to describe the notion that physical education does not take away from academics but rather enhances it.

Ratey's (2008) case example was particularly valuable in that he actually had the students elevate their heart rates to stay between 80-90% of their maximum heart rate. This was direct evidence that the students were working at a moderate to vigorous activity level, demonstrating that working at this level of intensity may be key to improving cognition. Some limitations of his example were that, while it did state that the fitness program is an hour in duration, it was not clear whether or not the students spent the entire time at 80-90% of their maximum heart rate. Furthermore, there was the potential role of other factors, rather than simply the component of physical activity contributing to the cognitive improvements. For example, the gender of the participants (i.e., may be different gender differences in cognitive development rates), the environment in which the intervention took place (i.e., a quieter, stress-free environment may have contributed to cognitive improvements), and the health of the participant (i.e., nutrition and other health concerns may contribute to cognitive development) were not examined but could have possibly interfered or contributed to participants' cognitive improvements (Gerdes et al., 2013; Lassi et al., 2017; Levine & Munsch, 2019; Ross & Zaidi, 2019).

A study completed by Pastula et al. (2012) examined if moderate-intensity exercise training can improve cognitive function in young adults with intellectual disabilities (ID). The objective for their research was the fact that many young adults with ID would like to be independent; however, given their poor health and cognitive functioning, they struggle to achieve success as they transition into adulthood (Pastula et al., 2012). The research methodology was clearly identified by the authors, stating a quasi-experimental design to conduct their study, meaning

they tested the young adults before and after the eight-week exercise intervention. Fourteen volunteers, nine of which were men and five of which were women, were chosen from a school specializing in working with students with ID. After receiving consent from their parents/legal guardians, their cognitive abilities were assessed using three subtests from the Woodcock-Johnson III Tests of Cognitive Abilities (Woodcock & Johnson, 1977; Woodcock, et al., 2001). Thoroughly describing how the subjects were selected and explaining that they were chosen appropriately by obtaining approval from parents/legal guardians is a strength of this study. All three tests examined processing speed, and included a visual matching test, a decision speed test, and a pair cancellation test. Their fitness was also assessed prior to the intervention using the Young Men's Christian Association (YMCA) step test. This involved having each student step up, alternating feet, onto a platform that is 12 inches above the ground. The student continued to step up and down for three minutes and then their pulse was taken. The participants had an average heart rate of 145 beats per minute after performing this exercise, which is in the range moderate-intensity exercise training of 60-70% of their maximum heart rate. After undertaking both the cognitive and fitness pretests, the fourteen young adults participated in an eight-week exercise intervention. Sessions ran 45-60 minutes, three times a week, at the same time each day. Each session included a combination of resistance training in the form of a circuit and aerobic exercise through some sort of sport activity, such as a volleyball or basketball game, relay races involving multiple motor skills like lunging and punching, as well as dance marathons. One of the most important components to fulfill this study was that each participant had to raise their heart rate to between 60-70% of their maximum heart rate and keep it within this range by consistently moving, as this range is defined as moderate-intensity. Finally, after completing the eight-week intervention, students retook both the cognitive and fitness tests in order to measure their progress.

The authors expected to evaluate the effect of a strict moderate intensity aerobic exercise training regime on the cognition of young adults with ID, as no previous studies had examined this. The methods used to measure the results of the participants were clearly defined. They also mentioned their reasoning behind choosing subjects at that particular age (approximately 19.4 years of age), stating that this is a transitional time in their lives and the predicted occupations that they choose will likely involve physical labour and repetitive tasks. However, this age group is outside of the school range of 5-17. It would be beneficial to have some additional research

focused on this age group, specifically for parents and teachers to use. Another limitation of the study related to the methodology was the types of measures used. While using a standardized test is beneficial in that it allows for accurate results, a variety of standardized tests, not solely the Woodcock-Johnson III tests (Woodcock & Johnson, 1977; Woodcock, et al., 2001), could have been used. This would potentially allow for a better-rounded set of results. Furthermore, other studies mentioned measuring IQ whereas this study did not; to fully compare results of studies, it would have been beneficial to measure similar aspects of cognition, such as IQ. Finally, with regards to limitations within the methodology, the authors did not include a control group. The omission of this may have accounted for skewed results, due to the Hawthorne effect, which refers to the increase in performance of individuals who are being studied by researchers (Landsberger, 1958). Having a control group would have allowed for researchers to determine if the positive results were due to the participants modifying their behaviour from the increased attention of being observed (Pastula et al., 2012).

Overall, the study demonstrated some notable results and met the purpose and objective intended by the authors. Throughout the intervention period, adherence to the training program was 100% and many participants noted these exercise sessions as the “highlight of their week” (Pastula et al., 2012, p. 3446). Overall, participants met the criteria of keeping within the range 60-70% of their maximum heart rate, with the average participant meeting 68% of their maximum heart rate. There was also a 17.5% increase in their aerobic fitness demonstrated from their baseline to post testing. Furthermore, there was a significant improvement in cognitive function and processing speed, as shown by the three completed Woodcock Johnson III tests (Woodcock & Johnson, 1977; Woodcock, et al., 2001). While many factors attribute to the conclusion that exercise training at a moderate intensity (between 60-70% of the maximum heart rate) can improve the cognitive functioning of young adults with ID, there is potential bias that exists with the study being conducted over such a short period of time. For instance, as evidenced by such a substantial improvement in cognitive function in such a short time period, this may once again be a result of the Hawthorne effect. Participants may have altered their responses in the Woodcock Johnson III tests (Woodcock & Johnson, 1977; Woodcock, et al., 2001) due to being aware of being observed. Although additional research is required to understand exactly why these gains were made with regards to cognitive functioning, including studies with a longer time frame, Pastula et al. (2012) suggested that they are likely attributed to

exercise-induced neuroplasticity. Pastula et al. (2012) stated that “Brain-derived neurotrophic factor (BDNF) is thought to be a key mediator of exercised-induced neuroplasticity (10), and in both human and animal models, exercise of low to moderate intensity is sufficient to produce a large upregulation of BDNF” (p. 3446).

According to numerous studies, it was clear that children with ADHD were consistently performing poorly on executive function tasks compared to those children without ADHD (Lambek et al., 2011; Re et al., 2015; Willcutt et al., 2005). Therefore, Gapin and Etnier (2010) conducted a study to focus on the effect that physical activity may have on executive function performance in those with ADHD. The study included 18 boys ranging from 8-12 years of age, all diagnosed with ADHD and taking medication to help with their ADHD. The study assessed moderate to vigorous physical activity over a period of 7 days using an accelerometer, which accumulated their moderate to vigorous activity time from when the child woke up to bedtime, as well as a daily physical activity log. Then students were required to participate in four different executive functioning measures, including inhibition, planning, working memory, and processing speed. These four measures are some of the key components to overall standard executive functions. Statistical analyses were conducted using SPSS 16.0 and descriptive analyses were performed on both the moderate to vigorous physical activity as well as the executive functioning measures. Separate regression analyses were used with moderate to vigorous physical activity as a predictor of each executive functioning outcome. The authors noted that, because this was the first study conducted on this topic, adjustments to alpha were not made and effect sizes were only given to guide future research in this area. The results indicated that moderate to vigorous intensity physical activity was a significant predictor of performance in planning as assessed by the Tower of London Total Move Score and Total Execution Time (Culbertson & Zillmer, 2005), which requires the child to copy a modeled pattern of three coloured beads and assesses how many moves they make and how long it takes them to complete the task (Gapin & Etnier, 2010). Furthermore, the results indicated that the other executive functioning measures, including inhibition, working memory, and processing speed, were positively associated with moderate to vigorous physical activity. This was indicated by tasks such as the Conner’s Continuous Performance Test (Conners, 2004), the Digit Span subtest of the WISC-IV (Wechsler, 2003), and the Children’s Colour Trails Tests 1 and 2 (Llorente et al.,

2003), alluding to the fact that higher physical activity may be positively associated with better executive functioning performance in children with ADHD (Gapin & Etnier, 2010).

This study was beneficial in that it examined some of the key areas of executive function, as well as focused specifically on children with ADHD. One limitation was that, although the researchers stated their reasoning for only including boys in their study based on the higher prevalence of ADHD in boys, this study was limiting as the data could not be used as a reference in many situations. Moreover, all of the participants were medicated for their ADHD. Therefore, it was not clear whether or not their medication had some impact on their performance on the executive function tasks as well as the exercise. It would be beneficial to conduct further research on children with ADHD not on medication to see if exercise alone can improve executive function and other cognitive functions. It would also be beneficial in future studies to examine other areas of executive function, including task initiation and organization. Executive functioning is such a vast category, so improving in solely one or two areas may not demonstrate an improvement in overall executive functioning. Finally, this study was not specific in terms of the intensity of the exercise. This is important, as engaging in vigorous aerobic activity compared to light activity could potentially alter the results of the child's improved cognition. The accelerometer as well as the daily physical activity log simply tracked the duration and frequency that the children engaged in exercise.

Ratey (2008) also continued his research to include the benefits of physical activity on cognition in students with particular learning needs, such as attention deficit hyperactivity disorder (ADHD). One of Ratey's patients, Jackson, age 15, began seeing him for anxiety that was heightened by his ADHD. Throughout high school, he struggled academically as well as with executive functioning, barely passing his classes, even though he was on numerous medications and actually quite bright. After graduating from high school, he started running. He was immediately hooked, not because of how it was changing his body physically but because of the therapeutic effect it had on him. His 1.8 GPA in high school changed to a 3.9 in his first semester in college, and Jackson attributed much of this change to the physical activity, as he had in fact stopped all his medications. Ratey (2008) suggested that in most cases, while exercise can assist in treating ADHD, it should not replace the medications and Jackson's case is quite unique.

Ratey (2008) provided a very personal story to demonstrate the benefits of physical activity for someone with ADHD, and this can be extremely effective. As alluded to by Clandinin and Caine (2013), the centrality of relationships between the researcher and the participant are integral to useful and reliable research. However, this study provided the limitation of other factors, not just exercise, interfering with the results of improved academics. It was difficult to determine if it was the exercise affecting Jackson's improvements in academics and focus rather than other factors, such as the environment or educational techniques. This limitation was present in other studies as well, including the study by Pastula et al. (2012) and Gapin and Etnier (2010).

Another study conducted by Chang et al. (2012) also centred on children with ADHD, and if acute aerobic exercise had a positive effect on executive functioning. In the study, 40 children with ADHD either performed a moderate intensity aerobic exercise for 30 minutes or watched an exercise related video. Neuropsychological tasks, including the Stroop Test (Stroop, 1935) and the Wisconsin Card Sorting Test (WCST) (Grant & Berg, 1981), were given both before and after each session. Improvements in areas in both of these tests were demonstrated, whereas no influences were noted in the performances of the children watching the video (the control group). The study led to the major conclusions that exercise allocates attention resources, as demonstrated by the Stroop Test, where participants had to identify colour names as quickly as possible. This test decreases inhibition control, which is an executive function that children with ADHD often show difficulty with (Chang et al., 2012). The study also led to the conclusion that exercise influences the dorsolateral prefrontal cortex. This is an area of the brain in which children with ADHD often have dysfunction, and it is responsible for executive functioning. The study showed that there was an increase in activation of the dorsolateral prefrontal cortex when the WCST test was performed, one of the most widely used tasks for executive function (Chang et al., 2012). Finally, the study shows an implication in exercise-induced dopamine release. Dopamine release regulates brain processes for movement, pleasurable responses, arousal, emotions, and cognitive functions.

The study by Chang et al. (2012) involved children with all types of ADHD (inattentive, impulsive, or combined), as well as both males and females with a wide range of ages (started with 8-15 years of age but ended up with 8-13 years of age). Heart rate monitors were also used to gather more precise measurements of if, and when, the children reached a particular range of

heart rate. However, the type of exercise that the researchers had the children engage in for the 30-minute duration was simply running on a treadmill. One had to question whether the children were motivated to participate in this, as well as whether having the children continue to engage in simply running on a treadmill was sustainable. Perhaps another sort of exercise that children would typically engage in should have been chosen, as this would have been a better indicator for people to refer to and use in the future.

A study by Nakutin and Gutierrez (2019) examined the effect of physical activity on academic engagement and executive functioning (EF) in children with ASD. Welsh and Pennington (1988) define EF as the ability to maintain appropriate problem-solving techniques in order to reach a goal. EF contains specific cognitive abilities, such as planning, prioritizing, working memory, and flexibility (Ozonoff & Strayer, 1997). Previous research has demonstrated that physical activity had been found to decrease maladaptive behaviours and increase desired behaviours (Griffin & Autism Focused Intervention Resources and Modules (AFIRM) Team). However, Nakutin and Gutierrez (2019) wanted to determine the effectiveness of physical activity as a school-based intervention, as well as examine the executive functioning piece specific to students with ASD. Three students, two males and one female aged 6-7 years old, with a diagnosis of ASD jogged for 12 minutes with walk breaks when necessary, followed by a five-minute cool-down. Students were then observed in their classrooms for 15 minutes after completion of the physical activity, with the observer using the Behavioural Observation of Students in Schools (BOSS) (Shapiro, 2003, 2011), looking for either engaged time or nonengagement (Nakutin et al., 2019). Engagement could either be considered active or passive. They also examined inhibition and working memory in terms of EF. Inhibition was measured through an online task in which participants were instructed to click as quickly as possible on solid green dots and not click on patterned green dots. Working memory was measured by stating digits both forwards and backwards. In order to evaluate the effectiveness of the jogging intervention, visual inspection and Tau-U effect size (i.e., to characterize the extent to which sample results diverge from expectations identified in the null hypothesis) was calculated (Kline, 2004; Vannest et al., 2016). In terms of visual inspection, researchers examined patterns of level, trend, variability, immediacy of the effect, and consistency of data patterns across similar phases. Tau-U provided further information about how effective physical activity was on a student's academic engagement time. Nakutin and Gutierrez (2019) determined physical activity had a

large immediate effect on academic engagement, however, it was not found to influence EF, as measures were given pre and post-test rather than directly after a physical activity intervention.

This study focused specifically on children with ASD, which is currently an under researched population in relation to physical activity as a school-based intervention (Nakutin & Gutierrez, 2019). As well, it focused on a specific younger age group (ages 6-7), which is important to note as the other studies within the realm of cognition mainly focused on adolescents (Pastula et al., 2012; Ratey, 2008) or had larger, older age ranges (Chang et al., 2012; Gapin and Etnier, 2010). The study used a multiple-baseline, single case design and included methods of making observations, using online measures, and a questionnaire. One potential limitation was that the researchers did not account for the participants' individual differences (e.g., severity of ASD) which could have influenced their interpretation of the results (McCoy, 2016). Also, the length of time required for exercise to have an effect on academic engagement is something that would be important to note in this study but was not investigated.

After examining each of the studies that were reviewed in this chapter related to physical activity and cognitive development, there were some potential gaps discovered in the research. First, none of the studies mentioned how they encourage children to be involved in physical activity. This involved two components: first, did the children willingly engage or become involved in all facets of the physical activities being offered, and second, were strategies provided for particular children in order to make their participation successful? Furthermore, the research studied in relation to cognitive development solely focused on moderate to vigorous intensity. There was limited research provided that focused on physical activity in the light to moderate range, and how this affects cognitive development. Finally, limited Canadian data was presented, as demonstrated with these five studies from the United States and Taiwan. These factors, strategies to engage children in physical activity, light to moderate intensity of physical activity, and Canadian data, would be interesting to pursue further to see if the research results would change. Not only can engaging in physical activity promote a child's cognitive development, it can also promote a child's physical health and well-being.

Physical Health and Well-Being. Engaging in physical activity can also promote one's physical health and well-being, the second health and well-being indicator for children according to the Canadian Institute for Health Information (CIHI, 2013). Children with exceptionalities often face challenges of obesity, inactivity, muscle weakness, decreased strength, and the

inability to perform daily living activities (Fedewa & Ahn, 2011; Obrusnikova & Cavalier, 2011; WHO, 2003). Thus, their participation in physical activity is even more imperative than children without exceptionalities as physical activity has been demonstrated to aid in these factors (Fedewa & Ahn, 2011; Obrusnikova & Cavalier, 2011; WHO, 2003). Database searches of PubMed, Springer Link, and Research Gate, years 1990 to 2021, were used, focusing in on the key search terms physical activity, health, well-being, exceptionalities, children, learning disabilities, intellectual disabilities, ADHD, and autism resulted in research articles focused on physical health and well-being and physical activity. Additional studies were also located within studies that were found through these databases and keywords used. The following six research studies from the United States, Netherlands, and Turkey that considered children with exceptionalities should be looked at in more detail since they provided relevant information pertaining to the topic, were considered current research as they were completed in the last 15 years, and focused on children with exceptionalities, including two of the four this research focused on. According to the study completed by Pastula et al. (2012), not only was an increase in cognition noted, but there was an increase seen in the participants' aerobic fitness; the average maximum heart rate was 68%, which is within the moderate-intensity exercise range of 60-70%. A total increase of 17.5% in aerobic fitness was noted, starting from the first testing at the beginning of the study to the assessment at the end. The study by Pastula et al. (2012) demonstrated some beneficial results in terms of physical health and well-being for children as it includes an average maximum heart rate for the participants. This showed that participants need to achieve a certain range of intensity (60-70% of their maximum heart rate) in order for their physical health to be affected. On the other hand, when examining the fitness test, participating in step-ups for three minutes does not adequately provide evidence that fitness has or has not improved, especially when participants had been participating in resistance training exercises as well. The fitness test needed to account for this, and test both aerobic exercise and resistance training separately.

Another study by Yilmaz et al. (2004) focused on children with ASD and demonstrated improvement in the subject's physical health. In this single-subject research, the study examined the effects of swimming training on specific motor skills, such as balance, grip strength, and muscle strength, using a variety of tests related to physical fitness, such as a standing broad jump and muscle strength, as well as a checklist. The subject was nine years old. Improvements in all

of these motor skill domains were noted following the swimming training. These researchers also examined the effects of exercise on a range of motor skills. It was also one of the few that studied children with ASD. Finally, the case study methodology was beneficial in that allowed for an in-depth, close approach.

Next, according to numerous studies, children with a developmental or intellectual disability, including ASD, are more likely to report sleep problems (Bartlett et al., 1985; Quine, 2001; Wachob & Lorenzi, 2015). In a study conducted by Wachob and Lorenzi (2015), the sleep activity and quality of ten children with ASD aged 9-16 was measured through both an accelerometer device worn by the children as well as daily sleep log and a questionnaire completed by parents over a period of seven days. The children's physical activity was also tracked and used for analysis, including the time spent in sedentary activity and time spent in moderate to vigorous physical activity using an Actigraph GT3X+ accelerometer device. Sleep was measured in terms of sleep efficiency (amount of time it takes a person to fall asleep) as well as wake after sleep onset (amount of time spent awake after sleep has been initiated and before final awakening). Descriptive statistics, independent t tests, paired samples t tests, and correlation tests were used in this study. At the conclusion of the study, the results showed that there was a significant relationship between daytime activity levels and positive sleep patterns. Furthermore, the study demonstrated that the children who engaged in more sedentary behaviours tended to have a lower sleep efficiency, alluding to the fact that the child struggled to fall asleep at night.

The results of this study demonstrate some significant findings, especially as it is one of the first attempts at examining how physical activity impacts a group of children, such as those with ASD, who have sleep-related problems. A limitation of this study includes the wide age range of the participants. As noted by Memari et al. (2013) as well as Pan (2008), children who are older engage in less physical activity. An age range this broad may provide skewed results in that some of the younger children may engage in more frequent physical activity than those who are older.

Next, a study completed by McMahon et al. (2019) observed individuals with intellectual and developmental disabilities engaging in *exergaming* using virtual reality (VR) to increase physical activity. Exergaming was defined in the study as playing a video game that involves some form of exercise. The study had four students between the ages of 14-21. The participants

used both a stationary bike as a controller for a variety of the VR games as well as the goggles. Visual analysis procedures were used and assessed intervention effects within-phase and between-phase data patterns using level, trend, variability, immediacy of the effect, overlap, and consistency of data patterns across similar phases as indicators. The study compared baseline results (a minimum of three exercise sessions on the stationary bike) to participation in the VR exergame. The four participants all increased their time on the stationary bike when participating in the VR exercise intervention, resulting in more total calories burned and a higher average heart rate.

Although this study presented many positive outcomes, it does have some limitations. First, the VR system may be financially unattainable for many families and/or school, thus making it inaccessible. Furthermore, initial setup of the VR system can be difficult and timely. Participants would likely not be able to achieve this on their own.

An additional study conducted by Wouters et al. (2019) examined the physical activity levels of children with ID and its results on particular physical health components, such as body composition, muscular strength, muscular endurance, and cardiorespiratory fitness. Wouters et al. (2019) looked at 128 participants aged 2-18 years with moderate to severe ID, many who were overweight or obese. Descriptive statistics were used to study the wear time and physical activity parameters, such as the steps per day and the physical activity intensity. Linear regression analyses were also performed with steps per day, the time of moderate to vigorous physical activity, and the counts per minute. The results from the study indicated the majority of participants (71-91%) scored below reference values for muscular strength, endurance, and cardiorespiratory fitness tests, but that there was a positive association between physical activity and cardiorespiratory fitness, as well as motor development (muscular strength and muscular endurance).

This study provided a large sample size, addressing both females and males with ID. It examined a variety of physical health components. However, it appeared that participants were only assessed for each of these components on one day, which does not really provide an accurate assessment. There may have been other factors at play on that one day, such as the participant having an off day. Furthermore, the age range is very large (2-18 years old), making it difficult to pinpoint specifics regarding the physical benefits of physical activity given the significant differences at these age levels. There also was not any direct evidence found in

addressing each of these health components; there were only positive associations made between the physical activity and the participants' physical health.

A review by Sorensen and Zarrett (2014) examined a variety of studies investigating the benefits of physical activity for adolescents with ASD discovered that one of the strongest areas of benefit was in the area of motor development and physical fitness. All included studies noted the overall frequency and duration of the physical activity sessions; however, the type and intensity of physical activity was only mentioned in nine of the nineteen studies. Six studies solely focused on the effects of physical activity on the physical health of adolescents with ASD, while others involved other effects, such as cognitive development and mental health. Of these six studies, five found beneficial effects in areas such as motor skills, endurance, strength, flexibility, as well as cardiovascular and aerobic fitness.

This review is beneficial in that it examines multiple areas within the realm of physical health in which physical activity can benefit adolescents with ASD. A major limitation that Sorensen and Zarrett (2014) found in all of the reviewed studies is that there were few physical activity-based strategies that target adolescents with ASD. Strategies, such as optimal settings for physical activity for youth with ASD as well as providing activity choice, were mentioned as possible strategies to potentially implement. Another limitation included the importance of describing the type and intensity of physical activity in each study. Various types of physical activity and the intensity at which they are engaged in could possibly alter the results; for example, if one study had participants run for 30 minutes with their average heart rate staying within 70-80% of their maximum compared to another that had participants engage in yoga for 30 minutes with no heart rate recorded, these studies could potentially yield very different results.

In regard to physical activity and its effect on the physical health and well-being indicator, there were some visible gaps in the research studied (McMahon et al., 2019; Pastula et al., 2012; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wouters et al., 2019; Yilmaz et al., 2004). Again, many of the studies did not discuss which strategies, if any, were implemented in order to engage the participants in physical activity. Wouter et al., (2019) even specifically mentioned in their conclusion that policies and strategies are urgently needed to increase physical fitness for children with ID. Moreover, some of the studies did not include the types of physical activity that the children engaged in. For example, the studies indicated that the

children's physical health and well-being improved; however, was this due to engagement in running each day or by playing basketball? Further research would be valuable to assess if different physical activities had an impact on the physical health and well-being results, or if the intensity simply had to be moderate to vigorous. Finally, further Canadian research would be beneficial. Physical activity not only affects a child's physical health and well-being, but it also affects their social relationships.

Social Relationships. Another health and well-being indicator for children is social relationships. Physical activity has been shown to have a positive impact on the social relationships of children (e.g., Davis & Jowett, 2014; Kang et al., 2011; Pan, 2010; Wilk et al., 2018). Database searches of ScienceDirect, Taylor and Francis Journals, PubMed, and Sage Journals, years 1990 to 2021, were used, focusing in on the key search terms physical activity, social effects, socialization, relationships, peers, coaches, exceptionalities, children, learning disabilities, intellectual disabilities, ADHD, and autism resulted in research articles focused on social relationships and physical activity. Additional studies were also located within studies that were found through these databases and keywords used. The following four research studies from Canada, Sweden, Taiwan, and Korea that considered children with and without exceptionalities should be looked at in more detail since they provided some Canadian research, provided some interesting perspectives in terms of social relationships that could be relevant for both children with and without exceptionalities, and were considered current research as they were completed in the last 15 years. A study by Wilk et al. (2018) demonstrated the link between parental support and parental physical activity with children's perception of parental support and children's physical activity. The study included 467 boys and 469 girls, all of whom were typically developing. A variety of questionnaires were used to obtain data. Structural equation modelling techniques were used to analyze the data. This technique estimated the relationships, as well as the direct and indirect effects, between the observed and latent variables in the measurement model. A sex-specific multiple group framework was used to identify potential differences between males and females. Finally, a latent mean structure (i.e., a mathematical model for making inferences about an underlying attitude distribution on the basis of the interrelationships of items), examining correlations between activity levels of boys and girls, as well as levels of parental support and parental physical activity, was used to test across-group differences (Lazarsfeld, 1950). Although there was not significant evidence for parental physical

activity related to children's perceptions of parental support for physical activity or to the children's physical activity itself, there was strong evidence demonstrating the importance of children's perceptions of parental support in relation to their physical activity. These supports could be in many forms, including but not limited to transporting them to places to be active, watching them be active, or motivating them to be active.

This study, conducted in Canada, provided an extremely large sample size including both males and females. It also looked at a variety of types of parental supports. However, the study did have two major limitations. First, the data, collected via the questionnaires, were self-reported. Therefore, they could be subject to some bias, such as the level of physical activity (Althubaiti, 2016). Second, the study neglected to examine differences in parental support and physical activity between mothers and fathers, which may have had an impact on sex-related differences in children's physical activity.

Another study related to the social relationship indicator analyzed the importance of the relationship between the coach and athlete on the athlete's well-being (Davis & Jowett, 2014). Davis and Jowett (2014) examined this attachment between a coach and an athlete, and concluded that a coach can, in fact, provide a secure attachment. Moreover, as stated in Davis and Jowett (2014) by Weiss (1991), a coach can provide the three basic attachment functions, including a target for proximity (is close when needed), a safe haven (for comfort or protection during times of need), and a secure base (from which one explores and engages in autonomous activities) during times of need. Sport psychology literature has viewed the coach as someone who is instrumental in enhancing athletes' performance, self-esteem, personal growth, and general well-being (Cote, 2002; Cote & Fraser-Thomas, 2007). Furthermore, Jowett and Cockerill (2003) suggested that athletes rely and depend on their coaches for support in times of need. This research demonstrates that coaches and athletes develop a unique and special bond.

The study presented provides a large sample size of 192 typically developing athletes, along with a fairly equal divide between males and females (Davis & Jowett, 2014). The study also looked at the relationship between the athletes and coaches in a variety of different sports. To base the research on the attachment theory provides further credibility to the ideas presented. However, although the study included a wide age range (16-32) of participants, which could be considered beneficial to some, it could also be viewed as one of the major detriments to the study. To have such a large age range, especially in this particular age range, can present

difficulties in reliability in that a participant who is 16 is going to demonstrate very different social relationships than a participant who is 32. In terms of this particular research question, it would have been more beneficial to focus the study on a smaller age range and, when relating it to my research, focusing on children somewhere between 5-17 would also be beneficial. Furthermore, the study did not identify whether or not the involved participants were with or without exceptionalities, as well as their level of support at home. These factors could potentially both be major influences on their relationships with their coaches, and further research to include both of these components would be useful. Mental and emotional health and well-being, the next indicator, may be the most important to address as statistics show the overwhelming number of children and adolescents who live with a mental disorder today (WHO, 2019).

An additional study conducted by Pan (2010) included a group of 16 boys with ASD were examined. Eight of the boys participated in a 10-week water exercise-swimming program. Not only were improvements noted in their aquatic skills, as demonstrated by the Humpries Assessment of Aquatic Readiness (Humpries, 2008), which includes mental adjustment, introduction to water environment, rotations, balance and control, and independent movement in the water, but a decrease in antisocial behaviour problems was seen, as measured by the School Social Behaviour Scales (Merrell, 2002) by their classroom teacher. These included behaviours such as spinning and rocking, all typical of ASD. A decrease in these antisocial behaviour problems was assumed to be due to observing the positive social interactions of others, as well as the individualized instruction and positive feedback given by the instructors.

This quantitative study was useful in that it was specific to children with ASD. It addressed both physical aspects, as well as social aspects. The duration of the study was also significant, as it was over a period of 10 weeks, and therefore was able to provide a substantial period of observation. There were a few limitations to the study. Two limitations were related to the sample of participants. Specifically, the study included a very small age range (ages 6-9) and all of the selected participants were of a single gender (male). This did not provide a very diverse sample, thus providing limiting research and requiring further research to be conducted (Glass, 2006). Finally, even though the study included both the duration (10 weeks) and frequency (twice a week for 90 minutes each), it did not include the intensity. Some participants may be reaching their maximum heart rate for a significant part of this 90-minute time frame whereas

another may only be reaching a moderate heart rate for the entire duration of the session. This could potentially impacted the results and identifying the range of heart rates or having all participants reach a particular range of heart rate would be beneficial in future research.

A final study by Kang et al. (2011) involved 13 children with ADHD and examined whether sport improved a variety of aspects, including social competency. One group was involved in 90 minutes of athletic activity, including aerobic exercise and goal directed exercises, twice a week for six weeks and the other group received education on behaviour control. During this six-week period, schoolteachers rated the students' social skills using the Social Skills Rating System (SSRS), which uses a frequency scale (never, sometimes, or very often) to look at various behaviours. Three specific social skills were examined in this study: self-control (taking turns, follows directions), interpersonal skills (makes friends easily, invites others to join activities), and verbal assertion (appropriate expression of questions). Statistical analysis was performed using the Mann-Whitney U test to compare differences in age, education years, and IQ. A repeated measure ANOVA and Spearman correlation were used to track changes in their scores, such as an attention severity score and digital symbol score. The results showed that the group involved in the athletic activity improved their social skills, especially in the area of cooperativeness.

This study employed a specific duration and frequency for participation in exercise physical activity. The repeated measure ANOVA provided a statistical technique that was beneficial to the study, in that it used the same, limited number of participants and rated their social skills many times in order to provide dependability (Howitt & Cramer, 2011). It was also interesting how there was not a control group, but rather the other group participated in education on behaviour control. This was extremely interesting to compare the results, as both groups were receiving some direct, specific intervention. The repeated measure ANOVA could also be seen as a limitation in that participants could experience negative effects on performance, such as their results improving as they were given more chance to practice and become familiar with the tasks or boredom, both due to the repeated measures (Bergh & Vrana, 1998; Collie et al., 2003). Other possible limitations to the study included the use of a three-point Likert scale and only examining three social skills. First, a study completed by Preston and Colman (2000) provided evidence of the optimal number of response categories in rating scales, including Likert scales. They compared numerous scale numbers in relation to reliability, validity discriminating power

and respondent preferences, and found that rating scales that yielded the least reliable results were those with the fewest response categories, specifically those with two-, three-, and four-point scales. The three-point Likert scale may also be questioned in this study due to the odd number of responses. Another study by Matell and Jacoby (1972) demonstrated that participants are often swayed to choose the middle response, in this case *sometimes*. This may be due to a variety of factors, including being unsure of a response or allotted insufficient time to complete the survey (Preston & Colman, 2000). Matell and Jacoby (1972) stated “Particularly if the scale builder desires to minimize usage of the “uncertain” category, he would be advised to use balanced even-numbered scales or scales with many points” (p. 508). Furthermore, the study only examined self-control, interpersonal skills, and verbal assertion. There are many other social skills that are important for a child to possess, including conflict resolution and active listening. Future studies should consider both of these limitations.

After examining studies involving physical activity and its effect on social relationships, some gaps in the research were noted (Davis & Jowett, 2014; Kang et al., 2011; Pan, 2010; Wilk et al., 2018). These studies did not provide strategies used to promote the involvement of participants in the physical activity, or list any modifications made. Also, some of the studies did not include both genders (e.g., Pan, 2010), or provided an age range that was extremely large (e.g., Davis & Jowett, 2014). Although one Canadian study was included, this is still not a substantial amount of research, and remains a gap within the reviewed literature. Finally, previous research pertaining to social relationships, specific to children with exceptionalities, was also not plentiful; hence the inclusion of two studies that focused on typically developing children. However, these two studies were included, as there may be potential crossover between the benefits of physical activity and its effect on social relationships for children with and without exceptionalities. Not only can a child’s social relationships be greatly affected by physical activity, but so can a child’s mental and emotional health and well-being.

Mental and Emotional Health and Well-Being. According to the World Health Organization (WHO), 10-20% of children and adolescents worldwide experience mental disorders (2019). This is the leading cause of disability in young people all across the world today (WHO, 2019). Studies have been conducted to demonstrate evidence that when a child participates in physical activity, they experience changes in their mood, feelings, and self-esteem, therefore, improving their overall mental and emotional health and well-being (e.g., Bell

et al. 2019; Dunton et al., 2014; Kiluk et al., 2008; MacMahon & Gross, 1987). Database searches of Sage Journals and Ovid, years 1985 to 2021, were used, focusing in on the key search terms physical activity, mental health, emotional well-being, emotions, exceptionalities, children, learning disabilities, intellectual disabilities, ADHD, and autism resulted in research articles focused on mental and emotional health and well-being and physical activity. Additional studies were also located within studies that were found through these databases and keywords used. The following four research studies from the United States and England that considered children with and without exceptionalities should be looked at in more detail since they provided some interesting perspectives, some from both parents and the children themselves, in terms of mental and emotional wellbeing that could be relevant for both children with and without exceptionalities, focused on specific changes in terms of mood, feelings, and self-esteem, as well as three out of the four studies focused solely on children with exceptionalities, including learning disabilities, ADHD, and mental health disorder.

A study conducted by Kiluk et al. (2008) examined the psychological benefits of physical activity in children with ADHD, specifically looking at mood and anxiety. The researchers included 65 children aged 6-14 diagnosed with ADHD, as well as a comparison group of 32 children diagnosed with a learning disorder, for a total of 97 participants. Parents completed the *Child Behaviour Checklist (CBCL)*, which focused on 112 specific problem behaviours as well as a section for parents to comment on any other additional problems (Achenbach, 1991). The results indicated that children with ADHD who participated in multiple sports had significantly fewer anxiety and/or depressive symptoms than those who did not participate in sports. These differences were not demonstrated among the comparison group including the children with learning disorders.

This study was beneficial to examine in that it solely focused on children with ADHD and their mood after participating in physical activity. The study included both female and male participants, who were school aged. One limitation was that no reliable measure, such as an accelerometer, was used in order to assess the physical activity levels. Therefore, it may be difficult to determine just how physically active or involved the child was in each of the sports they participated in. Furthermore, there may have been other factors at play in relation to the child's mood and their participation in sports. For example, a child's family circumstances, or other variables may have had an impact on their mood.

A study by Dunton et al. (2014) specifically looked at children and their feelings after physical activity. Dunton et al. (2014) studied 119 typically developing children over eight days. They used the Ecological Momentary Assessment (EMA), a real-time data capture study that obtains self-reports of psychological, affective, and behavioural variables during day-to-day life, to examine how affective and physical feeling states are related to physical activity (Shiffman & Stone, 1994). Before analysis was conducted, researchers examined patterns of unplanned missing data and evaluated it to determine whether it was missing due to demographic characteristics. Then, a series of mixed models were used for analysis, generating between-subjects (a child's level relative to the group mean) and within-subject (the level at any given time relative to his or her own average level) versions. After conducting the EMA monitoring 30 minutes before and after moderate-to-vigorous physical activity, results demonstrated higher ratings of positive affect, feeling energetic, and lower ratings of negative affect (Dunton et al., 2014).

Dunton et al.'s (2014) study was extremely useful in that the authors identified it was the first study to model stability in both feelings and exercise states. It also provided a large sample size of 119 children, consisting of both males and females. Finally, this study provided input from both the children and the parents. The data collected from the children measured both positive and negative affect after exercise. The data collected from the parents focuses on the impact of the exercise on the child over time. Involving both children and parents, or multiple data sources, in a study can increase the validity of the research, as source triangulation involves gathering more opinions as well as different opinions from those directly involved and those who observe the change in feelings are examined (Denzin, 1989). On the other hand, this study included some potential limitations. It focused on children from low-middle income families. One had to question whether or not income could have had an effect on the results and therefore, more studies need to be completed to include children from a variety of income levels (i.e., does income level also have an effect on a child's feelings after exercise or is it simply the exercise?). Furthermore, the study did not include very many days of assessment since children only participated in the study for eight days. This may not be a long enough period of time to represent children's typical feelings after engaging in exercise. The study simply reported on children's participation in leisure-time exercise. Therefore, any activities that took place outside of this time, such as at school or transport between activities, were not represented in the study

(Dunton et al., 2014). Finally, the study examined typically developing children and not children with exceptionalities, so the effects of physical activity on both of these groups of children may be different.

Another study conducted by MacMahon and Gross (1987) investigated the physical and psychological effects of aerobic exercise in 54 boys aged 7-12 with learning disabilities. Although they examined self-concept, academic achievement, motor proficiency, and physical fitness, for the purpose of this section on mental health and wellbeing, the focus was on self-concept. The boys participated in exercise consisting of distance running, aerobic dance and soccer five days per week for 20 weeks, raising their heart rates above 160 beats per minute for 25 minutes. A comparison group participated in less vigorous physical activity, such as dodgeball and volleyball, keeping their heart rates to below 150 beats per minute, for the same time period. In terms of measuring the boys' self-concept, the *Piers-Harris Children's Self-Concept Scale* was used (Piers & Harris, 1984). The measure was read aloud to the students to account for any potential reading difficulties, and students simply answered yes or no to the 80 questions posed. From this, significant differences were found in terms of the children's self-concept and physical fitness.

This study was useful in that it focused on children with learning disabilities and their self-concept. The research went directly to the source that was under focus, directing the questions from the *Piers-Harris Children's Self Concept Scale* to the children themselves rather than their parents and/or teachers. Also, the study took into account the children's heart rates, and a difference in self-concept was noted in those who raised their heart rate above 160 beats per minute, indicating the positive effect of vigorous activity. One limitation of this study was that it only included boys, so more research should be conducted to include both boys and girls with learning disabilities. Also, directing the *Piers-Harris Children's Self Concept Scale* to the children themselves may potentially be considered a detriment to the study in terms of their learning disability (i.e. length of questionnaire, auditory processing) or the children's age (i.e. being able to provide trustworthy results).

Finally, a study conducted by Bell et al. (2019) investigated whether physical activity was associated with improved mental wellbeing as well as reduced symptoms of mental health disorder in 928 12–13-year-olds. Physical activity was measured first using accelerometers which counted the volume of physical activity per minute as well as the intensity for seven days,

and at follow-up three years later, the *Warwick Edinburgh Mental Wellbeing Scale* (Clarke et al., 2011) as well as the *Strengths and Difficulties Questionnaire* (Goodman, 2010) to identify symptoms of mental health were used. Multilevel linear regression analyses were used to estimate exposure effects for potential mediators which were investigated by grouping them by related factors, such as socioeconomic factors. When the researchers found evidence of confounding or mediation, further models were fitted to investigate in more detail. Although this study found no strong evidence that physical activity is associated with better mental wellbeing or reduced symptoms of mental health disorder in adolescents, there was a positive association found between physical activity and the emotional problems subscale of the *Strengths and Difficulties Questionnaire*. This study suggested that physical activity has the potential to reduce symptoms of depression and anxiety in adolescents.

This study was one of the few that explored the relationship between physical activity and symptoms of overall mental health disorder (Bell et al., 2019). According to the researchers of the study, as no direct correlation was discovered between physical activity and reducing mental health symptoms, but a relationship was found between physical activity volume and emotional problems, further research is required to potentially provide more direct evidence on this topic. In particular, physical activity should be monitored for longer than seven days and then the scale and questionnaire should potentially be applied sooner rather than three years later. As well, scales or questionnaires that focus on one aspect of mental health disorder or mental wellbeing specific to children and adolescents would also be beneficial in allowing for more narrowed research.

There were some gaps present when examining research related to the indicator of mental and emotional health and well-being (Bell et al. 2019; Dunton et al., 2014; Kiluk et al., 2008; MacMahon & Gross, 1987). One gap in some of the research studies was that potential strategies that may have been used to engage children in physical activity were not included. If researchers incorporate certain encouragement techniques or demonstrated evidence of success when focusing on mental and emotional health and well-being, this could alter the results therefore these factors would be beneficial to examine in future studies (Ross & Zaidi, 2019). Furthermore, it would be valuable to include other forms of physical activity that involve light to vigorous intensities as well as anaerobic and aerobic forms. This could include determining whether participating in yoga or going for a walk would have the same effect on the participant's

mental and emotional health and well-being as participating in run or fitness circuit. Finally, all of the studies presented were completed outside of Canada. More research within Canada is needed.

In summary, the research reviewed in this section looked at physical activity and the overall health and well-being of children (e.g., Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al. 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). These studies have demonstrated that various types of moderate to vigorous physical activity improved the overall health and well-being of all children, including those with exceptionalities (e.g., Bell et al., 2019; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al. 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wouters et al., 2019; Yilmaz et al., 2004). Whether the study involved children performing a series of various exercises in a gym or running outside, all forms contributed to the four indicators of a child's health and well-being examined in children with exceptionalities. All of the studies reviewed in this section focused on children within the range of children between the ages of 4-19 (e.g., Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al. 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). However, there is still a need to explore the topic of physical activity and overall health and well-being in relation to children with and without exceptionalities as many studies found during library database searches focused on the effect of physical activity on adults, particularly in relation to cognition and may be more likely to be affected by brain diseases as they age, such as dementia (e.g., Gholamnezad et al., 2020). In addition, more current research should be undertaken related to children and physical activity, since the majority of the studies found and reviewed were completed in the last 15 years, which is quite a wide range (e.g., Bell et al., 2019; Chan et al., 2018; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Kang et al., 2011; Kiluk et al., 2008; McMahon et al. 2019; Nakutin et al., 2019; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob &

Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019). Most of the research being within the last 15 years can possibly be attributed to recent research demonstrating decreased levels of physical activity in the last few years, and, as a result, a major concern for children's overall health and well-being (i.e., concern for cognitive development, physical health and wellbeing, social relationships, and mental and emotional health and wellbeing) (WHO, 2019). While these commonalities are beneficial to demonstrate the immense value of physical activity and its effect on all four health and well-being indicators, there were also some gaps in the literature that need to be addressed.

Three major overall gaps in the literature presented should not be overlooked, and thus, potentially examined in future research. The first gap in the reviewed research relating to the four health and well-being indicators for children was the limitation of intensity level as well as the often unclear listing of the type of physical activity. The intensity level in almost all of the reviewed research studies involved participants engaged in moderate to vigorous physical activity (Chang et al., 2012; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; MacMahon & Gross, 1987; Pastula et al., 2012; Ratey, 2008). Additional research is required to explore if the four indicators can be impacted when engaging in physical activity at all intensity levels, including light to vigorous. In some of the studies, the type of physical activity that the participants engaged in was unclear (e.g., Gapin & Etnier, 2010; Ratey, 2008). Therefore, future research should attempt to determine if the intensity of an activity (i.e., engaging in a run, a sport, or a walk, and in turn) can impact participants' health and well-being.

Another gap in the reviewed literature was the limited Canadian data available. Only one of the eighteen studies (Wilk et al., 2018) provided research conducted in Canada. Even though the benefits of physical activity for children around the world would most likely be the same, it would still be beneficial to gain some Canadian research in this area.

Finally, and perhaps the most significant gap in all of the reviewed research, is the need to focus on what parents and educators can do to better involve or engage children in physical activity. More specifically, researchers need to determine what strategies parents and teachers can use to engage children with exceptionalities in physical activity. It was clear that physical activity is important by the benefits discussed in terms of the four health and well-being indicators (Bell et al, 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahan et al.

2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). There was some research focused on a few potential strategies that could be used to engage children in physical activity, including: providing role models (Rodrigues et al., 2018; Wilk et al., 2018), focusing on specific types of physical activities (Gao & Lee, 2019; Jensen, 2006; Mowling et al., 2004; Pham et al., 2020; Ruggiero et al., 2020;), providing education (Mowling et al., 2004; Ratey, 2008), making exercise accessible (Koch, 2013; Norris & Columna, 2016; Seidler et al., 1993; Walker et al. (2019), and demonstrating evidence of success (Bingham et al., 2010; Mowling et al., 2004; Ratey, 2008). However, this research was limited to a small number of studies, including some of which were dated and published more than ten years ago (e.g., Mowling et al., 2004; Seidler et al., 1993) and others that did not provide a lot of detail on this topic. Moreover, only a few of the existing research studies were specific to those with exceptionalities (e.g., Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Walker et al., 2019). It has been noted that it is even more difficult to involve or engage children with exceptionalities in physical activity than those with average abilities (Carlson et al., 2013; Frey et al., 2008; Rimmer, 2005) and perhaps even more imperative that we do due to higher obesity levels and health concerns (Chen et al., 2010). One particular study completed by Wouters et al. (2019) even specifically noted near the end of the study that more strategies were needed, and another review of studies by McGarty et al. (2018) suggested that future studies were needed as current strategies may be ineffective, due to potential factors such as needing a longer period of time to enable habit development or the specific individual(s) facilitating the strategies and if they were suitably trained to do so. Also, some of these studies did not provide actual research presenting evidence-based strategies, but instead, provided more of a discussion on existing strategies (e.g., Bingham et al., 2010; Seidler et al., 1993). Finally, similar to the research completed on the benefits of physical activity, there was limited Canadian research in terms of the specific strategies as well (Wilk et al., 2018). Therefore, it is important that this major gap in the research literature, along with examining varying types of physical activity and intensities and providing additional Canadian research, is investigated further with current strategies that are specific to those children with exceptionalities. Without specific strategies, educators and parents will be unable to engage children with exceptionalities in physical activity. It is necessary that further strategies be

examined to do everything possible to engage children with exceptionalities in physical activity, as there are so many benefits to their health and well-being (eg., Bell et al., 2019; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al. 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wouters et al., 2019; Yilmaz et al., 2004).

Physical Activity Strategies for Children With and Without Exceptionalities

As Jensen (2006) posed, “But what about students who don’t want to do exercise or physical activity?” (p. 179). As such, there has been some previous research completed relating to strategies to implement to engage children of all abilities in physical activity and, in turn, affect aspects of the four health and well-being indicators in a positive way (e.g., Bingham et al., 2010; Gao & Lee, 2019; Jensen, 2006; Koch, 2013; Mowling et al., 2004; Norris & Columna, 2016; Pham et al., 2020; Ratey, 2008; Rodrigues et al., 2018; Ruggiero et al., 2020; Seidler et al., 1993; Walker et al., 2019; Wilk et al., 2018). These strategies include providing role models, focusing on specific types of physical activities, providing education, making exercise accessible, and demonstrating evidence of success. These strategies addressed engaging children with and without exceptionalities in physical activity. However, there may be additional strategies teachers and parents use that are specific to children with exceptionalities.

The first strategy relates to the notion that, if a role model, such as a parent, teacher, or other influential person in the child’s life provides tangible or intangible support with regards to physical activity, it is likely that the child will engage in physical activity (e.g., Rodrigues et al., 2018; Wilk et al., 2018). In a study by Rodrigues et al. (2018), the influence of parental organized physical activity on children’s participation in extracurricular sport was examined. The study found that having both parents active was significantly associated with frequent participation in more sports for both girls and boys. Furthermore, not only was having a parent involved themselves in physical activity key to a child’s participation in physical activity, but parental support was also imperative to physical activity related behaviours of youth (Rodrigues et al., 2018). Attending their game, purchasing equipment, providing encouragement and praise, discussing the benefits of physical activity are all examples of parental supports that are important to implement in order to involve children in physical activity (Beets et al., 2010; Guidelines for School, 1997). In addition, the study by Wilk et al. (2018) demonstrated the link between parental support and parental physical activity by considering children’s perceptions of

parental support and children's physical activity. Although there did not end up being significant evidence supporting parental physical activity was related to children's perceptions of parental support for physical activity or to the children's physical activity itself, there was strong evidence demonstrating the importance of children's perceptions of parental support in relation to their physical activity. For example, participants outlined how important supports could be, including but not limited to, transporting them to places to be active, watching them be active, or motivating them to be active (Wilk et al., 2018).

Another strategy that could be used to engage children in physical activity is focusing on specific types of activities (e.g., Jensen, 2006; Mowling et al., 2004). Jensen (2006) questioned what should be done when children do not want to engage in exercise or physical activity. He responded "Find something they do like. It is that fundamental to the brain" (Jensen, 2006, p. 179). He continued by explaining that it is important to get children to participate in daily physical activity voluntarily. He suggested offering a range of choices from team sports to individual activities to dance, implying that the likelihood of something being attractive to each child increases and therefore, they are choosing to do it (Jensen, 2006).

A study completed by Mowling et al. (2004) demonstrated the importance of promoting intrinsic motivation by focusing on physical activities that the students enjoy. In their study of third grade students at a rural elementary school in the southeast United States, many students reported being bored, not enjoying the exercises, and not being active enough in the classes, only enjoying physical education "when they got to play games and run around" (Mowling et al., 2004, p. 41). The study suggested designing physical education lessons that are meaningful to students by explaining why they are learning what they are learning; for instance, which muscles they are using and how this may help them in their everyday activities (Mowling et al., 2004). They also suggested designing activities that will challenge all students. All students are going to present different levels of skills, so being able to adapt activities to engage all students is key (Mowling et al., 2004). For example, if students are working on passing a basketball, have students stand different distances apart or allow them the option of standing stationary or moving. Mowling et al. (2004) also recommended having specific goals for each activity. Educators should be intentional when asking students to participate in various exercises; each activity should have a definite purpose. Furthermore, they suggest that students should have some control over their learning; have students choose between a selection of activities, so then

they are interested in what they are doing. Therefore, the teacher still has some control, in that the activities develop skills learned previously; however, the students are even more engaged as they get to choose something they feel like doing. For example, set up stations that all develop a similar skill and students can choose which station they want to go to.

Another specific type of physical activity that can be used to promote exercise is exergames (Rudella & Butz, 2015). Rudella and Butz (2015) defined exergames as video games that require the player(s) to physically move in order to play. Games such as *Nintendo Wii Sports Boxing Game* and *Just Dance* are examples of exergames that can be used. Rudella and Butz (2015) claimed that, when exergames are used, both physical activity time as well as student motivation increases. More specifically, when using the *Nintendo Wii Sports Boxing Game*, it was reported that “students engaged in physical activity 60 percent of the time, exhibited a 78 percent increase in the amount of time spent physically engaged, and spend at least twice as much time practicing a physical education-related skill or activity” (Rudella & Butz, 2015, p. 10). Other studies have noted the benefits of pairing technology, which children often enjoy, with physical activity, such as exergaming, mobile apps, wearable devices, and using social media (Gao & Lee, 2019; Pham et al., 2020; Ruggiero et al., 2020). Not only is it important to motivate students by teaching fitness rather than sports, as well as providing them choice and control, but also through developing specific programs that cater to their individual needs. Whether the students have a learning disability or not, each student is incredibly unique, so it is key that physical activities be adapted to suit their specific needs. Davis et al. (2010) created a specific physical activity program for students with intellectual disabilities (ID) called the motivate, adapt, and play (MAP) program. They felt a strong need to cater a program to this population, as many “youth with ID are considered more overweight, less physically fit, and less motor proficient than peers without ID” (Frey & Chow, 2006, p. 861). The program centers around finding favourite reinforcers, catering to the students’ physical strengths, and involving their favourite activities (motivate), as well as fitting the students’ ability levels (adapt) and making sure the students are enjoying the activities and having fun (play). They also used specific items, such as pedometers and adapted sports equipment, to assist in these students’ motivation for fitness.

Next, it is important that children are provided with the education as to why physical activity is beneficial (Mowling et al., 2004; Ratey, 2008). Ratey (2008) emphasized the notion of

“teaching fitness instead of sports” (p. 12). Children are then learning an active lifestyle in which “healthy habits, skills, and a sense of fun” are being developed (Ratey, 2008, p. 12). Studies have also demonstrated the effectiveness of educating children on why they are learning what they are learning (e.g. Mowling et al., 2004). In turn, this will make it more likely that they will engage in the activity; in this case, if they know why they are to participate in physical activity and why it will benefit them, it will make it more likely that they will engage. Mowling et al. (2004) explained the benefit of giving “the students explanations of what they are learning and how it applies to life outside the school setting” (p. 41). For instance, if they are doing push-ups, explain to them which muscles they are using and how this might help them in future endeavors.

Another key strategy that may help children engage in physical activity is making it accessible (Koch, 2013; Norris & Columna, 2016; Seidler et al., 1993; Walker et al., 2019). One of the ways in which this can be accomplished is by integrating physical activity into academics right in the classroom (Koch, 2013). That way, educators are able to not only have the students learn academic content, but they can also accumulate physical activity minutes at the same time, along with other benefits. This can be accomplished right in the classroom with minimal equipment and the students may not even realize they are engaging in physical activity! In order for this to be successful, the classroom teacher needs to collaborate with the physical education specialists to gain activity ideas and an understanding of the locomotor, non-locomotor, and manipulative skills, as well as how to infuse the academic content with physical activity (Koch, 2013). A specific activity that Koch (2013) provided in her article was “Math-Bo” (p. 43). In her activity, she assigned various fitness movements for each math operation; for example, addition is punching, subtraction, is knee lifts, multiplication is upper cuts, and division is a hook. Then, the teacher has the students stand up and places different equations on the board. For each question, the students “bounce in place like a boxer”; for example, if the question is $3 \times 2 = 6$, the students would perform three upper cuts, show the “x” sign with their arms, perform two upper cuts, show the “=” sign with their arms, and then perform six more upper cuts for the answer (Koch, 2013, p. 43). Physical activity can also be accessible to students by providing adequate facilities. In order to promote physical activity to students, it is essential to incorporate specific youth areas and items within regular adult fitness clubs (Seidler, et al., 1993). Things such as smaller-sized equipment, youth-sized locker rooms, and innovative play areas are all components that could be specific to children and youth. These facilities aim to promote an environment that

is non-competitive and use novel equipment, such as child sized gerbil tunnels, bouncy waterbeds, and various slides (Seidler et al., 1993). Throughout the development of these child-friendly facilities, fitness is important, but fun and safety are the primary focus. These facilities should also be designed with students with exceptionalities in mind, so that they are also able to access them with ease. It is imperative that facilities be designed to encompass specific things, such as an electrically operated door at the main entrance, places accessible by a wheelchair, such as low counters and no elevation in floor changes, easy access without going through a turnstile, as well as easy entry into areas, such as swimming pools and hot tubs (Rauworth et al., 2003; Seidler et al., 1993). Doorways to courts and gyms should also be wider to allow access by a wheelchair. Finally, specialized equipment should be available when the general equipment is not suitable for students with exceptionalities. Specialized equipment falls into two categories: independence and modified sports equipment (Seidler et al., 1993). Independence equipment allows participants to participate in a given activity or sport independently, such as a prosthetic or a wheelchair. Modified sports equipment includes items such as sit-skis, bowling balls with handles, and one-armed paddles for canoeing (Seidler et al., 1993). In another study by Walker et al. (2019), the lack of access to facilities and equipment was also demonstrated. This particular study examined perceived facilitators and barriers to physical activity among adolescents with cerebral palsy in a rural community. Participants partook in a questionnaire as well as took photographs of potential facilitators and barriers within their community. Reported barriers included lack of inclusiveness, family isolation, and limited accessibility to particular equipment and resources (Walker et al., 2019). Finally, physical activity can be more accessible to all students if the children's families are keen and trained to support them at home. In a study conducted by Norris and Columna (2016), the experiences of families of children with visual impairments and their involvement in physical activity were investigated. In this study, Norris and Columna (2016) collected data by examining the family's demographic information as well as interviewing them over the phone. The results came back demonstrating two major themes: that families were keen to support their children with physical activity but were unsure how to do so with their visual impairment, as well as the concern of pushing their children too far. The parents "lacked the skills to teach and advocate for their children regarding physical activity" and "they voiced the need for a support system that would allow them to be more physically active" (Norris & Columna, 2016, A-71). From this study, it is clear that more needs to be done to

collaborate and, in turn, support these types of families, and any family, in providing easily accessible opportunities for children to participate more frequently in physical activity. Furthermore, staff at fitness facilities need to be informative and display a positive attitude when dealing with children with exceptionalities (Rauworth et al., 2003). In a study completed by Rauworth et al. (2003), many fitness facilities did not provide adequate staff to respond appropriately and knowledgeably to people with disabilities.

A final strategy in promoting physical activity in all students is providing evidence that they are being successful (Avery, 2012; Bingham et al., 2010; Craig et al., 1996; Mowling et al., 2004; Ratey, 2008). Not only can symptoms of anxiety be lessened or even eradicated with involvement in physical activity, but this can also be seen with symptoms of ADHD. As previously noted, Ratey (2008) worked with a patient named Jackson who struggled with ADHD, demonstrating great difficulties with his academics. After incorporating running into his regular routine, he saw a noticeable change in his levels of focus. Jackson emphasizes the importance of integrating physical activity into his daily life, pointing out that when he falls off his regimen, his concentration wavers. He states, “I can definitely tell when I don’t do it...It got to the point during my midterms that I had no time, but I’m like, You know what? I have to go out and run and clear my head. I have to do this” (Ratey, 2008, p. 163). When children see that they are competent in a particular activity, such as a specific exercise, it is more likely that they will enjoy it and as a result, continue to participate in it. Craig et al. (1996) supported this notion in their study examining factors that influence children’s participation in vigorous activity. They concluded that “Promotion of activities children enjoy, and in which they feel a sense of competency, is likely to sustain participation in vigorous activity throughout adolescence and possibly reduce the prevalence of obesity” (Craig et al., 1996, p. 506). Based on this evidence, it is imperative that educators provide activities that are tailored to the children’s capabilities and individual needs, as well as one in which they will likely regard themselves as having a high probability of success in (Craig et al., 1996). Finally, when children set short, realistic goals and then monitor and assess them, this allows them to observe direct evidence of their progress and their success. An article by Avery (2012) examined the use and benefits of web-based assessment of the physical education standards. Lincoln public schools considered implementing these assessments and one of their main reasoning’s behind doing this was the fact that, not only will this provide parents with information regarding their children’s progress, but they can also

“provide motivation for students” (Avery, 2012, p. 27). Furthermore, when students assess their own fitness progress, this is also seen to increase motivation (Mowling et al., 2004). Mowling et al. (2004) suggested that educators provide students with self-assessment checklists that will assist them in determining whether they are meeting their individual goals. Bingham et al. (2010) further confirmed the benefits of using self-assessments and suggested that elementary aged children are not too young to use them in order to increase motivation and achievement. They suggested that self-assessment should move beyond a basic checklist, and can involve discussions between the teacher and student, as well as selections from the child’s work to be included in a portfolio. All of these forms of self-assessment promote self-improvement, which, in turn, motivates students to perform better (Bingham et al., 2010).

Once again, there were some major gaps in the research related to strategies that can be used to engage children with and without exceptionalities in physical activity (e.g., Bingham et al., 2010; Gao & Lee, 2019; Jensen, 2006; Koch, 2013; Mowling et al., 2004; Norris & Columna, 2016; Pham et al., 2020; Ratey, 2008; Rodrigues et al., 2018; Ruggiero et al., 2020; Seidler et al., 1993; Walker et al., 2019; Wilk et al., 2018). Firstly, it was challenging to find current research related to specific strategies, such as the importance of building relationships with the child. Davis and Jowett (2014) was the only research that provided an example of the importance of the relationship between the child and coach; however, many other relationships, such as with a parent, educator, or peer, would be beneficial. Some of the studies were completed more than five years ago (egs., Bingham et al., 2010; Jensen, 2006; Koch, 2013; Mowling et al., 2004; Ratey, 2008; Seidler et al., 1993), and it was difficult to find ones that were recent, relevant, and provided thorough details related to strategies. Furthermore, although there is some research relating to strategies used to promote physical activity in all children, research is particularly limited in engaging children with exceptionalities. In many of the studies above related to strategies, there were limited studies that specifically pertain to children with exceptionalities (Davis et al., 2010; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993). Especially since children with exceptionalities are participating less frequently in physical activity (Fedewa & Ahn, 2011; Obrusnikova & Cavalier, 2011; WHO, 2003), it is imperative that parents and teachers cater to the whole child and their individual needs and implement a wide variety of strategies in order to engage children in physical activity (Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rimmer, 2005; Seidler et al., 1993). There are likely many specific strategies

that can and are being used today by parents and teachers to engage children with exceptionalities in physical activity that need to be explored. Not only will there potentially be additional strategies currently being used, but previous strategies may now be ineffective. McGarty et al. (2018) provided a review of strategies to increase physical activity in children with intellectual disabilities and concluded the article by stating that future research was needed and current strategies, such as adapting equipment and providing specific supports in the form of a physiotherapist, were ineffective. Also, while some of these studies did provide actual research presenting evidence-based strategies (egs., Mowling et al., 2004; Rodrigues et al., 2018), many simply provided a discussion from a variety of articles related to different strategies (egs., Koch, 2013; Seidler et al., 1993). It would be beneficial to gain additional evidence-based strategies so parents and teachers can implement them directly into their practice with ease. Finally, it will be crucial to gain some research that is Canadian to support this area. Most of the strategies addressed were based upon research conducted outside of Canada, such as the study completed by Rodrigues et al. (2018) that involved a sample of people from Portugal and Rudella and Butz's (2015) study that focused their research in the United States. It is also important to consider theories that are relevant to both the importance of engaging in physical activity and the strategies used to support a child's participation in physical activity.

Theories of Physical Activity Behaviour

Many of the studies examining physical activity have demonstrated the importance of physical activity due to its impact on the indicators of health and well-being in children (Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al. 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004), as well as strategies used to support participation in physical activity (Avery, 2012; Bingham et al., 2010; Craig et al., 1996; Davis, et al., 2006; Gao & Lee, 2019; Koch, 2013; McMahon et al., 2019; Mowling et al., 2004; Norris & Columna, 2016; Pham et al., 2020; Ratey, 2008; Rodrigues et al., 2018; Rudella & Butz, 2015; Ruggiero et al., 2020; Seidler et al., 1993; Walker et al., 2019; Wilk et al. 2018). Most of these studies are based on theories of physical activity behaviour.

One theory that supports the research of the impact of physical activity on the health and well-being indicators for children is the attachment theory (Bowlby, 1958). This theory,

developed by John Bowlby, examines the emotional bonds that are formed in close relationships. The notion of Bowlby's attachment theory (1958) begins when a child is born through maternal connection. This need for attachment, which is an emotional connection to a figure upon whom they rely on for comfort, protection, and reassurance during times of need, is essential in order to allow the child to develop appropriately (Bowlby, 1958). Ainsworth et al. (1978) continued Bowlby's (1958) idea of attachment to include categories known as attachment styles. Three attachment styles were developed, including secure, anxious-ambivalent, and avoidant. In secure attachment, the child is able to rely on a figure when needed and feel comforted and safe. If a child demonstrates an anxious-ambivalent attachment style, the child displays excessive signs of distress and deregulation, even in times of non-threatening situations. They are often not able to be calmed or comforted by this figure. Finally, in an avoidant attachment style, the child demonstrates few signs of emotional distress and does not make contact with the figure for comfort or security. When a child participates in an organized physical activity, the attachment theory supports the evidence that they can form a relationship with the coach or facilitator, and this can enhance their overall well-being (Cote, 2002; Cote & Fraser-Thomas, 2007; Davis & Jowett, 2014; Jowett & Cockerill, 2003). This theory may relate to the studies completed by Rodrigues et al. (2018) as well as Wilk et al. (2018) and the intervention of a role model providing support to the child in order to encourage their participation in physical activity. This notion may be of particular importance for those children that may not have a consistent figure in their life that they can develop an attachment to.

Another theory in relation to the impact that physical activity has on the health and well-being indicators for children is the endorphin theory (Sandman, 1990/1991; Sandman et al., 1990b). According to multiple sources, it is well known that physical activity enhances the release of beta-endorphin (Bender et al., 2007; Chronicle Herald, 2017; Schwarz & Kindermann, 1990). In the study by Schwarz and Kindermann (1990), twelve participants with an average age of 26.5 years, performed step tests as well as incremental graded cycle exercise. Both of these exercises were reported to significantly increase beta-endorphin. According to Wilson and Elmassian (1981), beta-endorphins are believed to have the potential to alter pain perception, mood, respiration, and the release of pituitary hormones. In relation to mood, Bartholomew et al. (2005) conducted a study involving 40 participants, which examined whether a single bout of moderate intensity exercise would improve mood. The participants were all receiving treatment

for major depressive disorder. Participants were instructed to complete the Profile of Mood States (POMS) (McNair et al., 1971) as well as the Subjective Exercise Experiences Scale (SEES) (McAuley & Courneya, 1994) to assess mood five minutes before engaging in the exercise, and five, 30, and 60 minutes following. It was noted that the participants reported reductions of distress, depression, confusion, fatigue, tension, and anger, as well as a significant increase in positive well-being and vigour. Based on this theory, in order for a child's mental and emotional health to be affected in a positive way, it is important that children engage in physical activity to improve mood (Bell et al., 2019; Dunton et al., 2014; Kiluk et al., 2008; MacMahon & Gross, 1987; Ratey, 2008).

A third theory that can be applied to physical activity is the theory of planned behaviour (Ajzen, 1985). This theory is an extension to the theory of reasoned action developed by Martin Fishbein and Icek Ajzen (1980). Downs and Hausenblas (2005) went on to interpret the theory of planned behaviour to include the belief that people will engage in a behaviour when they evaluate it positively, believe that others want them to engage in it, and perceive it to be under their control, as well as the belief that it will increase the likelihood of a behaviour. When Downs and Hausenblas (2005) reviewed 111 theory of planned behaviour and exercise studies, it was found that this theory effectively explained exercise intention and behaviour. The theory of planned behaviour can be applied to this research in relation to the suggested strategy of focusing on specific types of activities (Gao & Lee, 2019; Jensen, 2006; Mowling et al., 2004, Pham et al., 2020; Rudella & Butz, 2015; Ruggiero et al., 2020). When children are given the opportunity to have input in the type of physical activity they engage in, this will likely account for them viewing the activity in a positive way. Furthermore, in relation to the suggested strategy of providing evidence of success, the theory of planned behaviour suggests that seeing this success may increase the likelihood of participating in physical activity.

The social cognitive theory (SCT) was examined in relation to physical activity. (Bandura, 1986). According to Bandura and his theory, individuals learn not only through their own experiences, but also by observing the behaviours of others. Their own experiences could include facets such as the environment. Observational learning is most powerful when the person being observed is powerful, respected, or considered to be like the observer. Another major component of SCT is self-efficacy, or the confidence one has in completing the physical activity. Much research has already been completed with regards to SCT and physical activity. For

instance, Martin et al. (2011) examined 506 underserved middle-school children aged 10-14 years. Their study examined various social, cognitive, and environment-based constructs to discover whether they predicted physical activity and fitness. The study found that self-efficacy was a major barrier to participation, as well as the environment not being suitable to physical activity. Another study included 393 elementary-aged students, and examined associations between physical activity, SCT variables including self-efficacy, social support and enjoyment, and perceived environment variables (Harmon et al., 2014). Findings indicated that sex, self-efficacy, and social support were the biggest predictors of participation in physical activity (Harmon et al., 2014).

Social cognitive theory (SCT) will also likely have a major impact on this research (Avery, 2012; Bingham et al., 2010; Craig et al., 1996; Mowling et al., 2004; Ratey, 2008; Rodrigues et al., 2018; Wilk et al., 2018). Based on this theory, the suggested strategy of providing role models for children in order for them to engage in physical activity makes great sense. When children note that their parents, teachers, coaches, or other influential people in their lives participate in physical activity, it is likely that they may engage in physical activity as well. According to Bandura (1998), “health habits are rooted in familial practices” (p. 643). Schools also have a vital role in promoting the health of children (Bandura, 1998). A second part of the research that relates to this social cognitive theory is the suggested strategy of providing evidence of success. According to this theory, the child will engage more in an activity where they demonstrate success and/or when they can see it translating to success in other areas of their lives (Avery, 2012; Bingham et al., 2010; Craig et al., 1996; Mowling et al., 2004; Ratey, 2008). Another possible strategy of the research may be that children may be more willing to participate in physical activity if their peers are doing so. Not a lot of research has been completed yet to address this possible strategy. All of these factors related to SCT will be interesting to observe throughout this research, particularly as this research is specific to those children with exceptionalities and much of the previous research relates SCT to physical activity and children without exceptionalities. Physical activity has been shown to impact the health and well-being of children with exceptionalities.

Summary

This literature review introduced the exceptionalities of the children involved in the study, including learning disabilities (LD), intellectual disabilities (ID), attention deficit

hyperactivity disorder (ADHD), and autism spectrum disorder (ASD). Each exceptionality was thoroughly examined, and provided an overview of the diagnostic criteria, prevalence, etiology, and assessment procedures (Aro et al., 2009; Carroll et al., 2014; Curatolo et al., 2010; DSM-5, 2013; Faraone & Biederman, 1998; Feldman & Reiff, 2014; LDAC, 2017; Mash & Wolfe, 2016; NASS Report, 2018; Nigg et al., 2012; Purugganan, 2018; Phillips & Lonigan, 2005; Pires et al., 2012). Next, physical activity and exercise, as well as physical literacy, were defined. It was determined that physical activity would be the term used throughout the paper, as it encompasses not only exercise, but all bodily movements promoting activeness and the well-being of children (Caspersen et al., 1985; Johnson & Turner, 2016; WHO, 2019).

From here, the impact of physical activity on four of the health and well-being indicators for children, including cognitive development, physical health and well-being, social relationships, and mental and emotional health and well-being, was thoroughly examined, with a focus on the effects on those children with exceptionalities (Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al., 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). Based on a variety of studies pointing to the effects of physical activity on each of these four health and well-being indicators in children with exceptionalities, it was determined that physical activity is instrumental in promoting optimum results in each of these areas. There were three main gaps in the reviewed literature pointing to each of these areas of health and well-being indicators: the lack of identification of the type of activity and intensity level (Chang et al., 2012; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Pastula et al., 2012; Ratey, 2008); the lack of Canadian research (Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al., 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Wachob & Lorenzi, 2015; Wouters et al., 2019; Yilmaz et al., 2004) and the lack of identification of specific strategies to engage children, in particular those with exceptionalities, in physical activity.

Additional studies were then considered to determine some of the most commonly used strategies currently being employed to engage all children in physical activity. Strategies such as

providing role models (Rodrigues et al., 2018; Wilk et al., 2018), focusing on specific types of physical activities (Gao & Lee, 2019; Jensen, 2006; Mowling et al., 2004; Pham et al., 2020; Ruggiero et al., 2020), providing education (Mowling et al., 2004; Ratey, 2008), making exercise accessible (Koch, 2013; Norris & Columna, 2016; Seidler et al., 1993; Walker et al., 2019), and demonstrating evidence of success (Bingham et al., 2010; Mowling et al., 2004; Ratey, 2008), were evidenced. These strategies were limited in number and breadth, as well as were dated. They particularly lacked focus on children with exceptionalities, and because these strategies are so important in engaging children in physical activity, this study will not only address further strategies to implement with children with exceptionalities, but also how to implement them. Many of the strategies provided were also not evidence-based, but instead a discussion of various articles and the strategies they presented. As well, there were limitations in the research provided on the strategies in that most of it was not Canadian based.

Finally, in relation to both the impact of physical activity on children's overall health and well-being as well as how to engage them in physical activity, a variety of theories of physical activity behaviour were presented to support these findings. These include attachment theory (Bowlby, 1958), endorphin theory (Sandman, 1990/1991; Sandman et al., 1990b), theory of planned behaviour (Ajzen, 1985) and social cognitive theory (Bandura, 1986).

Chapter 3: Methodology

Parent and educator thoughts, perceptions, and experiences related to specific strategies that work best to engage children with exceptionalities in physical activity were examined in the present study. This chapter presents the rationale for using qualitative methodology, basic interpretive qualitative research, participant selection and recruitment, data generation and analysis, trustworthiness, and ethical considerations.

Rationale for Qualitative Methodology

When examining specific strategies to use in order to engage children with exceptionalities in physical activity, I implemented a qualitative approach to address my research question. Although qualitative research can be difficult to define due to such diversity in every dimension, this was also why it was such an effective methodology to use in my research. Qualitative methods allow for connections, understanding, and making meaning (Merriam, 2002). According to Graue and Karabon (2013), qualitative research can provide diversities in perspectives, context, and form. Different researchers may study the same topic, but how they conduct and present their research may look very different. This is true in terms of my research, as I used interviews whereas many of the studies from the literature review used other methodologies. Furthermore, the context in each area of research may also differ, as we explore what we need to understand before the research is conducted. Finally, the form in which the research is presented could be different. Furthermore, I chose to use a qualitative approach, as this methodology was used in existing studies that involved strategies to engage children in physical activity and these studies were able to demonstrate success in providing results in this area (Koch, 2013; Mowling et al. 2004; Ratey, 2008; Rudella & Butz, 2015; Seidler et al., 1993).

Qualitative research has been used in many different fields and employs many different methods, such as interviews, case studies, and narrative inquiry (Graue & Karabon, 2013). This methodology always directly involves the researcher and they become a learner themselves (Graue & Karabon, 2013).

Basic Interpretive Qualitative Research

An interpretive qualitative approach is learning how individuals experience and interact with their social world, as well as the meaning it has for them (Merriam, 2002). I attempted to envision and understand phenomena from the participant's perspective. A basic interpretive qualitative research approach best fits the posed research question that guided this study:

What strategies have parents and educators used to engage or encourage children with exceptionalities to be involved in physical activity?

All forms of interpretative qualitative research designs have many key components. The first is that researchers must work towards understanding the meaning people constructed about their world and experiences. This means understanding what it is like for the participant in their setting, what their life is like, and what is going on for them (Merriam, 2002). In this research, I sought to understand how, from their perspective, the parents and teachers attempted to engage the child in physical activity and what this may have looked like, including strategies that they may have employed. The second characteristic is that the researcher is the primary instrument for collecting and analyzing all data. The main goal for this research was understanding. Therefore, I collected and analyzed data from the interviews in order to understand. Next, this process is always inductive rather than deductive, meaning the researcher gathers data to build concepts, make hypotheses, or develop theories. The data is gathered from making observations and coming to understandings. In this research, the data was gathered by making understandings of the interviews. Finally, the interpretive qualitative approach is always richly descriptive (Merriam, 2002). Instead of numbers, words and pictures are used to convey the information that the researcher has gathered. Data such as direct quotes from the participants, field notes, and videotapes, are key examples contributing to qualitative research. In this research, direct quotes and audio recordings were used.

Under this approach, data can be collected through interviews, observations, or document analysis, or a combination. In this study, data was collected through semi-structured interviews, where a mix of structured and less structured questions were posed and differed based on the participant's response (Merriam, 2002). These interviews were classified as active interviews, as there was a purposeful exchange of ideas between the participants and me (Trainor, 2013). In addition, as these were semi-structured interviews, this allowed the ideas to be exchanged "based on the researchers open-ended questions or areas of interest with probes that are designed to elicit details and explanations" (Trainor, 2013, pp. 125-126). This method of data collection allowed me to go straight to the source and pose questions, and receive immediate, meaningful responses (Trainor, 2013). Kvale (1996) furthers the notion of interviews by describing the interviewer as a miner, as they "seek nuggets of essential meaning", as well as a traveler,

alluding to the exchange between the interviewer and participant and the creation of a new experience for both.

When implementing the interview, it is important to note some specific guidelines that were followed in order to conduct a successful interview. Firstly, it is key that the group size, as well as the variety of the sample of participants, is optimal (Trainor, 2013). In qualitative research, a specific number of participants is not required; instead, the quantity of participants is sufficient when both the breadth and depth of the collected data is said to be adequate by the researcher, based on funding, logistics, and time (Trainor, 2013). Trainor (2003) continued by posing the question “What is the sampling strategy, and does it match the purpose of the study?” (p. 127). In this research, a criterion was provided, and snowball sampling was employed to gather participants, and these strategies were in congruence with the interview questions. Eleven people ended up responding to the recruitment flyers asking them to participate in the study. One person opted not to participate, allowing for a total number of 10 participants. After interviewing these participants, saturation was employed as a criterion for a sufficient sample size; in this particular research, responses became redundant and themes were able to be formed using the existing responses. Next, when looking at the sample of participants, it is important to determine whether they are suited to answer all of the necessary questions and provide a variety of responses in order to shape the research. Do they possess the “appropriate experiences, knowledge, perceptions, and/or ability” to participate in the research and provide suitable data (Trainor, 2013, p. 128)? When looking at the group of participants, there was a variety of roles in their involvement with children with exceptionalities; that is, perspectives of both teachers and parents. As well, the variety of participants was likely to provide suitable perceptions and experiences. Another guideline to keep in mind, and perhaps one of the most significant, is the relationship that the researcher develops with the participants. Rubin and Rubin (2005) explained that people will be more willing to participate in an interview with someone with whom they are acquainted or someone they know well. In terms of this research, many participants were recruited due to snowball sampling. This allowed for the researcher to be somewhat acquainted with the participant, as the person who provided the referral acted as a neutral party between them. This provided some degree of connection and level of comfort during the interview. The fourth guideline to bear in mind when conducting the research is the issue of subjectivity and reflexivity (Trainor, 2013). Using the interview method is an in-depth, involved process

therefore there is, without a doubt, going to be some influence of the researcher on some of the data collected; as long as this was recognized and kept in mind, the interviews were likely successful. Finally, it is crucial that the interview questions reflect the overall research questions (Trainor, 2013). I strove to ensure the interview questions pertained to the research questions related to the importance of engaging in physical activity and knowing this, what strategies could be implemented. After the interview was completed, the remaining steps were of equal importance, including describing how the data was collected, analyzing it, and then representing it.

Participant Selection and Recruitment

Upon University of Saskatchewan Ethics Board of Approval, purposive sampling was used to recruit 11 participants in a large urban centre in Western Canada. Upon receiving further details regarding the study, the 11th participant declined to participate; thus 10 participants ended up being included in the current study. Three teacher and seven parent participants provided a cohesive picture of physical activity strategies being used in both the school and home environments. I believe I reached saturation in my research, as many of the same or similar strategies were discussed in the interviews and I was then able to formulate these into a limited number of themes once I had analyzed the data. Each participant had a child in their class or their own child that had been diagnosed with an LD, ID, ADHD, or ASD. These specific exceptionalities were chosen due to my familiarity and interest with each exceptionality as well as their increasingly high prevalence in society today. Furthermore, components such as years of teaching experience, additional qualifications pertaining to special education, age, ethnic backgrounds, and gender were taken into consideration in order to determine commonalities or themes in the data collected. The inclusion criteria for the study participants were: (1) being 18 years of age or older; (2) having a child or child in their class aged 5-17 years of age; (3) having a child or child in their class diagnosed with an LD, ID, ADHD, or ASD; (4) willing to share their experiences with engaging the child in physical activity.

The recruitment process involved advertising for potential participants by distributing flyers in person and electronically to teachers, parents, libraries, grocery stores, and school boards within the community (see Appendix A). From this initial allocation of flyers, snowball sampling occurred, meaning that these teachers and parents ended up passing along the flyer to others who they thought may be interested in participating in the study. This was crucial in order

to gain participants for my study. The flyer described the study in detail and requested the person's participation in the study. Once the participant expressed interest in participating in the study, a consent form was provided, indicating the strict confidentiality policy, stating that no child's or adult's name or personal information would be released (see Appendix B). The children of participants attended both private and public schools across a large urban centre in Western Canada, and teachers were employed at both private and public schools. The parent and teacher participants sought were those who could provide responses on children of varying genders (i.e., male, female, non-binary, transgender, or gender x), ages, and ethnic backgrounds.

After recruiting and interviewing eight participants in person, an amendment was required on the flyer due to the Coronavirus Disease of 2019 (COVID-19) being declared as a pandemic. The pandemic resulted in restrictions being placed on many regions around the world, including places of study (i.e., restrictions prevented people from gathering inside). Therefore, I was not able to continue interviewing participants in person. I resubmitted an amendment to the ethics approval for this study to request a change for interviews to be conducted online rather than in person, and this amendment request was approved (see Appendix B). The final two participants were interviewed via Google Meet. This method of interviewing proved to work just as well as interviewing in person and I was able to complete the collection of data for the research based on all 10 participants.

Data Generation

Data generation and analysis occurred in a simultaneous process. The theoretical frameworks of attachment theory (Bowlby, 1958), endorphin theory (Sandman 1990/1991; Sandman et al., 1990b), the theory of planned behaviour (Ajzen, 1985), and the social cognitive theory (SCT) (Bandura, 1986) were used as lenses to review and interpret the collected data and generate themes.

Survey

After participants were given a flyer and committed to participating in the study, additional screening was completed to ensure all participants met the study's criteria. This was conducted through initial survey questions at the beginning of the interview (see Appendix C). I then reviewed each survey to determine if the interview should proceed. All of the distributed surveys demonstrated that the participants were eligible to participate in the study and therefore, all interviews were able to proceed.

Interviews

After the surveys were completed, two interview sessions, an initial interview and a follow-up interview, were held with each adult participant chosen based on the criteria for the study. The following materials were required to conduct the interview: (1) initial interview questions; (2) iPad with an app to record and transcribe the interview; (3) quiet space/environment; (4) follow-up interview questions. Initial interviews were approximately 10-15 minutes long and held in a private room one-on-one or online due to COVID-19. All interviews were digitally recorded using an app with security and privacy features. The app not only digitally recorded each interview, but also transcribed it simultaneously. Although the app was fairly accurate, the researcher did have to go back into the app and listen to the recordings again while following the transcriptions, and make some changes to spelling as well as words that were not recognized accurately by the app.

The initial interviews followed a semi-structured format, with open-ended questions that were followed up with additional questions based on the participant's response (see Appendix C). As noted by Kvale (1996), questions may be loosely sequenced, as well as may change form or arrangement based on the interviewee's participation. Various additional questions were asked in order to gain more details or clarity (e.g., What types of activities do you do with each age group? Do you take input from students with regards to activities? Do you participate in any physical activities as a family?).

After completing a literature review centred around the importance of physical activity for children's overall health and well-being, as well as what strategies can be used to engage them in physical activity, interview questions were developed and selected accordingly to ensure the information gathered from participants would provide reliable results that addressed gaps in the literature. Many of the studies reviewed and critiqued in the literature review recommended physical activity and its benefits but failed to mention strategies to engage children in physical activity (e.g., Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; MacMahon et al., 2019; Nakutin & Gutierrez, 2019; Pan, 2010; Pastula et al., 2012; Rately, 2008; Sorensen & Zarrett, 2014; Tremblay et al., 2000; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). Instead, both the benefits and specific strategies should be discussed concurrently, as reaping the best benefits likely cannot be attained without

employing particular strategies. Therefore, questions were asked about specific strategies that parents or educators may employ (e.g., In order to engage your child or child in your class in physical activity, what specific strategies or strategies do you employ? Do you provide modifications? Do you have access to special facilities or programs?). Moreover, the research that did address strategies to use to engage children in physical activity mainly focused on all children (e.g., Avery, 2012; Bingham et al., 2010; Craig et al., 1996; Gao & Lee, 2019; Jensen (2006); Koch, 2013; McMahon et al., 2019; Mowling et al., 2004; Pham et al., 2020; Rodrigues et al., 2018; Rudella & Butz, 2015; Ruggiero et al., 2020; Wilk et al. 2018). Limited research has addressed engaging children with exceptionalities in physical activity. Therefore, questions were included to address these issues (e.g., Do you implement different strategies or strategies for different children? Why do you think it's important or not that the children in your class with exceptionalities engage in physical activity?). While some of these strategies may be similar, it will be beneficial to compare this research.

One follow-up interview lasting 10-15 minutes was conducted with each participant at a set location and mutually agreed upon time, or online due to COVID-19. Each participant was given a printed copy or emailed a copy of their interview transcript, so they could review it and add, change, or delete anything that they felt uncomfortable releasing. Participants were then provided with a transcript release form and asked to sign it once they felt the final interview transcript suitably reflected their thoughts, perceptions, and experiences (see Appendix D).

Data Analysis

According to Trainor (2013), the analysis of interviews may examine what was said, how it was said, how what was said was interpreted, and what interactions transpired between the researcher and participant. Further to this, reasoning was used to determine themes among all of the data collected (Trainor, 2013).

Brenner (2006) provided five phases for data analysis. While these phases are presented in a linear progression, Brenner (2006) noted that working with data is a cyclical process as the researcher looks for meaning, understanding, and connections; therefore, returning to different points of the data throughout the process is appropriate. In this research, I returned to the recordings and transcriptions of the interviews numerous times to determine new themes and find key information. For example, when initially sifting through the research, the theme of "Valuing Relationships" was not depicted; however, when reviewing the transcriptions later on,

this theme was uncovered. The first phase was transcription, whereby I prepared the collected interview data for subsequent analysis. The audio recording and transcript, as well as any additional notes taken, were examined. Next, the phase of description was completed. In this phase, I identified the content of the data that was collected. This phase focused on bringing order and organization to all of the data (i.e., grouping like content, generating and organizing subcodes). I read through each of the transcripts, wrote down common points that arose from each related to the major topics, such as strategies and different benefits between different activities. Then, I colour coded and numbered various points throughout the transcripts that all pertained to these similar topics, and then grouped these together. For example, many parents mentioned that their child was happier after participating in physical activity. The third phase of the data analysis was the analysis itself. This was the heart of the process, focused on relations in the data generated by participants. I purposively selected themes across data within the various interviews. According to Braun and Clarke (2006), this is known as thematic analysis. In order to select a common theme, Braun and Clarke (2006) suggested capturing something important about the data in relation to the research question and representing some sort of patterned response or meaning within the set of collected data. This was definitely the longest phase of analysis, as I had to return to the generated data numerous times, selecting themes and subthemes and then uncovering additional, more prominent themes as the content collected continued to be studied in further depth. An emphasis on inductive analysis was key, purposively selecting themes strongly linked to the data themselves (Braun & Clarke, 2006). For example, taking specific data points from participants, such as recognizing how far the child has come and then relating that to a broader theme, such as “Breaking down barriers: Providing verbal support and feedback” was key to the process, but not an easy task. The five key themes that emerged were: (1) “It helps their brain, it helps their body, it helps their mood, it helps everything”: Improving children’s health and well-being; (2) “Knowing what makes them tick”: Valuing relationships; (3) “Breaking down barriers”: Providing verbal support and feedback; (4) “Tapping into what they enjoy”: Finding and promoting physical activities children enjoy; and (5) Presenting “different opportunities”: Providing access to physical activities. Interpretation was the next phase of data analysis. This was where connections were drawn between the data generated and larger theoretical issues (i.e., building a rapport with the child and the attachment theory) were addressed. It was important to explore how the research contributed to new knowledge, or how it

connected with previously conducted research. The following theories were used to analyze and interpret the data further, as they all had key components that directly pertained to the data generated: attachment theory (Bowlby, 1958); endorphin theory (Sandman, 1990/1991; Sandman et al., 1990b); the theory of planned behaviour (Ajzen, 1985); and the social cognitive theory (Bandura, 1986). Parents and teachers alike stated the importance of forming connections, which related to attachment theory which emphasizes the importance of relationships and communication for children (Bowlby, 1958). When children are engaged in physical activity, they have the opportunity to develop these connections with an adult figure as well as their peers. The endorphin theory also contributed to the analysis of the data as it explains that, when children participate in physical activity, it makes them feel good and has an effect on many physical and emotional factors (Sandman, 1990/1991; Sandman et al., 1990b), which can be directly linked to the children's health and well-being indicators (CIHI, 2013). The theory of planned behaviour discusses the significance of making physical activity a positive experience for children (Ajzen, 1985). In the collected data, it was mentioned that if children enjoy the activity they are engaging in, they will likely want to do it again and this will, in turn, support many of the benefits, including cognitive, physical, social, and mental/emotional, linked to physical activity and children's health and well-being (CIHI, 2013; Jensen, 2006; Mowling et al., 2004). A final key component of the data was providing all children with the opportunity to participate. This relates to Bandura's social cognitive theory and within this, the notion of self-efficacy (Bandura, 1986); if a child has the confidence that they can succeed, they will likely want to participate. This notion not only encompasses physical activity, but also physical literacy. Recall that physical literacy can be defined as "the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life" (The International Physical Literacy Association, 2017). As well, this theory correlates to the generated data regarding children wanting to participate when they observed a parent, coach, or peer participating in the activity. Brenner (2006) noted the phase of display which is the final phase of data analysis. This phase relates to how the researcher is going to present the research to the public. Whether the information is provided as a summary, tables, figures, direct quotations, or examples, it is important to determine what manner may be most valuable for those reading it (Braun & Clarke, 2006; Brenner, 2006). How a researcher represents their data should "produce new ways of thinking about the problem or question under

consideration” (Trainor, 2013, p. 134). In this research, many direct quotations and specific experiences and examples from both teachers and parents were presented. This representation was valuable for this specific research in that it provided authentic accounts and strategies that could be directly employed by other teachers and parents alike (Braun & Clarke, 2006; Brenner, 2006).

Trustworthiness

When one evaluates the worth of a research study to determine if the results and interpretations are grounded in the data, this is defined as trustworthiness (Lincoln & Guba, 1985). Brenner (2006) described the importance of building trust between the interviewer and the participant prior to an interview. How the participants perceived the interviewer would influence the kind of information received (Brenner, 2006). A large component of the trustworthiness of this particular research was the rapport built between the interviewer and the participants. Three main aspects were key to developing this rapport to ensure trustworthiness within the interviews: snowball sampling, the time before the interview began, and the time after the interview took place (Brenner, 2006). In terms of snowball sampling, when the participants were referred to the study by someone they knew, this neutral party provided some common ground between the participant and me, allowing for more ease during the interview as well as a better rapport between the participant and me (Rubin & Rubin, 2005). Next, before the interview began, I provided some additional background about the study, including confidentiality, as well as asked some general questions, such as about their day and their child. This allowed me to gain a little more insight into the participant, but also put the participant at ease (Brenner, 2006). Finally, during the follow-up interview, the participant was provided a copy of the interview transcript. This provided them with the reassurance that they were able to change, adapt, modify, or delete anything that they did not feel comfortable with (Brenner, 2006; Lincoln & Guba, 1985). Further to this notion of trustworthiness are credibility, transferability, dependability, and confirmability, which are integral to this concept as well.

Credibility

Credibility refers to whether the findings from the research data match reality (Merriam, 2009). That is, did the study measure what it intended to and do the results reflect the research questions/purposes? In order for the research to be credible, a few elements must be in place. First, multiple sources of data must be considered to produce maximum understanding, which is

known as triangulation (Lincoln & Guba, 1985; Merriam, 2002; Trainor, 2013). In this research, interviews were conducted with 10 participants, providing numerous perspectives and experiences. Interviews were recorded as well as additional notes were taken throughout the interviews. I also strove to establish rapport with each participant when I met with them to answer any questions they had and fill out and discuss their initial survey responses before their interview, and then spent time with them in the actual interview itself working through the semi-structured interview guide. A follow-up interview was also available to participants if they had any additional questions or concerns to ensure the accuracy of their provided information and their comfort with what was shared (i.e., member checking) (Lincoln & Guba, 1985).

Transferability

Transferability refers to the degree to which the results of this research can be applicable in other contexts (Bitsch, 2005; Tobin & Begley, 2004). In order for the research to have transferability, thick description must be utilized. This refers to deep, detailed explanations of the phenomena being studied (Denzin et al., 2006; Trainor, 2013). When questions were posed throughout the interviews and discussion ensued, thick description was used by parents and teachers in order to recount personal experiences of utilizing strategies to engage children with exceptionalities in physical activity. When attempting to use thick description, it is key that the description captures all senses, thoughts, impressions, and insights of the observer in order to provide detailed results in their entirety (Trainor, 2013). With regards to this particular research, it would be beneficial for it to be used in multiple contexts in the future, such as in the classroom or for parents with children with exceptionalities.

Dependability

Dependability refers to the findings being consistent (Merriam, 2009). That is, if the research were completed again, would the findings be the same? In order to ensure a high level of dependability in this research, the process of conducting a follow-up interview to review the transcribed interview was of huge importance in order to ensure the accuracy of the information provided. Parents and teachers were provided the opportunity to review and edit their interviews before they were used in the research, so that each participant could ensure that what they had shared was accurate and what they wanted to portray. Moreover, it was crucial to maintain audio, transcripts, as well as written notes during the interview process to further ensure accuracy. That way, I not only had a record of the participant's exact words through both the audio recording

and transcript, but I also made notes on their expressions, actions, and body language (Brenner, 2006).

Confirmability

Confirmability refers to the degree of neutrality in the participant's responses, and not having them shaped by components such as researcher bias, motivation, or interest (Tobin & Begley, 2004). Again, triangulation comes into effect here. It was crucial to have a large enough sample size in order to consider multiple sources of data (Trainor, 2013); in this research, the sample size being 10 participants. Moreover, an audit trail was used to demonstrate the steps taken from the start of the research until the reporting of the findings, through methods including the data collection, process notes, and audio (Bowen, 2009). In this research, the audit trail included collecting completed consent forms, audio recordings, transcripts, other notes from the interviews, and permission to release data forms. This ensured that the entire process was evidenced, not simply the final product (Bowen, 2009).

Ethical Considerations

Ethics approval was sought from, and granted by, the University of Saskatchewan Ethics Board. Ten participants were selected to participate in the study, all recruited from varying areas and having different roles in relation to children. Their decision to participate in the study was voluntary and they had the right to withdraw from the study at any point. All participants were required to sign a consent form before participating in the study, which included information regarding the purpose of the study, the participant's rights, as well as information on their right to withdraw and confidentiality. Due to the COVID-19 pandemic, an ethics amendment was submitted so that interviews could be conducted online rather than in person. An updated consent form was created, and approval was given to conduct the final interviews online. Each participant was also granted a follow-up interview, at which point they had the opportunity to add, change, or delete any information from the interview. This was conducted in-person or online due to COVID-19. It was important to note the sensitivity of the research topic, that of parents and teachers associated with children with exceptionalities; therefore, being as mindful as possible of both the participant's needs, as well as their emotional and psychological states, was key. All data from this study will be properly stored for the required five years. After careful consideration and practices in conducting and gathering the data, the next chapter will provide the results found from the interviews, including parents' and teachers' thoughts pertaining to the

benefits of physical activity for children with exceptionalities, as well as the strategies that they have used to engage them.

Chapter 4: Results

This chapter introduces the 10 individuals, seven parents and three teachers, who participated in this study. Their thoughts, perceptions, and experiences related to the benefits of physical activity for children with exceptionalities and engaging strategies are presented. All participants were assigned pseudonyms in accordance with confidentiality protocols. In order to promote further confidentiality as well as clarity, participants' quotations may have been edited, including particular words changed (e.g., names) or deleted (e.g., um, yeah, like). Brenner's (2006) five phases for data analysis and Braun and Clarke's (2006) framework around thematic analysis guided the analysis of the collected data.

Participants

There were 10 individuals, seven parents and three teachers, who participated in the study. The participants were male and female adults, who had various education levels (e.g., Bachelors Degree(s), Business Degree, Master's Degree, College Diploma, High School, Technical Certificate), occupations (e.g., teacher, counsellor, human resources, life coach, stay at home mom), ways of being physically active themselves (e.g., spin, HITT, running, aerobics, weights, biking, hiking, walking, boxing, skiing, sports), and relationships to the child they were describing (e.g., adoptive parent, biological parent, teacher). The participants had children, or children in their class, with varying ages, ranging from 5-13 years of age. The children discussed had been diagnosed with one or more of the following exceptionalities: a generalized learning disability, dyslexia, Fetal Alcohol Syndrome Disorder (FASD), Oppositional Defiant Disorder (ODD), ADHD, and ASD. Each participant rated the importance of physical activity for their child or children in their class on a scale of 1-10, with 1 being the least important and 10 being the most important (see summary in Table 4.1). The participants had many similar viewpoints with regards to the benefits of physical activity; however, each participant had different experiences and examples to share relating to the specific strategies used to engage the children, which added to the uniqueness, authenticity, and depth of the study.

Table 4.1*Participants*

Participant name and gender	Employment	Highest level of education	Participant's reported physical activity	Relationship to described child(ren)	Described child(ren) gender, age, grade, shared ethnicity, and diagnosis	Participant's rating of physical activity importance
Susie; Female	Highschool science teacher	Master's degree	Participates in physical activity (i.e., walking, step class, and weights) 4-5 times per week; average 45-60 minutes each time	Biological parent	Female; 7 years old; Grade 2; Caucasian; diagnosis of ADHD	10
Carole; Female	Stay at home mom	Graduate level degree	Participates in physical activity (i.e., hiking and spin classes) 3-5 times per week; average 50-60 minutes each time	Biological parent	Males; 10 & 13 years old; Grade 5 & 8; Caucasian; diagnoses of dyslexia	8
Sara; Female	Trauma therapy counsellor for adults	Counselling degree	Participates in physical activity (i.e., cycling, running, boxing, and going to the gym) 6 times per week; average 60 minutes each time	Biological parent	Female; 12 years old; Grade 7; Caucasian; diagnosis of a learning disability	10
Betty; Female	Construction business owner	Building technology certificate	Participates in physical activity (i.e., hiking, running, and walking) 4-5 times per week; average 60 minutes each time	Biological parent	Female; 12 years old; Grade 7; Caucasian; diagnosis of dyslexia	10

Participant name and gender	Employment	Highest level of education	Participant's reported physical activity	Relationship to described child(ren)	Described child(ren) gender, age, grade, shared ethnicity, and diagnosis	Participant's rating of physical activity importance
Paula; Female	Director of Human Resources	Business degree	Participates in physical activity (i.e., running, hiking, and spin classes) 6-7 times per week; average 1-4 hours each time	Biological parent	Female; 9 years old; Grade 5; Mixed ethnicity; diagnosis of ODD and ADHD	10
Kate; Female	Founder & director of charitable organization	High school diploma	Participates in physical activity (i.e., running, lifting weights, and biking) 3 times per week; average 60 minutes each time	Adoptive parent	Males; 7, 8, and 12 years old; Grades 2, 3, and 7; Mixed ethnicities; diagnoses of a learning disability, FASD, ADHD	10
Sally; Female	Stay at home mom	College diploma	Participates in physical activity (i.e., skiing, running, cycling, and hiking) 3 times per week; average 60 minutes each time	Biological parent	Male; 9 years old; Grade 4; Caucasian; diagnosis of ASD	10
Jill; Female	Classroom teacher and administrator	Bachelor's degree	Participates in physical activity (i.e., sports, fitness) 3-4 times per week; average 60 minutes each time	Teacher/Administrator	Female & male; 11- & 12-year-olds; Grade 6 & 7; varying backgrounds; varying diagnoses	10

Participant name and gender	Employment	Highest level of education	Participant's reported physical activity	Relationship to described child(ren)	Described child(ren) gender, age, grade, shared ethnicity, and diagnosis	Participant's rating of physical activity importance
Tamara; Female	Classroom teacher	Bachelor's degree	Participates in physical activity (i.e., HIIT exercises and sports) 6-7 times per week; average 45 minutes each time	Teacher	Female & male; 7 and 8 year-olds; Grade 3; varying backgrounds; varying diagnoses	7/8
Russ; Male	PE teacher	Bachelor's degree	Participates in physical activity (i.e., running, sports, and going to the gym) 7 times per week; average 60 minutes each time	Teacher	Female & male; 5-12-year-olds; K-7; varying backgrounds; varying diagnoses	10

Note. Each participant's rating of physical activity importance was on a 10-point scale with 10 being the most important.

The first participant was Susie who was the biological parent to three children, one of which had been diagnosed with ADHD and a potential learning disability. This child was Caucasian, 7 years old and in Grade 2. According to Susie, she was high functioning, meaning that she was fully integrated into the mainstream classroom. Susie worked as a high school science teacher, but for the purpose of this interview, she spoke specifically in regard to her daughter in Grade 2. Susie had a bachelor's degree, as well as a master's degree. Susie reported she participates in physical activity, such as walking, step class, and weights, four to five times per week, for an average of 45-60 minutes each time. She also rated the importance of physical activity for her daughter as 9 on a 10-point scale with 10 being the most important.

The next participant was Carole, a biological mother to two boys aged 10 and 13, both with learning disabilities. Both of her sons attended a school specializing in working with students with learning disabilities, specifically dyslexia. Carole has a graduate level degree in education. Her boys were Caucasian, coming from a European background. She stated that she

participates in 50-60 minutes of physical activity, three to five times per week, including activities such as hiking and spin classes. She rated the importance of her boys participating in physical activity to be an 8 on a 10-point scale with 10 being the most important.

Sara, the next participant, was a trauma therapy counsellor for adults. Her family's ethnic background was Caucasian, and she was the mother of two children, one in which had a learning disability. Her daughter attended a public school, receiving some extra pullout support. She put a strong emphasis on the importance of physical activity for both her and her 12 year old daughter, noting that she participates in cycling, running, boxing, and going to the gym six days per week and rated the importance of physical activity for her daughter a 10 on a 10-point scale with 10 being the most important.

The fourth participant to be interviewed was Betty, a mother to four children, one of whom was 12 years old and had been diagnosed with dyslexia. After attending public school, all of her children were now homeschooled. Her family's ethnic background was Caucasian. Betty completed three years of post-secondary in psychology as well as completed a building technology program at a technical school. She shared that she enjoyed hiking, walking, and running and participates in these activities four to five times per week for an hour each time. She rated the importance of physical activity for her daughter a 10 on a 10-point scale with 10 being the most important.

Paula, the fifth participant to be interviewed, had a business degree. She was the mother to two girls, one of which was nine years old and has been diagnosed with ODD and ADHD. Her family was of mixed ethnicities. Her daughter attended public school and was able to be fully integrated into the mainstream classroom. Paula reported running, hiking, and taking spin classes six to seven days per week for one to four hours each time. She believed that physical activity for her daughter was of utmost importance, rating it a 10 on a 10-point scale with 10 being the most important.

Kate was the adoptive parent to three boys, aged 7, 8, and 12. They were all diagnosed with a learning disability, FASD, and/or ADHD. Her boys all attended public school, with many additional supports, such as an educational assistant, pullout instruction, and counselling. Her boys came from mixed ethnic backgrounds; some areas were unknown given the fact that they were all adopted. Kate graduated from high school and runs a charitable organization dedicated to inspiring young people to create change through giving. She relayed she lifts weights, runs, or

bikes three times per week for one and half hours each time. She rated the importance of physical activity for her sons a 10 on a 10-point scale with 10 being the most important.

Sally was the seventh participant in the study. Her education consisted of a college diploma. She had a 9-year-old boy diagnosed with ASD who attended public school but received extra support one-on-one. Their ethnic background was Caucasian. She reported that she engages in skiing, running, cycling, and hiking three times per week for an hour. Sally put a strong emphasis on physical activity for her son, giving it a rating of 10 on a 10-point scale with 10 being the most important.

The next participant was Jill, an intermediate classroom teacher and administrator at a public elementary school. The children in her class and school were of varying backgrounds, including Caucasian, Asian, African American and Iranian. She reported having children in her class as well as in the school requiring a range of supports, including full integration within the mainstream classroom, one-on-one support with an educational assistant, and occasional pullout instruction. She had a bachelor's degree focused in two different areas and was currently working on completing a master's degree in an education related field. She also divulged she participates in numerous sports and fitness related activities herself, approximately one hour each time, three to four times per week. She rated the importance of physical activity for children with exceptionalities in her class a 10 on a 10-point scale with 10 being the most important.

Another participant, Tamara, was a teacher at an independent elementary school. She reported having children with multiple ethnic backgrounds, including First Nations, Asian, and Caucasian. Children in her class required varying supports, but most could be addressed within the mainstream classroom. She had a bachelor's degree in general studies and in education. She reported she participates in HIIT exercises as well as various sports, including basketball and softball, six to seven times per week for about 45 minutes each time. She rated the importance of physical activity for children with exceptionalities a 7 or 8 out of 10 on a 10-point scale with 10 being the most important.

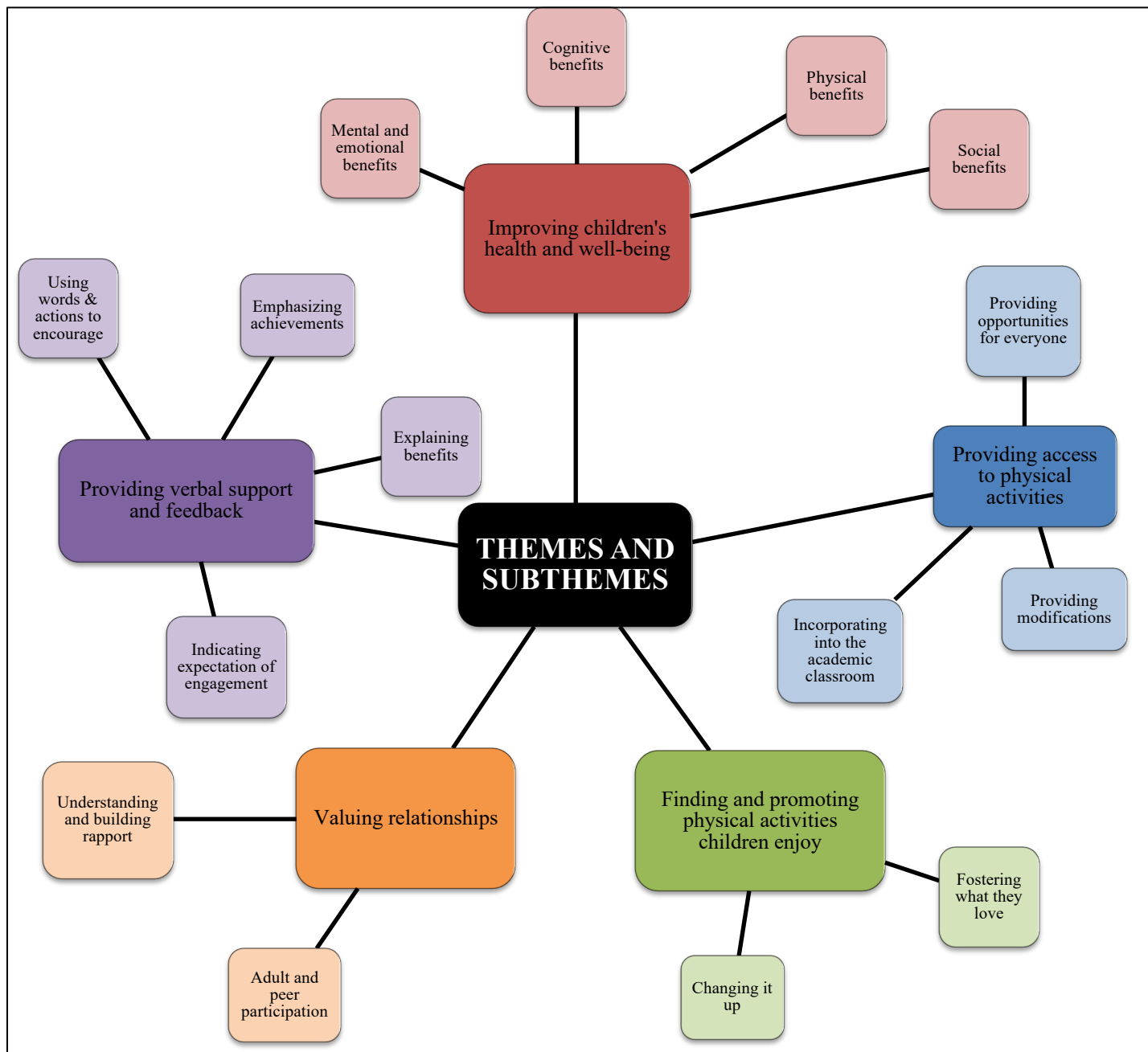
The final participant, Russ, was an elementary school teacher, specializing in physical education. He presented that the children in his classes were of varying ethnic backgrounds, including First Nations, African American, Asian, and Caucasian. He had a bachelor's degree in both physical activity and in education. He greatly valued physical activity, participating himself for approximately an hour a day in running, different sports, and attending the gym. He also held

this same value of physical education for children with exceptionalities, rating the importance of participation 10 out of 10. As he specialized in physical education, his responses differed in that he had the most expansive knowledge of how to implement physical activity, mentioning keywords such as “differentiation” and “levelled approach”. He was also the strongest advocate for children participating in physical activity and observed the most benefits from children participating, stating that it was key to “almost everything” in their lives.

The individuals participated in an interview with the student researcher to examine the benefits of physical activity for children with exceptionalities and as such, explore specific strategies to employ in order to engage these children in physical activity. After reviewing each interview transcript using the lenses of the theoretical frameworks of attachment theory (Bowlby, 1958), endorphin theory (Sandman, 1990/1991; Sandman et al., 1990b), the theory of planned behaviour (Ajzen, 1985), and the social cognitive theory (SCT) (Bandura, 1986), five major themes were purposively selected: (1) “It helps their brain, it helps their body, it helps their mood, it helps everything”: Improving children’s health and well-being; (2) “Knowing what makes them tick”: Valuing relationships; (3) “Breaking down barriers”: Providing verbal support and feedback; (4) “Tapping into what they enjoy”: Finding and promoting physical activities children enjoy; and (5) Presenting “different opportunities”: Providing access to physical activities (see Figure 4.1). These themes are discussed in further detail and linked together using meaningful participant quotes.

Figure 4.1

Themes and Subthemes



“It Helps their Brain, it Helps their Body, it Helps their Mood, it Helps Everything:”

Improving Children’s Health and Well-Being

The parent and teacher participants in this study shared how they felt physical activity improved their children’s or student’s health and well-being. Their reported beliefs and experiences can be organized into four subthemes: (1) cognitive benefits of physical activity; (2) physical benefits of physical activity; (3) social benefits of physical activity; and (4) mental and emotional benefits of physical activity.

Cognitive Benefits of Physical Activity

Five of the 10 participants commented on physical activity cognitively benefiting the children in their lives, whereas the other five participants did not comment on this connection. For example, as a parent, Kate noticed a better and faster rate of learning when a child engaged in physical activity while learning, sharing:

It’s a great way for them to learn when they’re moving their bodies, especially kids with ADHD... It’s their way of learning, when sitting down at a table doesn’t work. So, when you can be creative with learning words, for example, or spelling words, and they get to move their body, whether that’s hopscotch or hitting a ball against the words, they learn much faster.

Jill in her role as a teacher has had similar experiences with her students when they were active before completing a learning activity. She observed they were often able to better focus on the task at hand, leading to enhanced understanding and comprehension of class material, revealing:

I think that, in order to fully learn and fully understand concepts...there’s a huge connection between locomotor activities and then the ability to focus...the benefits from physical activity are huge on the development of the brain and your ability to understand. So, I think that for kids with exceptionalities, even if it’s just walking down the hall to get some water and coming back, that they come back and they’re able to focus...A quick movement break kind of gets the blood flowing and reinvigorates them.

As a parent, Susie disclosed that some type of movement for her daughter allows for a break as well as the opportunity to refocus, declaring:

It provides a nice break for her if she’s working on something that requires them to sit still or concentrate on something. If she has a little bit of an opportunity to move around, sometimes that helps her to refocus.

Tamara, a grade three teacher, mentioned that she believes physical activity makes a difference in the children's academic performance both before and after engaging in the activity, stating:

A physical break, especially if it's an enjoyable activity for them, is motivating. They'll work harder before the activity as well as after. If they know it's coming, it's something they can work towards. But I also think, when they come back in, there is a sense of, okay I've gotten the wiggles out.

Finally Russ, a physical education teacher, alluded to the cognitive benefit of physical activity, seeing not only direct evidence of this with his students at his school, but also learning this from his training in physical activity and previous schooling. "From what I've read in school and things, it helps you learn better. If you've exercised, your blood is flowing through your body."

In this theme, four of the five participants who commented on physical activity benefitting cognition were practicing teachers. Participants not only commented on physical activity providing cognitive benefits for children they also spoke out about the physical benefits as well.

Physical Benefits of Physical Activity

Four of the 10 participants also felt there were physical benefits to children engaging in physical activity. For example, Susie felt physical activity had many physical health benefits, noting, "I think it is important for their physical health; for their heart and for their lungs and also just for weight regulation, building muscle and having a psychologically healthy attitude to exercise." Another parent, Betty, mentioned that the physical health aspect of physical activity is of utmost importance in terms of balance, relaying, "So much food that we consume is easy access and convenience. So, I really stress to my kids to make sure there's a balance between the level of exercise and the level of nutrition that we get." As a physical education teacher, Russ stated that the benefits of physical activity are so encompassing, but stressed specific benefits pertaining to physical health, including "physical fitness, health, growth, and brain health. The list is endless. I'm a strong advocate for physical education." Another major aspect that parents noted in relation to the physical benefits of engaging in physical activity was sleep. Sara reported after her daughter participates in physical activity, "she tends to sleep better and be more tired at the end of the day." Susie also noted the physical benefit of sleep, mentioning:

It's great just to help them be tired at the end of the day. Even though she definitely is tired at the end of the day, just in general, I think it's important to exercise so that you're tired at night.

In summary, parents and teachers both commented not only on the physical benefits that could be seen in their children or students, but also went further and considered other qualities such as brain health and sleep. The participants also discussed the social benefits of physical activity.

Social Benefits of Physical Activity

Another key benefit of physical activity was the social component. This was noted by five of the 10 participants; the other participants did not comment on this particular aspect of physical activity. Jill described the importance of physical activity for her students based on their social development, divulging:

It's huge for their social development...Physical activities that involve interacting with peers helps build their confidence and their sense of belonging, in turn, producing better work. I think there's a time and a place for individualized activities, but I think most of them enjoy physical activity that involves other people. And I think that those activities benefit them more so than individual ones.

Parents also noted the social benefits of physical activity. Susie explained that "if you're able to participate in group sports, I think it's great to have that as a common point of connection with your peers." Betty also mentioned that she notices different activities having different benefits by stating, "Throwing them outside is, you know, more a creative way for them to be active; ringette is more of a social benefit." Finally, Sally discussed the importance of the social component of physical activity in that it contributes to her son's regulation:

When biking, we have issues as soon as there's an obstacle that he can't do himself. We always do a route...where he has to go uphill first. And usually that's the longest because he's throwing his bike and kicking it and we have to say pick up your bike, keep going. If there's a friend with us that's his age, he won't do that. Even if we're being passed by kids on the trail that are around his age, then he'll self-regulate himself. And then, when they're out of earshot and sight, then he'll throw his bike and kick it.

Working in a school with children of varying abilities and needs, Russ commented on the huge significance of physical activity in terms of social skills:

The underrated part is the social development that people don't think about. Especially kids with special needs, like autism, where they're lacking some of those natural social skills, they can learn a lot of cues, context, and casual conversation – all of these skills through sports, especially team sports. A lot of parents in our school – what they'll be doing is they'll put their kid in swimming or, you know, dance or very individual based activities and I always push the parents to put them on a team sport like soccer, baseball, volleyball, softball, whatever – where they're interacting with coaches, other parents, and other kids because it's such an important thing.

Both parent and teacher participants discussed the social benefits of physical activity, with the teacher participants predominantly commenting on the social component of physical activity. The parent participants who had children with exceptionalities where socialization was a challenge, such as ASD or were homeschooled, shared how physical activity benefitted this specific area. Participants also commented on the mental and emotional benefits of physical activity.

Mental and Emotional Benefits of Physical Activity

The final reported benefits of engaging in physical activity mentioned by five of the seven parents, that were also indicators of children's health and well-being, were mental and emotional benefits of physical activity such as mood improvement, regulation or controlling one's self and body, and decreased anxiety. Carole expressed that participating in physical activity was good for her child “whether it's fun or just a release, it's so important for your long-term mental health.” Sara revealed that participating in yoga and other cardio-based activities “sets her daughter up to have less reactionary time to things that are happening in the day to day; she's calmer...and generally speaking, she's just a bit more at ease.” In terms of physical activity having an effect on mood, Betty disclosed:

In terms of their mood and clarity, they're just so much happier when they're active, even if it's just outside, right? You know, sometimes I'll just throw them out in the yard, go outside and run around because, you know, you're getting antsy. And then they go outside and then they come in, they're just more even keeled.

Carole explained that her boys are “kind of just happier...and more peaceful” after engaging in physical activity. Another component of the mental and emotional benefits reported by parents and teachers was an improvement in a child's ability to regulate, or have control over oneself and

their body, after engaging in physical activity. Kate, a parent that was interviewed, described, “It grounds them, it controls their emotions. For my kids, the activities regulate their bodies. That’s literally what happens – it regulates their bodies.” Sally described an example regarding her son and skiing, stating “I don’t know how to explain it, but I read that skiing is great for kids with ADHD because it’s grounding...his behaviour the next day at school, it’s always better...the outdoor activity is super grounding for them.” Finally, in terms of anxiety, parents and teachers noticed that symptoms of anxiety were lessened when the child engaged in physical activity. When considering her child Sara revealed, “I think physical activity is important for her health now, and also setting up for her health in the future, knowing that it’s also great for anti-stressing, anti-anxiety...” In addition, Susie mentioned the fact that physical activity can be a “good stress reliever” for her daughter. One of the biggest benefits of physical activity that Carole noticed in one of her children was a decrease in anxiety. She relayed, “He’s just more peaceful. And so, I can tell that his anxiety is lower, and his general worries are lower. He’s just able to get to that Zen place.”

In summary, parent and teacher participants provided numerous examples and experiences related to the benefits of physical activity in multiple areas of a child’s health and well-being, including the cognitive, physical, social, mental, and emotional benefits. The participants also shared various strategies used by parents and teachers alike to engage their child(ren) or students in physical activity.

Knowing “What Makes Them Tick:” Valuing Relationships

The parent and teacher participants in this study shared how valuing relationships assisted their children or students in engaging in physical activity. Six of the 10 participants’ shared beliefs and experiences that can be organized into two subthemes: (1) adult and peer participation; and (2) understanding and building rapport with each individual child.

Adult and Peer Participation

Some parents observed that their children were more likely engage in specific physical activities if they also engaged with them. Three parents stated that not only did their participation assist in getting their child participating in physical activity, but they also mentioned that they liked engaging in the physical activity with their child and often other members of their family. Kate reported, “I think the biggest strategy is actually participating with them. Or having friends participate with them, but usually it’s participating with them to get them involved...to actually

do the activity too.” When asked if Carole’s family participates in physical activity together, she divulged, “When it’s a family, it’s mostly tag. The park... We also go for long walks.” Sara also discussed incorporating physical activity as a family, “We sometimes ride bikes, or go skating, skiing, swimming, sometimes running up the track.” As well, in terms of children wanting to participate due to their peers also participating, Sara noted, “Because a lot of the activities that she does are also social, that’s often a motivator for her.” In summary, three parent participants commented that their participation or peer participation in physical activity aided their child in engaging in physical activity. Participants also shared how understanding and building a rapport with each child was important to getting them involved in physical activity.

Understanding and Building Rapport with Each Individual Child

One of the specific strategies teacher participants mentioned related to the theme of the value of relationships were two notions that go hand in hand: understanding each individual child and building a rapport with the children in their class. Jill explained two specific examples of the importance of this strategy from her physical education class:

If I notice that there’s resistance, then I’d have everyone doing the activity and then I take one-on-one time with these students which often involves me being their partner or just standing near them, so they feel that level of comfort. I also specifically avoid activities that I know will trigger. So, in the past, I’ve done games like Bench Ball or dodgeball in PE, but I definitely don’t play those this year, just knowing that, with the makeup of my class, not everyone will benefit from it.

Russ really stressed the importance of understanding each child in order to select a specific strategy to help them engage in physical activity, noting, “I think really knowing and getting to know the kids. You know, what makes them tick. So, then you know what intervention to use.” He provided two examples, demonstrating this notion:

For some kids, it’s being really strict and saying something like, “No, you don’t have a choice” works, and then for other kids, you kind of have to find a resolution with them by kind of give and take, I guess. As well, being aware of when kids may need a break or suggesting it before they ask for it. That sort of thing, where I’ve seen things escalate, or I’ll send the EA [educational assistant] who works with that child – “can you go over to them now because I can see that they’re about to _____” that sort of thing or I’ll step in. Just kind of reading the room, but most of the time you try and get it, especially

in gym class, before it escalates too much because the tantrums can get pretty serious in there!

After understanding each child, Russ further explained a rapport building strategy he employs when a child is resistant to participating:

So, the first thing I would do is try and just let them figure it out on their own. If that's not working, if I can tell they're really hesitant, then I would pull them aside and have a long conversation, kind of asking them what they're afraid of or what the problem is or why they're not enjoying it. Sometimes they just say I need to go to the bathroom or I'm feeling sick. Other times it would be 'Oh I'm scared'. So then figuring out what the root of the concern is for the kid can help.

Finally, two of the teacher participants emphasized that building rapport and understanding each child, in turn, creates a positive classroom environment. Tamara stated:

If I'm taking them out for a quick game, I will take that into consideration. I know that they don't like certain games; for instance, dodgeball – I'm thinking of two particular students in my class, but the rules are just a little bit too much. And so, I'll try and make sure, like, you know, I want an inclusive attitude in my classroom.

Russ furthered this notion by sharing:

For some of the older kids, when I inherited them, some of the kids didn't have the skills that others had – the differentiation is always big. They didn't feel like they liked gym, or they belonged in gym, that kind of thing. So that was really tough when they're in grade six or seven at that point. But I've noticed that, the younger that I've started with them, they're less fearful going forward...The classroom environment of them supporting each other is really important and feeling comfortable to try things is something I really focus on.

In summary, teacher participants felt understanding and building a rapport with each child was a key piece in establishing teacher-student relationships and encouraging them to engage in physical activity. Participants also discussed the benefits of giving verbal support and feedback to children and students.

“Breaking Down Barriers:” Providing Verbal Support and Feedback

The parent and teacher participants in this study revealed the benefits of providing verbal support and feedback to their children or students to encourage their engagement in physical

activity. Five of the 10 participants highlighted the importance of providing verbal support and feedback to students with exceptionalities to better engage them in physical activity including: (1) emphasizing children's achievements, (2) explaining the benefits of physical activity, (3) indicating expectation of engagement in physical activity, and (4) using words and/or actions to encourage children's engagement.

Emphasizing Children's Achievements

Both a parent and a teacher participant commented that verbally emphasizing children's achievements in physical activity in various ways was a good strategy for engaging their children and students in physical activity. Kate disclosed it's about, "always recognizing how far they have come versus where they came from." Tamara, one of the teachers interviewed, provided the following visual example when communicating achievements, "We've used incentives, for instance; you know, if you can run this many laps, you can earn a sticker, things like that." In addition to emphasizing achievements, participants considered explaining the benefits of the specific activity as important to foster a student's/child's engagement in physical activity.

Explaining the Benefits of Physical Activity

Another strategy two parent participants felt assisted getting their children engaged in physical activity was explaining the benefits of the activity to them. Carole explained the following health benefits to her child, "We pushed running because I know that from personal experience, it helps relax the mind and I try to explain that to him...I've been pushing the link between how he feels afterwards, and he does feel better after." She also emphasized the long-term benefits of engaging in golf and other activities in relation to career, stating, "Because he's very long term focused, we had to tie it into getting into university, getting a job, those kinds of things. Then he sees it." Betty also explained the benefits of physical activity as a method to engage participation. She stated:

Their brain, their heart, their body, their attitudes, their everything, all the good things that it contributes them, so we certainly talk with them when they're tired. On a hike, we're like one strong foot in front of the other, big heart, you know, we do these little chants to make it, you know, for them to realize that it helps their brain, it helps their body, it helps their mood, it helps everything.

In summary, two parent participants felt explaining the benefits or *why* behind it was important to participate in physical activity assisted their children. Participants also commented on the need to indicate the expectation for a child to participate in physical activity.

Indicating Expectation of Engagement in Physical Activity

Another strategy parents and teachers shared they used to engage their children or students in physical activity was to explicitly state participation was an expectation. Sally explained that her son often does not want to attend soccer practice:

We just tell him he has to go. He doesn't have a choice. Sometimes we'll, you know, with the soccer, we'll say you're on a team and your team depends on you and you have to go. And I have to admit, it's been easier as he's getting older to get him to. He gets concepts, he understands he doesn't really have any choice with regards to going. This is something he has to do.

Furthermore, Betty has made physical activity an expectation in their household from the beginning, revealing:

The kids, in general, are somewhat expected to participate in a high level of exercise. And so, I don't make it easy or nice, or you know, I don't do that. It's just the way that the expectation is – you sometimes need to do things you don't necessarily love, but it's working hard and it's learning how to work hard so I sort of take it as a learning opportunity for them to, you know, actually go through things that aren't necessarily fun.

Carole also mentioned that participating in physical activity is “simply a requirement” in their household; she explained that her son chose golf as one activity and then, in addition, “he has to have a couple of activities that he does outside.” As a teacher, Russ also used this tactic with students, sharing:

Maybe at home, they're allowed to say, “I don't want to, and I don't have to do it.” But, I kind of teach them, in gym class, there's not much of a choice. This is what we're doing, the whole class is doing it. And, you know, maybe next day we'll be doing something you like more but sometimes you have to do things that are not your favourite.

Both parent and teacher participants stated they framed participation in physical activity as an expectation and did not offer their children/students a choice as a strategy to increase physical activity engagement. Participants also discussed using their words and/or actions to encourage children's/students' participation in physical activity.

Using Words and/or Actions to Encourage Children's Engagement

One parent and one teacher participant also discussed the usefulness of using words or actions as a strategy to affirm or encourage their children or students become and stay engaged physical activity. Kate shared, "It's more just cheering them on in any moment of success that they have, whether it's just riding their bike or doing a jump." Susie also mentioned:

Everybody that she's had to work with has always been very supportive and affirming, which I think is great and she definitely benefits from positive affirmation...And if you give her a high five or that sort of thing, she's the sort of kid who really thrives on that kind of stuff.

Both a teacher and a parent participant felt using supportive words and/or actions during physical activity kept their child/student was engaged. Participants also commented on the importance of figuring out personal physical activity preferences to better engage students/children in physical activities.

"Tapping into What They Enjoy:" Finding and Promoting Physical Activities Children Enjoy

Five of the 10 parent and teacher participants in this study emphasized the importance of finding and promoting physical activities that their children or students enjoyed to encourage them to be more engaged. Some parents and teachers also mentioned that their child/student did not always enjoy the physical activity initially presented to them, so they changed the physical activity to something that the child(ren) enjoyed, but still reached their target outcome. This section is broken into two subthemes: (1) Fostering what they love; and (2) changing it up.

Fostering What They Love

One parent and three teacher participants shared they find out what physical activity the child/student likes and then will support the child/student in doing that specific activity to encourage their physical activity participation. Carole stated, "My son doesn't enjoy swimming lessons or very formal training. If it's much more play based, such as playing tag, climbing on apparatuses, jumping on the trampoline, then yes, he absolutely enjoys it." For instance, Jill shared when working with her students, "I find that always tapping into what they enjoy works the best. So that one that really enjoys dancing, or even just interacting with their peers, so sometimes we'll do free play."

Russ described how he formulates a physical education class, making sure to tap into what they enjoy:

I start very structured, where we're using this specific equipment to do this specific task because I know it'll be most successful with the age range or with the skill level of the children. But, within that, there are a variety of ways they can demonstrate what we're doing. I'll give them a few different ways to do the task, maybe. So, some parts of that will be quite specific, like we're throwing and catching a ball with one bounce...And then, as the lesson goes on, I'll let them try different ways to throw and different ways to catch...Then, you can throw it in the hoop, or you can kick the ball – kind of free time for them to explore and try things.

Tamara further explained in her grade 3 class that physical activity is a huge positive for many of the children, revealing, “Sometimes the physical times are the times that they can shine and be themselves and, you know, be happy with their friends because that's an area they have a strength.”

In summary, participants shared that by engaging the child/student in a physical activity they love is key to engaging them again and again. Participants also commented on the need to emphasize movement rather than a particular activity.

Changing it Up

Parent and teacher participants also discussed focusing on the goal of movement rather than a specific activity to encourage engagement in physical activity. Sara shared that if her daughter:

... doesn't want to do something in that moment, like a specific exercise, then we'll do something else that would be targeting the same thing. For example, if it was a cardio thing and she didn't want to run, then we would do something else.

Russ continued this idea of encouraging parents and other teachers not to be particular about what kind of movement children want to do, sharing, “I don't care what the kids love or get into or even like, they just need to like something...It doesn't matter as long as they're doing something that they like, and they're enjoying their time and getting outside.”

Jill focused on this idea of movement being key by divulging:

One particular student with an exceptionality likes to get on an exercise ball and just bounce. So, what I've done now is that we have multiple exercise balls so that he's

socializing with his peers as he's bouncing on these exercise balls and I allow him to do that as long as there's movement, that's kind of the criteria for that activity. Both parent and teacher participants shared that changing activities up could help to engage students/children in physical activity.

In summary, in this theme participants felt fostering the physical activities that students/children love and changing up activities to focus on movement were two strategies to use to better engage students/children in physical activity. Participants also discussed the need to provide children/students access to physical activities to foster their engagement.

Providing “Different Opportunities:” Improving Access to Physical Activities

Five of the 10 parent and teacher participants in this study revealed the benefits of improving children's and students' access to physical activities. Their beliefs and experiences can be organized into three subthemes: (1) providing opportunities for everyone; (2) incorporating physical activity into the academic classroom; and (3) providing modifications.

Providing Opportunities for Everyone

In terms of providing opportunities for everyone, both Tamara and Russ discussed the importance of children having equal opportunities in relation to physical activity, regardless of their economic background and/or family upbringing. Tamara presented the following example in her class:

We have one end which is a very wealthy population in this city and then we also have several students from the local First Nations band.... The First Nations students do engage in a lot of physical activities at their recreation centre and things like that. But some children, I find, haven't had the same opportunity as those other wealthier students and I think it's really important for them to get that physical exercise. There are kids who go home and play video games and eat their dinner and go to bed. And I think school is a great place for everyone to get that physical activity.

Russ also divulged:

I think every kid should have the opportunities to learn skills and try new things and be exposed to as many different opportunities that they can...giving them the opportunities is the most important thing. I think a lot of parents, particularly those with kids with exceptionalities, are scared to put their kids into team sports or those sorts of things because they're worried about their behaviour. But I think, if they start young, they learn

earlier and you can help solve the problems...When kids are young, the other kids don't know that they're different or the behaviour's different; they just see kids as kids, and I think that's an important time to start.

Also, within this domain of providing opportunities for each child is the notion that children will have a variety of skill levels. Russ described how he takes this into account when planning his physical education classes, stating:

The first thing I always do is, whenever I'm doing a unit or lesson, I start with something I know that they'll all be able to do successfully. So, I start with something very, very basic within that skill. If it's throwing and catching, it could be just throwing the ball to yourself and catching it, or bouncing it to yourself, so they can just even explore and feel and try. It's kind of like a levelled approach where I'll say, 'Okay, this is the first level I want you to do. Then, if you're successful 10 times or whatever, then you can do the second level which is slightly more challenging' and it's progressive. For kids that are struggling, I know who they are, and I specifically start with them to make sure that they're learning the key things they need to know in order to be successful. And then, if they're not, I can, you know, modify by making the ball bigger, or making the ball softer, or changing their partner they're working with to someone who's of higher skill to help them learn the skills through watching them or by playing with someone who's more skilled. The student can learn from them, and they can help teach, or using an EA [educational assistant] or like a teaching assistant to help those children with the skills one on one, to help them feel confident.

As a parent, Susie explained that she has to provide a ladder approach during certain family activities for her daughter, revealing:

At the playground, we'll push her on the swings sort of to get her on there at least and doing something different than colouring in her notepad. And then that's kind of like a little ladder approach to saying, "Okay, now you have to do it yourself if you want to stay on the swing."

In summary, parent and teacher participants felt it was important to provide each child with equal opportunities to participate in physical activity. Participants also shared incorporating physical activity into the classroom learning was a simple way for teachers to increase engagement in physical activity.

Incorporating Physical Activity into the Academic Classroom

Two teacher participants also felt ensuring accessibility to physical activity was important through incorporating physical activity within the academic classroom. Jill mentioned:

Even though it's a grade six/seven class, we do movement breaks and I find that this helps for all of my students, not just the ones with exceptionalities, as I do have a very high energy class. So, this can be anything from yoga, mindful breathing, jumping jacks, or sometimes they want to challenge each other in push up competitions, or dance offs. Just some really quick movement breaks to get everyone refocused.

In Tamara's grade three class, she disclosed:

I try and get them moving as much as possible. So, a lot of math, we do games, collaborative games, things like that. Get them up and moving, whether it's heads or tails, four corners, running around the classroom, things like that. If I have like a larger work block, like in the afternoons for example, if I don't have anything to break up that time, I'll always make sure I take them out for a few minutes. I mean, all kids need that fresh air and movement in order to focus for that period of time.

Incorporating physical activity into the academic classroom is an easy way for all students to have access to in physical activity daily. Providing modifications within the activity is the last subtheme within the theme of providing opportunities.

Providing Modifications

Finally, two teacher participants, one of whom was both a parent and a teacher, felt specific activity modifications need to be made in order for physical activity to be accessible to all children. Jill shared that she taught a volleyball unit in her physical education class with her grade six's and seven's and provided the following example of a modification she employed:

I had to use a more inclusive sized volleyball, one that was easier to hit and track. I also had to make sure that the rest of the students are controlled with their movements, because sometimes when there's more running around or volleyballs flying everywhere, this causes one of my students to internalize a little bit and not want to participate as much.

Jill also provided modifications in a dance unit, sharing, "If it's too loud, then I will provide noise cancelling headphones, which really helps because one of my students loves to dance but

he doesn't love loud noises." Anytime Jill provided a modification however, she tried to make it as inclusive as possible, explaining, "I use them for all of the kids. Trying to normalize it too, so it's not just for one kid, or else it becomes obvious why I'm doing it." As a parent and a teacher Susie explained the importance of modifications for her daughter to participate in both gymnastics and swimming lessons, describing:

Her gymnastics' teachers seem to sort of take the activity level down to where she is...With swimming, when the other kids have progressed to being able to float independently, the instructor gives her a pool noodle or a floaty thing that she has to hold in her hands.

In summary, three participants felt providing various modifications to include all children in physical activities, including those with exceptionalities, are necessary to ensuring children/students can fully participate.

Summary

The interviews with both parents and teachers provided examples and experiences related to the benefits of physical activity for children with exceptionalities as well as various strategies that can be used to engage them in physical activity. Their accounts provided five major themes and subthemes: (1) "It helps their brain, it helps their body, it helps their mood, it helps everything:" Improving children's health and well-being; (a) Cognitive benefits; (b) Physical benefits; (c) Social benefits; and (d) Mental and emotional benefits; (2) "Knowing what makes them tick:" Valuing relationships; (a) Adult and peer participation; (b) Understanding and building rapport; (3) "Breaking down barriers:" Providing verbal support and feedback; (a) Emphasizing achievements; (b) Explaining the benefits; (c) Indicating the expectation of engagement; (d) Using words/actions to encourage; (4) "Tapping into what they enjoy:" Finding and promoting physical activities children enjoy; (a) Fostering what they love; (b) Changing it up; and (5) Presenting "different opportunities:" Providing access to physical activities; (a) Providing opportunities for everyone; (b) Incorporating physical activity into the academic classroom; (c) Providing modifications. Parents and teachers both offered similar and different conceptualizations of the benefits of physical activity for children with exceptionalities, which then determined various strategies used to engage the children. The next chapter will present a discussion into what these results may offer in relation to existing literature, practical and

theoretical implications of the findings, strengths of the current study, and limitations and directions for future research.

Chapter 5: Discussion

While the themes may all differ, they are, in fact, very much related and provide many points of overlap, as well as demonstrate a well-rounded representation of the data generated from the interviews. The purpose of this basic interpretive qualitative study was to examine the benefits of physical activity for children with exceptionalities and explore engaging strategies from the perspective of parents and teachers. Specifically, the research question that guided this study was:

What strategies have parents and educators used to engage or encourage children with exceptionalities to be involved in physical activity?

The teacher and parent participants each described the value of physical activity for their child(ren) and students, if and how resistance to participating was demonstrated, and what strategies they employed in order to engage their child(ren) and students in physical activity. This chapter discusses the main themes drawn from the gathered data and relates key findings to existing research literature and theories of physical activity behaviour, including the attachment theory, the endorphin theory, the theory of planned behaviour, and the social cognitive theory. Practical implications, strengths, and limitations of this study, as well as directions for future research are outlined.

Summary of Findings

The objective of the current study was to explore the specific strategies that have been used by teachers and parents to engage children with exceptionalities in physical activity. This information contributes to the current knowledge base of the various benefits of physical activity related to the four out of five health and wellbeing indicators discussed in the literature review. Ten participants, seven parents and three teachers, were interviewed to examine the specific strategies used to engage children in physical activity. The generated data was then formulated into five major themes.

In the first theme and subthemes, “It helps their brain, it helps their body, it helps their mood, it helps everything”: Improving children’s health and well-being, paired with the four subthemes of cognitive benefits, physical benefits, social benefits, and mental and emotional benefits, parents and teachers discussed the benefits of physical activity related to four specific areas of health and well-being. In the majority of the interviews, all four of these areas were mentioned, with most parents and teachers speaking to the social as well as mental and emotional

benefits of physical activity. In terms of the first benefit of cognition, children who were active prior to learning, in the middle of learning, as well as incorporating physical activity within learning, demonstrated benefits in this area. These benefits pertained to understanding and focus level. It was observed that mostly teachers commented on the cognitive benefit of physical activity; all who commented on this were teachers but one. Another aspect that parents reported was that their children benefited physically from participating in physical activity. The knowledge of physical activity having positive effects on their bodies, including their heart and lungs, was enough to have them participate. Furthermore, some parents mentioned that their child(ren)'s sleep was affected by their participation in physical activity; the more physical activity they did, the easier it was to fall asleep. The third health indicator, social relationships, was mentioned frequently by both parents and teachers as being a key benefit of physical activity. All teachers commented on the importance of physical activity on this indicator. Parents who either had a child with an exceptionality where socialization was a specific challenge or had a child who was homeschooled pointed out the importance of this indicator. Social relationships were developed through physical activity; for example, increasing confidence and socialization skills. Children also chose to participate in certain activities because their peers were participating, therefore using the physical activity as a common ground for connection. Finally, mental and emotional health was another huge factor noted by both parents and teachers as a direct correlation to physical activity. The major themes were in relation to mood, regulation, and anxiety.

In order to engage children with exceptionalities in physical activity, the second theme of "Knowing what makes them tick": Valuing relationships was developed. It was broken down into two related subthemes of adult and peer participation and understanding and building rapport. If parents and teachers engaged in the physical activity themselves, it was discovered that children were more likely to engage as well. Similarly, if the children's peers were involved, for example, as part of a team, it was more likely that they would also want to participate on the team too. The second aspect of this theme pertained more to teachers. If teachers were able to understand each unique child, this would then help teachers select strategies to use in order to engage children in physical activity. Moreover, if a rapport had been built with the child, it was likely that the child would be receptive to wanting to participate in physical activities.

Another major theme uncovered by the research was “Breaking down barriers:” Providing verbal support and feedback. This was then separated into four subthemes, including emphasizing achievements, explaining the benefits, indicating the expectation of engagement and using words/actions to encourage. One of the ways in which this was implemented in order to facilitate participation in physical activity was by demonstrating evidence of success. By providing words and/or visuals to show progress, the child was able to feel like they were achieving success and more willing to participate in the physical activity again. Another method in which this strategy was employed was by explaining the benefits of the physical activity to the child. By understanding the *why*, children will recognize why parents and teachers are asking them to partake in physical activity. When parents and teachers utilized this technique, it was with children who were high functioning, so they were able to make the connection between physical activity and its benefits. Furthermore, this strategy was utilized by parents and teachers having the expectation that the child must participate in the physical activity. The children understood this and participated based on the fact that they were expected to do so. Finally, using words of affirmation and encouragement pertaining to the child’s participation in the physical activity was a strategy used by parents and teachers. This was also seen to keep the child engaged as well as participate in the activity again. Teachers always provided an explanation to their words or an evidence-based technique when providing support and feedback; for instance, Russ stated in his physical education class that the child may not like the activity today but that there would be something different for them tomorrow and Tamara provided a visual representation of progress using stickers. Parents, on the other hand, simply provided the words.

A fourth strategy employed by both parents and teachers in order to engage children in physical activity was “Tapping into what they enjoy:” Finding and promoting physical activities children enjoy. Fostering what they love and changing it up were two subthemes that were key to this strategy. Finding out and honouring what physical activities the child likes is key to having them participate in it again. Many adults recognized the most important aspect of having children engage in physical activity is movement; they then did not emphasize what type of physical activity they engaged in.

The fifth theme within the research was presenting “different opportunities:” Providing access to physical activities. This theme was developed by providing opportunities for everyone, incorporating physical activity into the academic classroom, and providing modifications. One of

the ways in which this strategy was applied was allowing for opportunities in physical activity for everyone. For example, a child's family who may not have the financial means to sign them up to play on a soccer team should not mean that this child simply does not get to play soccer. In order to make it more accessible, teachers explained the importance of incorporating physical activity right into their day to day within the academic classroom. That way, all children have access to participate and this can even be integrated within specific subjects, such as math and science. The final aspect to making it accessible is providing modifications within the specific physical activity. Every child is unique and will have various strengths and weaknesses, so catering to these and allowing the child access to each activity through modifications, such as through equipment or specific movements, is key to their success. This theme was only touched on by teacher participants in this study.

Integration of Findings with Existing Literature

As anticipated, the findings in the current study were consistent with the existing body of literature on the benefits of physical activity for children. As many previous studies have already centred around the benefits of physical activity for children with exceptionalities, this was not a central research question in my study. However, I do believe that it is important to note that the interviews I conducted did confirm the notion that physical activity benefits children with exceptionalities cognitively, physically, socially, and mentally and emotionally. In the literature reviewed, four areas from the children's health and well-being indicators were discussed, including cognitive, physical, social, and mental and emotional (CIHI, 2013). Both parents and teachers within the current study perceived benefits within these areas when their child participated in physical activity. As well, findings within the current study also paralleled much of the existing body of literature with regards to strategies used to engage children in physical activity. The four remaining themes of valuing relationships, providing verbal support and feedback, finding and promoting physical activities children enjoy, and providing access to physical activities were found in both the literature review and within the current study. However, while all of these strategies were mentioned to an extent in previous literature, these strategies were repeated multiple times as well as broadened or perceived differently within the current study. For instance, the notion of accessibility within existing literature encompassed the idea of providing adequate facilities and equipment, as well as incorporating physical activity

right into the classroom, but failed to mention accessibility regardless of a family's financial situation which parents and teachers noted in the current study.

“It Helps their Brain, it Helps their Body, it Helps their Mood, it Helps Everything:”

Improving Children's Health and Well-Being

The first theme uncovered in the current study, the benefits of physical activity in relation to the children's health and well-being indicators (CIHI, 2013), was also present within the existing literature. In both the current study as well as the existing literature, cognitive benefits were seen in the areas of understanding and focus. These cognitive benefits were observed when the child was active prior to learning, in the middle of learning, and while learning. In terms of understanding, parents and teachers noticed better understanding of concepts for children with or without exceptionalities during or after completing physical activity. Ratey (2008) performed a case study at Naperville Central High School in which a special fitness program was developed for students who were academically low in reading. Before school began, they participated in an hour of vigorous, aerobic activity. The study demonstrated improvements in their reading and comprehension by 17 percent compared to the other students who participated in standard physical education.

With regards to focus level, parents and teachers noted that, when children engaged in physical activity before or during learning, their level of focus was better than when they did not participate in physical activity, and difficulties that may occur when sitting at a desk for a long period of time were alleviated, particularly in those students with ADHD. Gapin and Etnier (2010) conducted a study to focus on the effect that physical activity may have on the executive function performance in those with ADHD. It was discovered that certain tasks involving executive functioning, such as planning and working memory, were improved and/or positively associated with moderate to vigorous activity. Ratey (2008) examined one of his patients who had anxiety that was heightened by his ADHD. His patient stopped his medications and began running. Within a short amount of time, he noticed significant improvements in his academic marks, and he attributes the positive change to the physical activity. Finally, a study by Nakutin and Gutierrez (2019) examined the effect of physical activity on academic engagement and executive functioning in children with ASD. They had students with a diagnosis of ASD jog for 12 minutes, with walk breaks when necessary, followed by a five-minute cool-down. Afterwards, students were observed in their classrooms once they had completed the physical activity. It was

determined that physical activity had a large, immediate effect on academic engagement; however, it was not found to have an effect on EF. It is important to note that, while the benefit of cognition was mentioned in the current study, particularly by teachers, it was the largest area of focus within previous literature. I believe that this lesser focus can be attributed to more prominent areas of concern in children today, such as the rising rates of obesity (i.e., physical) and mental health concerns (i.e., mental and emotional health).

Engaging in physical activity was also seen to have physical benefits, as demonstrated in both existing literature as well as by parents and teachers within the current study. Parents and teachers mentioned the physical benefits of physical activity, such as growth and building muscle, based on their own background knowledge. Although parents did not monitor heart rates, weight loss, and other physical factors, they did mention one of the main reasons why they have their children engage in physical activity is because of the well-known physical benefits. As Yilmaz et al. (2004) discovered, physical activity improves specific areas such as muscle grip, strength, and balance. A couple of parents in this study noted sleep to be a specific physical benefit of physical activity. A specific study, conducted by Wachob and Lorenzi (2015), measured the sleep activity and quality of children with ASD, as well as collected a daily sleep log and questionnaire from parents related to their child's sleep, in conjunction with their time spent participating in physical activity. The study showed that there was a significant relationship between daytime activity levels and positive sleep patterns. Another study by Wouters et al. (2019) examined the physical activity levels of children with ID and its results on particular physical health components, such as body composition, muscular strength, muscular endurance, and cardiorespiratory fitness. The study showed a positive association between physical activity and cardiorespiratory fitness, as well as motor development (muscular strength and muscular endurance). Parents and teachers noted the importance of building children's cardio for their heart health, as well as building muscle and strength.

The social aspect was a major benefit of physical activity noted by parents and teachers alike within the current study. Participating in physical activity was thought to improve social development, confidence, sense of belonging, as well as produce a common point of connection among peers. As mentioned by Russ in his interview, children may not have many social connections but by being active, this can change that by having some common ground. Within previous literature, a study completed by Pan (2010) demonstrated decreased antisocial behaviour

problems for children with ASD. In another study by Kang et al. (2011), children with ADHD were seen to improve their social skills according to the Social Skills Rating System (SSRS), particularly in the area of cooperativeness (Gresham & Elliott, 1990).

The final benefit of physical activity for children according to the children's health and well-being indicators is the mental and emotional benefits. This benefit was another frequent area mentioned by both parents and teachers in the current study. Parents and teachers saw this as a benefit in terms of mood, regulation, anxiety, and self-esteem. In previous literature, there were numerous studies completed that were related to the benefit of physical activity specifically on reducing anxiety and alleviating symptoms in order to improve mood. Bell et al. (2019), Kiluk et al. (2008), and Ratey (2008) all looked at levels of anxiety in people and found that those with anxiety disorders who participated in physical activity were seen to have reduced levels of anxiety and related symptoms afterwards. Moreover, MacMahon and Gross (1987) examined physical and psychological effects of aerobic exercise, with one of the effects being self-concept. The researchers discovered significant benefits to one's self-concept after participating in physical activity. As both parents and teachers have alluded to, the resounding response to the benefits of physical activity in multiple areas, including cognitive, physical, social, and mental and emotional, confirms past research completed in this area.

Knowing "What Makes Them Tick:" Valuing Relationships

The value of relationships was one of the main themes within the current study; however, not a lot of previous literature referenced this topic. Parents mentioned that when they participated in the physical activity with their child, this encouraged their child to be engaged. Moreover, when a child's peers were involved, this often engaged them in the physical activity as well. Teachers alluded to the importance of building a rapport with their students. This includes finding out what makes them comfortable, what they enjoy, and what may trigger them. One study by Davis and Jowett (2014), included in the social relationships section of Chapter 2, demonstrated the importance of the relationship between the coach and athlete, and that the coach can provide a secure attachment for the child. When a child feels comfortable with a coach and/or teacher, this person can enhance their performance, self-esteem, personal growth, and general well-being (Cote, 2002; Cote & Fraser-Thomas, 2007). In other existing literature, while it was not quite the same in terms of actual participation with the child, Rodrigues et al. (2018) showed that, if the parents of the child were active themselves, it was more likely that the

children were active as well. The fact that all parents and teachers who were interviewed stated that they were involved in physical activity on a regular basis themselves and valued it a great deal, does show some correlation to this study. Another study that related to valuing relationships was conducted by Wilk et al. (2018). It demonstrated the link between parental support and parental physical activity with children's perception of parental support and children's physical activity. There was strong evidence demonstrating the importance of children's perceptions of parental support in relation to their physical activity. These supports could be in many forms, including but not limited to transporting them to places to be active, watching them be active, or motivating them to be active. While motivating children to be active was demonstrated in the current study, the other forms were not directly mentioned by participants. These would definitely be worth looking into in future studies.

“Breaking Down Barriers:” Providing Verbal Support and Feedback

Providing verbal support and feedback as a specific strategy to engage children in physical activity was another main strategy employed by both parents and teachers within the current study and was only demonstrated within certain areas in existing literature. One of the ways in which verbal support was used was to demonstrate evidence of success. Parents and teachers used words as well as visuals, such as stickers, to show the child's progress in physical activity. Ratey (2008) noted this strategy when his patient noticed their own anxiety levels lessen when they engaged in physical activity. Craig et al. (1996) explained that when children engage in activities they enjoy and are competent in, they are likely to sustain participation in the activity. Finally, Avery (2012) also conducted a study to demonstrate the aspect of providing evidence of success by having students set goals and then monitor and assess them. When children do this, they are able to observe direct evidence of their progress and success. The importance of demonstrating evidence of success in order to engage children in physical activity is key.

Providing verbal support and feedback was also used when parents and teachers explained the benefits of physical activity to the child. Often when a child can detect or visualize short term and/or long-term benefits, they can be more likely to engage. Mowling et al. (2004) explained the importance of allowing the child to understand what they are learning and how it applies to life outside of school.

Another aspect of verbal support from the current study was that parents and teachers often stated that participating in physical activity was an expectation. Whether the child was part of a sports team, playing soccer in their physical education class, or their family was participating in a hike together, it was expected by parents and teachers that the child participates, and this was something that they just had to do. Within existing literature, there were not any studies found that explored or found physical activity was an expectation of parents or teachers when working with children with exceptionalities.

The final component of this strategy is words or actions demonstrating affirmation by parents and teachers. Providing positive words as well as actions, such as a high five, can encourage the child and make them want to participate in the physical activity again. In studies conducted by Beets et al. (2010) and Guidelines for School (1997), parental support in forms such as attending the child's game and providing encouragement and praise were major supports that encouraged children to be involved in physical activity.

“Tapping into What They Enjoy:” Finding and Promoting Physical Activities Children Enjoy

The fourth major theme from the current study is the strategy of finding out what the children enjoy. Parents and teachers noted that, if the child enjoyed the physical activity that they were participating in, they were likely to partake in it again. Finding various activities that target the same desired skill/outcome and tapping into what the child enjoys is key. Research by Jensen (2006) stated how to engage children in physical activity when they may not want to by saying, “Find something they do like. It is that fundamental to the brain” (p. 179). Moreover, Mowling et al. (2004) suggested focusing on activities that children enjoy by doing things such as allowing choice, designing activities that will challenge them, and providing activities with a purpose. This will, in turn, promote intrinsic motivation for the children, beginning to engage because they want to engage. Gao and Lee (2019), Pham et al. (2020), Rudella and Butz (2015), and Ruggiero et al. (2020) all suggested exergames for children. These are video games in which the player(s) have to physically move to play. Their study demonstrated that, when exergames are used, the length of physical activity as well as the child's motivation increases.

Providing “Different Opportunities”: Providing Access to Physical Activities

The final strategy is making physical activity accessible. While this was discovered and noted as a common strategy in my Literature Review in Chapter 2, this strategy utilized by parents and teachers alike seemed to encompass a much broader scope, including providing

opportunities for everyone, incorporating physical activity into the academic classroom, and providing modifications. Teachers explained the importance of creating equal opportunities for every child, independent of their economic background, family upbringing, or skill level coming in. There was no previous literature that was located and reviewed addressing this aspect of accessibility; however, an important one nonetheless as numerous teachers and parents mentioned it in the current study.

Another aspect of accessibility is incorporating the physical activity within the academic classroom. Teachers discussed not having to have a specific physical education class in order to move and be active; rather, incorporating movement into math class, having a dance-off in class, or taking the class out for a ten-minute playground break were ways in which physical activity could easily be incorporated. Previous research by Koch (2013) referenced this aspect of accessibility. Koch (2013) engaged her students in a game of *Math Bo*, where various movements represented different math operations. For example, air punches represented addition, so if the question was $2+2=4$, the students had to perform two punches, then another two, make the equals sign with their arms, and then perform four more punches for the answer. She often found that students enjoyed it and did not even realize they were engaging in physical activity.

Finally, specific modifications may have to be made in order for physical activity to be accessible to all children. Parents and teachers touched on this within the current study, often noting a change in equipment in order to allow the child to be successful and participate in the same physical activity with the other children. It was also stressed that people working with children need to have the knowledge to make these adaptations when necessary. Within existing literature, Seidler et al. (1993) mentions the importance of incorporating facilities and equipment specific to youth, such as smaller-sized equipment, specialized equipment, and play areas. Rauworth et al. (2003) conducted a study examining staff at fitness facilities and their knowledge and ability in assisting children with exceptionalities. Many did not know how to adequately provide support, and the literature emphasizes the importance of being informative in this area. Finally, a study by Walker et al. (2019) discussed the importance of making equipment and facilities available to those with exceptionalities in rural areas.

Theoretical Implications

The five major themes identified in the current study were closely related to the four theories of physical activity behaviour that were used to analyze and interpret the data: (1) attachment theory (Bowlby, 1958); (2) endorphin theory (Sandman, 1990/1991; Sandman et al., 1990b); (3) theory of planned behaviour (Ajzen, 1985); (4) social cognitive theory (SCT) (Bandura, 1986).

The first theory, attachment theory, centres around the idea that children have an immediate need for emotional connection, and this allows them to develop appropriately. Ainsworth et al. (1978) continued Bowlby's notion of attachment to include various attachment styles, such as secure, anxious-ambivalent, and avoidant. The current study relates to this theory in terms of the two major themes of valuing relationships and providing verbal support and feedback. Many of the parents and teachers interviewed discussed the importance of participating with as well as building a rapport with the child. When these are accomplished, positive attachments can then be made. Furthermore, the attachment theory relates to the theme of providing verbal support and feedback. When words of affirmation and positive actions are demonstrated by the parent or teacher, this encourages the child to engage in the physical activity and creates a relationship between the two people.

The endorphin theory also relates to one theme in particular, the benefits of physical activity in relation to the children's health and well-being indicators (CIHI, 2013), uncovered in the current study. The endorphin theory encompasses the idea that physical activity enhances the release of beta-endorphin, which has the potential to alter pain perception, mood, respiration, and the release of pituitary hormones (Bartholomew et al., 2007; Chronicle Herald, 2017; Schwarz & Kindermann, 1990). The notion of the beta-endorphin having these effects relates to the current study in terms of the specific physical as well as the mental and emotional benefits that children gain when engaged in physical activity.

Another theory of physical activity behaviour is the theory of planned behaviour. This theory includes the belief that people will engage in a behaviour when they evaluate it positively, believe that others want them to engage in it, and perceive it to be under their control, as well as the belief that it will increase the likelihood of a behaviour (Downs & Hausenblas, 2005). The largest connection to this theory comes from the theme of finding and promoting physical activities children enjoy. Parents and teachers mentioned that it was key for the child to enjoy the

physical activities that they engage in, provided by things such as giving them choice, tapping into what they enjoy, and providing a challenge. If the child enjoys it, they will more than likely engage in it again. Moreover, the theory of planned behaviour relates to the theme of providing verbal support and feedback as well. If parents and teachers are able to provide evidence of the child having success in the physical activity, this will also increase the likelihood that they will engage in the activity again.

Finally, in terms of social cognitive theory (SCT), Bandura (1986) explained that individuals learn not only from their own experiences, but also by observing the behaviours of others. Another major component of SCT is self-efficacy, or the confidence one has in completing the physical activity. This theory encompasses three of the themes disclosed in the current study: valuing relationships, providing verbal support and feedback, and providing access to physical activities. The child can observe and learn from their peers, parents, teachers, and coaches, and as a result, this can have the potential to want them to engage in the physical activity. Russ describes the children in his class being at all different skill levels, but that differentiation in the class is huge in order for them to enjoy gym and feel like they belong. In terms of verbal support and feedback, when parents and teachers provide words of affirmation or encouraging actions towards the child, this can promote their self-confidence and allow them to want to continue participating. This theory in relation to these specific themes goes beyond the notion of physical activity, which was initially thought to be sufficient to support all of this research; however, the idea of physical literacy better coincides with these themes, as it includes a much broader perspective, including motivation, confidence, physical competence, knowledge, and understanding (The International Physical Literacy Association, 2017). Finally, SCT including self-efficacy, also relates to the strategy of accessibility. When the child is provided with an opportunity and environment within physical activity that works for them and allows them to be successful, this will help develop self-efficacy and, in turn, urge them to participate in the activity.

Strengths of Current Study

The current study had numerous strengths, providing some similar findings related to previous research to strengthen certain notions, but also providing some unique findings. In terms of supporting and adding to the existing research, parent and teacher participants further emphasized the importance of engaging children, particularly those with exceptionalities, in

physical activity for cognitive, physical, social, and mental and emotional benefits. Not only did parent and teacher participants comments support existing research in terms of the various benefits of physical activity, but they also mentioned some similar strategies, to engage children in physical activity (e.g., importance of role models, focusing on specific types of activities). Their comments reiterated the importance of these strategies and that they can be successfully used with children to increase their engagement in physical activity. The current study's focus or research topic was unique compared to previous studies in three ways: (1) it was current and novel within Canada; (2) it provided a different perspective; (3) it provided numerous varying strategies.

First, the research topic was current and novel within Canada. This study reflected current perspectives that were specific to Canada, by having teachers and parents discuss children that attended Canadian schools and participated in activities reflective of the area. There were limited studies on both the importance of physical activity in relation to the four health and well-being indicators as well as specific strategies to implement completed within the last five years, in particular those related to children with exceptionalities (Bell et al., 2019; McMahon et al., 2019; Nakutin et al., 2019; Wouters et al., 2019). The current study provided evidence of the importance of physical activity and specific strategies to implement to engage children in it, particularly those that would be beneficial for those with exceptionalities. As well, the research was conducted in Canada whereas the majority of the research completed previously in this subject area was conducted in the United States of America, Europe, and Asia, or it was not specifically stated where it was conducted (Avery, 2012; Bell et al., 2019; Bingham et al., 2010; Chang et al., 2012; Craig et al., 1996; Davis & Jowett, 2014; Gao & Lee, 2019; Gapin & Etnier, 2010; Jensen, 2006; Kang et al., 2011; Mowling et al., 2004; Norris & Columna, 2016; Pan, 2010; Pastula et al., 2012; Pham et al., 2020; Ratey, 2008; Rauworth et al., 2003; Rodrigues et al., 2018; Seidler et al., 1993; Sorensen & Zarrett, 2015; Yilmaz et al., 2004). Research that is Canadian is important as each country has different school curriculum, guidelines, and methods compared to other places in the world, so the implementation of these strategies may look different. For example, Russ provided specific strategies to use within a gym setting. These suggestions may not work for schools in places where gyms are not common and physical education takes place outdoors. According to the European Environment and Health Committee (2003), 20% of schools in Hungary have gymnasiums and 40% of school yards and facilities are

considered unsatisfactory for sports, relaxation, and play (as cited in Rattigan et al, 2016). Moreover, not only will different physical class locations cause strategies to be unique, but different locations around the world will have various opinions on inclusion of children with exceptionalities. There may also be differences in terms of accessibility in other countries, which again could lead to varying strategies.

A second strength of this study was the perspective from which it was presented. This study provided parent and teacher perspectives and thoughts of the benefits of physical activity for children with exceptionalities and strategies they use in order to specifically engage them. Many previous studies focused on children in general (Avery, 2012; Bingham et al., 2010; Chan et al., 2018; Craig et al., 1996; Gao & Lee, 2019; Jensen et al., 2006; Koch, 2013; Mowling et al., 2004; Pham et al., 2020; Rodrigues et al., 2018; Rudella & Butz, 2015; Ruggiero et al., 2020; Wilk et al., 2018). While many of the strategies presented could be used with all children, this study provides specific strategies that have been successfully implemented with children with exceptionalities. As well, previous studies that were located and examined were limited in offering interviews of adults discussing children with exceptionalities; instead, the research conducted was often quantitative in design and/or included a questionnaire, or offered a review of previous studies (Avery, 2012; Bell et al., 2019; Bingham et al., 2010; Craig et al., 1996; Davis et al., 2010; Gao & Lee, 2019; Koch, 2013; McMahon et al., 2019; Mowling et al., 2004; Nakutin et al., 2019; Pham et al., 2020; Rauworth et al., 2003; Ruggiero et al., 2020; Walker et al., 2019; Wilk et al., 2018; Wouters et al., 2019). This research study generated data through participant interviews, and provided a meaningful approach where personable, private accounts were shared and expanded upon. While questionnaires can provide useful information amongst large populations, interview data often gathers more in-depth insights from participants, specifically in terms of their attitudes, thoughts, and actions (Kendall, 2008).

A third and final strength of the study, and potentially the most important, was related to the strategies participants shared. Many of the strategies shared by participants in the study provided some overlap to existing studies that were examined. For instance, similarities can be drawn between Koch (2013) and Tamara, one of the teachers interviewed, as they both discussed incorporating action and movement directly into the classroom through math games. However, the strategies highlighted by participants in this study were also broadened and looked at in a different way compared to previous research. There were also new strategies that were

highlighted that were specifically used with children with exceptionalities. For instance, in terms of being broadened or looked at in a different way, the strategy of ensuring activity accessibility was not only presented in terms of facilities and modifications as it is in existing literature, but also incorporated providing opportunities for everyone to be involved in the activity as well as encouraging students to be engaged in physical activity within the academic classroom. Wouters et al. (2019) and McGarty et al. (2018) both emphasized the need for future research to determine more strategies that could be used to engage children in physical activity and to ensure these interventions were effective. In the current study, both parent and teacher participants suggested using the strategy of making physical activity a requirement for students/children and not a choice. This strategy was not discussed in the reviewed research literature.

Providing verbal support or feedback was mentioned by both parents and teachers in the current study and deemed by them to be effective in engaging their children/students in physical activity. Strategies such as this that are specific to those children with exceptionalities have been limited in previous literature (Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Walker et al., 2019). It is more difficult to engage children with exceptionalities in physical activity (Carlon et al., 2013; Frey et al., 2008; Rimmer, 2005). Therefore, it is even more crucial that children with exceptionalities do participate in physical activity due to increased risk factors such as obesity, inactivity, muscle weakness, decreased strength, and the inability to perform daily living activities (Chen et al., 2010; Fedewa & Ahn, 2011; Obrusnikova & Cavalier, 2011; WHO, 2003). This current study was able to focus on strategies specific to children with exceptionalities in order to aid in their engagement in physical activity.

Limitations

Three potential limitations were noted within the current study. The first potential limitation was related to the participant selection. While there was an appropriate sample size, the participant group was not culturally diverse. Incorporating some more individuals who were male (there was only one participant out of 10), individuals who were recent immigrants to Canada (there were none), individuals who were Indigenous, or individuals from different locations within British Columbia or Canada may have had a varying effect on their answers regarding physical activity and strategies used.

A second potential limitation of the current study was omitting or limiting particular questions that could have had an effect on the study. For example, a question asking the participant's age was not included. As well, some participants did not elaborate on their educational background. Both of these factors could have influenced a participant's beliefs about physical activity and its importance.

Another possible limitation of the study was the length and depth of some of the interviews. One of the interviews was only five minutes long and this proved difficult to address all aspects of the current study in this time. The short interview length was possibly due to the participant being uncomfortable in an interview setting or not feeling a connection to the questions posed, and therefore not elaborating and providing details for questions.

Implications for Educators, Schools, Parents, and Related Professionals

The research findings presented are applicable to parents and all professionals within and outside of the school setting who are working with children. This information will assist professionals within a Canadian school setting with applying updated procedures and methods specific to Canadian children's/students' needs. For instance, incorporating physical activity into the everyday classroom would look different in Canada versus other countries since school curriculums and facilities differ. This Canadian research will also allow parents and other professionals (i.e., educational assistants, occupational therapists, etc.) to potentially build relationships and draw parallels with others in the field or similar areas.

Another implication of this research is that it highlighted the perspectives of both parents and teachers on the topic of physical activity and strategies that can be used to engage or involve children. Allowing them to share their personal successes and challenges gives others the opportunity to see themselves in their stories and consider for themselves how they could better involve children in physical activity.

Finally, this study added to the existing research since the parent and teacher participants illustrated the importance of engaging children in physical activity for cognitive, physical, social, mental, and emotional benefits (Bell et al, 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; MacMahon et al. 2019; Nakutin et al., 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). All people working with children should be encouraging them to be engaged in physical activity to reap these benefits.

Furthermore, the strategies parents and teachers reported using in the current study not only highlighted and supported what had been reported in the research literature, but also broadened existing ideas and presented new ideas. Participants looked at engaging students/children in physical activity in a different or completely new way such as suggesting educators and parents need to provide opportunities for everyone. Perhaps most importantly, these strategies suggested by both teachers and parents were specific to those children with exceptionalities which have only been explored in limited previous studies (Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Walker et al., 2019). The teacher and parent participants in this study reported using specific strategies to encourage their children/students to be engaged in physical activity due to the multitude of benefits that would result. The findings in this study will surely be able to assist educators, schools, parents, and related professionals to help all students be more engaged in physical activity moving forward.

Directions for Future Research

The findings in the current study suggest that there are additional areas of research that could be explored within this topic. The first area that could be further examined is considering the perspectives and experiences of coaches, physiotherapists, occupational therapists, and other professionals working with children with exceptionalities related to physical activity (i.e., benefits, challenges, strategies, etc.). Each of these professionals would provide different benefits and strategies depending on their expertise. For example, a physiotherapist may focus more on strategies to enhance physical benefits whereas an occupational therapist may focus more on strategies related to the social benefits in order to improve a child's self-esteem. Every person working with children would have a different relationship with them, providing researchers an opportunity to look at this topic from different angles or employ source triangulation (i.e., involving several different participants to gain a better understanding of the topic in various contexts) (Denzin, 1989).

In addition, although the research was to include children aged 5-17, parents and teachers interviewed ended up having or working with children up to age 13. Further research with children within the range of 13-17 years of age would be beneficial, as specific strategies would likely change as a student enters their teen years since engaging them in physical activity may prove to be different or more of a challenge than with younger children. For instance, their interest levels would be different and the types of physical activity in which they engage in

would likely be different. As well, older students may not be as willing to participate, so the type of strategy to actually get them engaged may be different.

Another direction for future research within this topic would be to employ more mixed methodologies, such as large quantitative studies or case studies. Using varying methodologies may allow for a greater depth or breadth of information, as well as a diverse understanding of the phenomenon (Almalki, 2016).

Finally, gathering a wider variety of participants from varying ethnically diverse backgrounds (i.e., parents, teachers, and other related professionals working with children) would allow researchers to consider how children with diverse needs and from diverse backgrounds may experience physical activity engagement differently.

Conclusion

This qualitative study explored parents' and teachers' perceptions as to the benefits of physical activity in relation to the children's health and well-being indicators (CIHI, 2013), and specific strategies they found useful in engaging their child(ren) or students with exceptionalities in physical activity. The results of this study yielded five important findings. First, participants' reported beliefs and experiences that physical activity benefits children cognitively, physically, socially, mentally, and emotionally supports previous research findings (Bell et al., 2019; Chang et al., 2012; Davis & Jowett, 2014; Dunton et al., 2014; Gapin & Etnier, 2010; Kang et al., 2011; Kiluk et al., 2008; MacMahon & Gross, 1987; McMahon et al., 2019; Nakutin et al., 2019; Pan, 2010; Pastula et al., 2012; Ratey, 2008; Sorensen & Zarrett, 2014; Tremblay et al., 2000; Wachob & Lorenzi, 2015; Wilk et al., 2018; Wouters et al., 2019; Yilmaz et al., 2004). Parents and teachers shared their experiences working to engage students with exceptionalities in physical activity and provided specific examples of how children/students benefitted during or after engaging in physical activity. Their reported experiences support what has been reported in the previous limited research done in this area (Davis et al., 2010; Norris & Columna, 2016; Ratey, 2008; Rauworth et al., 2003; Seidler et al., 1993; Walker et al., 2019). Next, valuing relationships was another theme uncovered in this study. Parent and teacher participants shared when parents or peers participated in the physical activity with the child, or teachers were able to build a rapport and positive classroom environment, then the child was more likely to engage in the physical activity. Providing verbal support and feedback was the next major theme within the current study. Specific methods participants reported using included emphasizing achievements,

explaining the benefits of physical activity, indicating the expectation of engagement, and using words/actions to encourage children's/students' participation to engage them in physical activity. Another strategy participants reported employing was finding and promoting physical activities children enjoy. They believed it was important to foster what the children/students love to do, as they would then often want to participate in this activity again. They also felt it was important to change an activity to meet the needs of the individual child. Finally, participants emphasized the importance of providing opportunities for everyone including incorporating physical activity into the academic classroom and providing modifications if necessary. Many of these strategies can be integrated immediately each day in order to engage children in physical activity. Parents, teachers, and other educational professionals need to be cognizant that implementing these strategies on a consistent basis will better foster children/students to engage in physical activity and obtain benefits in multiple areas of their lives.

**Appendix A
Flyer**

**PARTICIPANTS NEEDED FOR
RESEARCH IN Physical Activity and Students with
Exceptionalities**

We are looking for volunteers to take part in a study of parents and teachers, and the strategies used to engage children with exceptionalities in physical activity.

As a participant in this study, you would be asked to: complete a survey, an interview, and a follow-up interview.

Your participation is **entirely voluntary** and would take up approximately an hour and a half of your time on 3 separate occasions. By participating in this study you will help us to discover additional strategies that both parents and teacher can implement to engage children with exceptionalities in physical activity.

To learn more about this study, or to participate in this study, please contact:

Student Investigator:

Katie MacDougall
778-994-6429
kam627@mail.usask.ca

This study is supervised by: Dr. Laureen McIntyre, Department of Educational Psychology and Special Education, University of Saskatchewan.

laureen.mcintyre@usask.ca 306-966-5266

This study has been reviewed by the University of Saskatchewan Research Ethics Board.

Appendix B



Department of Educational Psychology and Special
Education
Room 3104, 28 Campus Drive Saskatoon SK S7N 0X1

Consent Form

Title of Study: Physical Activity Benefits for Children with Exceptionalities: Exploring Engaging Strategies

Student Researcher and Supervisor: Katie MacDougall, Master of Education candidate in the Department of Educational Psychology and Special Education at the University of Saskatchewan.

E-mail: kam627@mail.usask.ca

Cell Number: xxxx

Dr. Lauren McIntyre, Department of Educational Psychology and Special Education, University of Saskatchewan.

E-mail: laureen.mcintyre@usask.ca

Office Telephone: xxxx

Purpose of the Study: You are invited to participate in a study, the purpose of which is to survey and interview teachers and parents to gain an understanding of strategies and strategies to engage children with exceptionalities in physical activity. This research will be used to collect the attitudes and opinions of participants in order to provide insight for future directions in regard to employing various strategies to engage children with exceptionalities in physical activity in multiple environments.

There are no known risks in this research study. The results will be used for the purposes of this thesis, and may also be used in publications, and presentations to teachers, parents, and professionals. This consent form will be stored separately from any data.

As a participant in this study:

1. You are asked to sign this consent form and complete the survey titled Parents and Teachers Working with Children with Exceptionalities. The survey may take approximately 5 minutes to complete. Data will be kept confidential. Consent forms will be stored separately from the survey completed by participants. Participants will not be identified and responses will remain anonymous and confidential.
2. You have the right to refuse to answer individual questions.
3. You have the right to withdraw from this study at any time. If you choose to withdraw, the data you provided will be removed from analysis and destroyed.
4. Your data will be stored in a locked cabinet accessible only by the researcher's supervisor, and safeguarded for a minimum of five years. If you have any questions concerning the study, please feel free to contact the researcher.

This study was approved by the University of Saskatchewan Behavioural Research Ethics Board has approved this study on _____. Any questions regarding your rights as

a participant may be addressed to that committee through the Office of 98 Research Services (966-2084). Results will be available through the University of Saskatchewan Library upon completion of the thesis.

I have read and understand the description above. I have been provided with contact information in order to have any questions addressed. I consent to participate in the study described above, understanding that I may withdraw this consent at any time.

Name of Participant (please print): _____

Signature: _____

Date: _____

Signature of Researcher: _____

Katie MacDougall

Masters Candidate, University of Saskatchewan

Oral Consent Form

Title of Study: Physical Activity Benefits for Children with Exceptionalities: Exploring Engaging Strategies

Graduate Student Researcher: Katie MacDougall, Master of Education candidate in the Department of Educational Psychology and Special Education at the University of Saskatchewan.

E-mail: kam627@mail.usask.ca

Supervisor: Dr. Laureen McIntyre, Department of Educational Psychology and Special Education, University of Saskatchewan.

E-mail: laureen.mcintyre@usask.ca

Office Telephone: xxx

Purpose of the Study: You are invited to participate in a study, the purpose of which is to survey and interview teachers and parents to gain an understanding of strategies and strategies to engage children with exceptionalities in physical activity. This research will be used to collect the attitudes and opinions of participants in order to provide insight for future directions in regard to employing various strategies to engage children with exceptionalities in physical activity in multiple environments.

There are no known risks in this research study. The results will be used for the purposes of this thesis, and may also be used in publications, and presentations to teachers, parents, and professionals.

In order to participate in this study, volunteers must be:

- (1) Eighteen (18) years of age or older;
- (2) The parent or teacher of a child aged 5-17 who has been diagnosed with a learning disability (LD), intellectual disability (ID), attention deficit hyperactivity disorder (ADHD), or autism spectrum disorder (ASD); and
- (4) Willing to share their experiences with engaging the child in physical activity.

We are asking volunteers to complete:

- (1) One individual 60 minute interview (which would also involve completing a short written survey) to explore parents and teachers' experiences engaging children with exceptionalities in physical activity. This interview will be audio/digitally recorded. The information from the audio recordings will only be heard by the graduate student researcher and her supervisor. You can ask to have the recordings turned off at any time **without giving a reason**. This interview will be

written out word for word. Then you will be given a copy of the interview to read at the follow-up meeting; and

(2) One follow-up meeting. The follow-up meeting will take approximately 30 minutes. During this time, participants will be presented with their transcript from their initial interview. They will have the opportunity to add, change, or delete any part of the transcript to aid with confidentiality and to allow further clarity in their responses. If participants review their transcripts they have been sent electronically (i.e., to their personal email address) and decide they have no concerns/suggested edits and do not need to schedule a follow-up meeting, a follow up meeting will not need to be scheduled but they will still be asked to sign the transcript release form and return it to the graduate student researcher.

Interviews will be conducted by phone or online using an online meeting platform (i.e., WebEx) in order to limit personal contacts during the current pandemic. The student researcher will be in a private room, and ask the participant to ensure they are in a private room, when interviews are conducted over the phone/online to ensure everyone's privacy is being guarded.

Your participation is voluntary and you can answer only those questions that you are comfortable with. You may withdraw from the research project for any reason, at any time without explanation or penalty of any sort. If a participant chooses to withdraw, his/her/their data can be removed up until the last participant's follow up interview to review and endorse his/her/their transcript. The data he/she/they provided will be removed from analysis and destroyed within two weeks of his/her/their date of withdrawal. Prospective participants' participation or nonparticipation will not affect their access to services (such as health care or school), employment, or how they will be treated. In addition, your name and identity will be kept private by using a different name.

The data will be stored in a locked cabinet accessible only by the researcher's supervisor, and safeguarded for a minimum of five years. **The consent forms will be stored separately from the data.** If you have any questions concerning the study, please feel free to contact the researcher.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office ethics.office@usask.ca (306) 966-2975. Out of town participants may call toll free (888) 966-2975.

To obtain results from this study, please contact the graduate student researcher by email at kam627@mail.usask.ca or by emailing or calling the graduate student researcher's thesis supervisor Dr. Laureen McIntyre at laureen.mcintyre@usask.ca or xxx.

I have read and understand the description above. I have been provided with contact information in order to have any questions addressed. I consent to participate in the study described above, understanding that I may withdraw this consent at any time.

Oral Consent:

I read and explained this consent form to the participant before receiving the participant's consent, and the participant had knowledge of its contents and appeared to understand it.

Name of Participant

Researcher's Signature

Date

Appendix C
Survey

All participants, including 4-6 parents and 4-6 teachers, were given a survey to complete.

- | | | |
|--|-----|----|
| 1. Are you 18 years of age or older? | YES | NO |
| 2. Do you have a child or a child in your class aged 5-17? | YES | NO |
| 3. Do you have a child or a child in your class diagnosed as LD, ID, ADHD, or ASD? | YES | NO |
4. What is your educational background?
- _____
- _____
5. What is your gender? _____
6. What is your ethnic background? _____
7. a. What type of physical activity do you do? _____
- b. How often do you participate in physical activity and for what duration each time?
-
8. On a scale of 1-10 (1 being the least important and 10 being the most important), rate the importance of your child/the child(ren) with exceptionalities in your class engaging in physical activity. 1 2 3 4 5 6 7 8 9 10
9. Child's age: _____
10. Child's gender: _____
11. Child's ethnic background: _____
12. Relationship to Child: (please circle one)
- biological parents
 - step parents
 - adoptive parent
 - legal guardian
 - other relative
 - teacher

Interview Guide

All participants, including 4-6 parents and 4-6 teachers, were interviewed. The parents and teachers were provided with a different set of questions, both centring around the topic of strategies to engage the child(ren) in exercise:

Guiding Questions for Parents

1. Moderate physical activity allows children to slightly sweat and breathe harder. Activities include bike riding, playground activities, and skating (Canadian Society for Exercise Physiology, 2019). Vigorous physical activity causes children to sweat and be ‘out of breath’. Activities include running, swimming, and rollerblading (Canadian Society for Exercise Physiology, 2019). Based on this, how often does your child participate in moderate to vigorous physical activity each week?
 - When and if they do, do they enjoy it?
 - What types of moderate to vigorous physical activities do they participate in?
 - Is there resistance to participating?
2. In order to engage your child in physical activity, what specific strategies or strategies do you employ?
 - Do you provide modifications?
 - Do you incorporate physical activity into your everyday living?
 - Do you have access to special facilities or programs?
 - Do you tailor it to their interests?
 - Do you show evidence of your child’s success?
 - Do you explain the benefits of physical activity to your child?
 - Which strategies or strategies have been most successful? Least successful?
 - When strategies or strategies did not work, what did you do?
 - If you have other children, do you implement different strategies or strategies for all children?
3. Why do you think it is important or not that your child engages in physical activity?
4. What are the specific benefits that you observe when your child engages in physical activity?
 - If so, how do these benefits affect other components of their daily living?
 - Do different types of physical activities have different benefits?

Guiding Questions for Teachers

1. Moderate physical activity allows children to slightly sweat and breathe harder. Activities include bike riding, playground activities, and skating (Canadian Society for Exercise Physiology, 2019). Vigorous physical activity causes children to sweat and be ‘out of breath’. Activities include running, swimming, and rollerblading (Canadian Society for Exercise Physiology, 2019). Based on this, how often do the children with exceptionalities in your class engage in moderate to vigorous physical activity at school each week?
 - When and if they do, do they enjoy it?
 - What types of moderate to vigorous physical activities are they participating in?
 - Is there resistance to participating?
2. In order to encourage these children to participate in physical activity, what specific strategies or strategies do you employ?
 - Do you provide modifications?
 - Do you incorporate physical activity into your academic classes?
 - Do you have access to special equipment, facilities, or programs?
 - Do you tailor it to their interests?
 - Do you allow for additional movement breaks for children with exceptionalities?
 - Do you show evidence of the children’s success?
 - Do you explain the benefits of physical activity to the children?
 - Which strategies or strategies have been most successful? Least successful?
 - When strategies or strategies did not work, what did you do?
 - Are these different than those that you would employ with all children?
3. Why do you think it is important or not that the children in your class with exceptionalities engage in activity?
4. What are the specific benefits that you observe when these children engage in physical activity?
 - If so, how do these benefits affect other components of their daily living?
 - Do different types of physical activities have different benefits?
 - Do you notice any differences in the benefits between children with or without exceptionalities?

Appendix D

DATA/TRANSCRIPT RELEASE FORM

I, _____, have reviewed the complete transcript of my personal interview in this study, and have been provided with the opportunity to add, alter, and delete information from the transcript and my quotations. I acknowledge that the information accurately reflects what I said in my personal interview with Katherine MacDougall. I hereby authorize the release of this transcript to Katherine MacDougall to be used in the manner described in the Consent Form. I have received a copy of this Data/Transcript Release Form for my own records.

Name of Participant

Date

Signature of Participant

Signature of Researcher

References

- Achenbach, T. M. (1991). *Manual for the child behavior checklist/4-18 and 1991 profile*. Burlington, VT: University of Vermont/Department of Psychiatry.
- Ainsworth, M., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Oxford, England: Lawrence Erlbaum.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Almalki, S. (2016). Integrating quantitative and qualitative data in mixed methods research—challenges and benefits. *Journal of Education and Learning*, 5(9), 288-296. Doi: [10.5539/jel.v5n3p288](https://doi.org/10.5539/jel.v5n3p288)
- Althubaiti, A. (2016). Information bias in health research: definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, 9, 211-217. Doi: [10.2147/JMDH.S104807](https://doi.org/10.2147/JMDH.S104807)
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Aro, T., Poikkeus, A., Eklund, K., Tolvanen, A., Laakso, M., Viholainen, H., Lyytinen, H., Nurmi, J., & Ahonen, T. (2009). Effects of multidomain risk accumulation on cognitive, academic, and behavioural outcomes. *Journal of Clinical Child & Adolescent Psychology*, 38(6), 883-98. Doi: [10.1080/15374410903258942](https://doi.org/10.1080/15374410903258942)
- Avery, M. (2012). Web-based assessment of physical education standards. *Journal of Physical Education, Recreation & Dance*, 83(5), 27-34. Doi: [10.1080/07303084.2012.10598776](https://doi.org/10.1080/07303084.2012.10598776)
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health*, 13(4), 623-649. Doi: [10.1080/08870449808407422](https://doi.org/10.1080/08870449808407422)
- Bartholomew, J., Morrison, D., & Ciccolo, J. (2005). Effects of acute exercise on mood and well-being in patients with major depressive disorder. *Medicine and Science in Sports and Exercise*, 37(12), 2032-2037. Doi: [10.1249/01.mss.0000178101.78322.dd](https://doi.org/10.1249/01.mss.0000178101.78322.dd)

- Bartlett, L., Rooney, V., & Spedding, S. (1985). Nocturnal difficulties in a population of mentally handicapped children. *The British Journal of Mental Subnormality*, 31(60), 54-59. Doi: 10.1179/bjms.1985.009
- Beets, M., Cardinal, B., & Alderman, B. (2010). Parental social support and the physical activity-related behaviours of youth: A review. *Health Education & Behaviour*, 37(5), 621-644. Doi: 10.1177/1090198110363884
- Bell, S., Audrey, S., Gunnell, D., Cooper, A., & Campbell, R. (2019). The relationship between physical activity, mental wellbeing and symptoms of mental health disorder in adolescents: a cohort study. *International Journal of Behavioral Nutrition and Physical Activity*. 16:138. Doi: [10.1186/s12966-019-0901-7](https://doi.org/10.1186/s12966-019-0901-7)
- Bender, T., Nagy, G., Barna, I., Tefner, I., Kádas, &., & Géher, P. (2007). The effect of physical therapy on beta-endorphin levels. *European Journal of Applied Physiology*, 100(4), 371-382. Doi: [10.1007/s00421-007-0469-9](https://doi.org/10.1007/s00421-007-0469-9)
- Bergh, O. & Vrana, S. (1998). Repetition and boredom in a perceptual fluency/attributional model of affective judgements. *Cognition and Emotion*, 12(4), 533-553. Doi: [10.1080/026999398379556](https://doi.org/10.1080/026999398379556)
- Bingham, G., Holbrook, T., & Meyers, L. (2010). Using self-assessments in elementary classrooms. *The Phi Delta Kappan*, 91(5), 59-61. <http://www.jstor.org/stable/27755646>
- Bitsch, V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness*, 23(1), 75-91. Doi: [10.22004/ag.econ.59612](https://doi.org/10.22004/ag.econ.59612)
- Boets, B., Op de Beek, H., Vandermosten, M., Scott, S., Gillebert, C., Mantini, D., Bulthe, J., Sunaert, S., Wouters, J., & Ghesquiere, P. (2013). Intact but less accessible phonetic representations in adults with dyslexia. *Science*, 342(6163), 1251-1254. Doi: [10.1126/science.1244333](https://doi.org/10.1126/science.1244333)
- Bowen, G. (2009). Supporting a grounded theory with an audit trail: An illustration. *International Journal of Social Research Methodology*, 12(4), 305-316. Doi: 10.1080/13645570802156196
- Bowlby, J. (1958). The nature of the child's tie to his mother. *International Journal of Psychoanalysis*, 39, 350-371. Doi: [10.4324/9780429475931-15](https://doi.org/10.4324/9780429475931-15)
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. Doi: [10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa)

- Brenner, M. (2006.) Survey methods in educational research. In J. Green, G. Camilli & P. Elmore (Eds.), *Handbook of complementary methods in education research* (pp. 357-370). Mahwah, NJ: Lawrence Erlbaum.
- Brown, J., Fishco, V., & Hanna, G. (1993). *Nelson–Denny Reading Test: Manual for Scoring and Interpretation, Forms G & H*. Rolling Meadows, IL: Riverside Publishing.
- Canadian Institute for Health Information. (2013, February). *Child and youth health and well-being indicators project: CIHI and B.C. PHO joint summary report*.
<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/special-reports/child-health-2013.pdf>
- Canadian Society for Exercise Psychology. (2019). *Canadian 24-Hour movement guidelines for children and youth (ages 5-17 years): An integration of physical activity, sedentary behaviour and sleep*. <https://csepguidelines.ca/children-and-youth-5-17/>
- Carlson, S., Taylor, N., Dodd, K., & Shields, N. (2013). Differences in habitual physical activity levels of young people with cerebral palsy and their typically developing peers: A systematic review. *Disability and Rehabilitation*, 35(8), 647-655. Doi: [10.3109/09638288.2012.715721](https://doi.org/10.3109/09638288.2012.715721)
- Carroll, J., Mundy, I., & Cunningham, A. (2014). The roles of family history of dyslexia, language, speech production and phonological processing in predicting literacy progress. *Developmental Science*, 17(5), 727-742. Doi: [10.1111/desc.12153](https://doi.org/10.1111/desc.12153)
- Caspersen, C., Powell, K., & Christenson, G. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126-131. Retrieved from <https://www.jstor.org/stable/20056429>
- Chang, Y., Liu, S., Yu, H., & Lee, Y. (2012). Effect of acute exercise on executive function in children with attention deficit hyperactivity disorder. *Archives of Clinical Neuropsychology*, 27(2), 225-237. Doi: [10.1093/arclin/acr094](https://doi.org/10.1093/arclin/acr094)
- Chen, A., Kim, S., Houtrow, A., & Newacheck, P. (2010). Prevalence of obesity among children with chronic conditions. *Obesity (Silver Spring)*, 18(1), 210-213. Doi: [10.1038/oby.2009.185](https://doi.org/10.1038/oby.2009.185)
- Clandinin, D.J., & Caine, V. (2013). Narrative inquiry. In A. A. Trainor & E. Graue^[1] (Eds.), *Reviewing Qualitative Research in the Social Sciences* (pp. 166-179). New York, NY: Routledge.

- Clarke, A., Friede, T., Putz, R., Ashdown, J., Martin, S., Blake, A. Warwick Edinburgh Mental Well-being Scale (WEMWBS): validated for teenage school students in England and Scotland. A mixed methods assessment. *BMC Public Health*. 2011;11(1):487.
- Colley, R., Carson, V., Garriguet, D., Janssen, I., Roberts, M., & Tremblay, M. (2017). Physical activity of Canadian children and youth, 2017-2015. *Health Reports* 2017, 28(10), 8-16. <https://www150.statcan.gc.ca/n1/pub/82-003-x/2011001/article/11397-eng.pdf>
- Collie, A., Maruff, P., Darby, D., & McStephen, M. (2003). The effects of practice on the cognitive test performance of neurologically normal individuals assessed at brief test-retest intervals. *Journal of the International Neuropsychological Society*, 9(3), 419-428. Doi: [10.1017/S1355617703930074](https://doi.org/10.1017/S1355617703930074)
- Conners, C.K. (2004). *Conners Continuous Performance Test II V. 5 for Windows*. North Tonawanda, NY: Multi Health Systems.
- Côté, J. (2002). Coach and peer influence and children's development through sport. In J.M. Silver & D.E. Stevens (Eds.), *Psychological foundations of sport* (pp. 520–540). Boston, MA: Allyn & Bacon.
- Côté, J., & Fraser-Thomas, J. (2007). Youth involvement in sport. In P.R.E. Crocker (Ed.), *Introduction to sport psychology: A Canadian perspective* (pp. 266–294). Toronto: Pearson Prentice Hall.
- Cotman, C. & Engesser-Cesar, C. (2002). Exercise enhances and protects brain function. *Exercise and Sports Sciences Reviews*, 30(2), 75-79. Doi: [0.1097/00003677-200204000-00006](https://doi.org/0.1097/00003677-200204000-00006)
- Craig, S., Goldberg, J. & Dietz, W. (1996). Psychosocial correlates of physical activity among fifth and eighth graders. *Preventive Medicine*, 25(5), 506-513. Doi: [10.1006/pmed.1996.0083](https://doi.org/10.1006/pmed.1996.0083)
- Culbertson, W., & Zillmer, E.A. (2005). *TOL DX 2nd edition- Tower of London*. Chicago: Multi-Health Systems.
- Curatolo, P., D'Agati, E., & Moavero, R. (2010). The neurobiological basis of ADHD. *Italian Journal of Pediatrics*, 36, 79. Doi: [10.1186/1824-7288-36-79](https://doi.org/10.1186/1824-7288-36-79)

- Davis, K., Hodson, P., Zhang, G., Boswell, B., & Decker, J. (2010). Providing physical activity for students with intellectual disabilities: The motivate, adapt, and play program. *Journal of Physical Education, Recreation & Dance*, 81(5), 23-28. Doi: [10.1080/07303084.2010.10598476](https://doi.org/10.1080/07303084.2010.10598476)
- Davis, L. & Jowett, S. (2014) Coach–athlete attachment and the quality of the coach–athlete relationship: implications for athlete’s well-being. *Journal of Sports Sciences*, 32(15), 1454-1464. Doi: [10.1080/02640414.2014.898183](https://doi.org/10.1080/02640414.2014.898183)
- Denzin, N. (1989). *The research act: A theoretical introduction to sociological methods* (3rd ed.). Prentice-Hall.
- Denzin, N., Lincoln, Y., & Giardina, M. (2006). Disciplining qualitative research. *International Journal of Qualitative Studies in Education*, 19(6), 769-782. Doi: [10.1080/09518390600975990](https://doi.org/10.1080/09518390600975990)
- Downs, D. S., & Hausenblas, H. A. (2005). The theories of reasoned action and planned behaviour applied to exercise: A meta-analytic update. *Journal of Physical Activity and Health*, 2(1), 76-97. Doi: 10.1123/jpah.2.1.76
- Dunton, G., Huh, J., Leventhal, A., Riggs, N., Hedeker, D., Spruijt-Metz, D., & Pentz, M. (2014). Momentary assessment of affect, physical feeling states, and physical activity in children. *Health Psychology*, 33(3), 255-263. Doi: [10.1037/a0032640](https://doi.org/10.1037/a0032640)
- Faraone, S. & Biederman, J. (1998). Neurobiology of attention-deficit hyperactivity disorder. *Biological Psychiatry*, 44(10), 951-958. Doi: 10.1016/S0006-3223(98)00240-6
- Fedewa, A. & Ahn, S. (2011). The effects of physical activity and physical fitness on children’s achievement and cognitive outcomes: A meta-analysis. *Research Quarterly for Exercise and Sport*, 82(3), 521-35. Doi: [10.1080/02701367.2011.10599785](https://doi.org/10.1080/02701367.2011.10599785)
- Feldman, H. & Reiff, M. (2014). Attention deficit-hyperactivity disorder in children and adolescents. *The New England Journal of Medicine*, 370, 838-46. Doi: [10.1056/NEJMc1307215](https://doi.org/10.1056/NEJMc1307215)
- Fishbein, M. & Ajzen, I. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.

- Franz, A., Bolat, G., Bolat, H., Matijasevich, A., Santos, I., Silveira, R., Procianoy, R., Rohde, L., & Moreira-Maia, C. (2018). Attention-deficit/hyperactivity disorder and very preterm/very low birth weight: A meta-analysis. *Pediatrics*, *141*(1). Doi: [10.1542/peds.2017-1645](https://doi.org/10.1542/peds.2017-1645)
- Frey, G. & Chow, B. (2006). Relationship between BMI, physical fitness, and motor skills in youth with mild intellectual disabilities. *International Journal of Obesity*, *30*(5), 861-867. Doi: [10.1038/sj.ijo.0803196](https://doi.org/10.1038/sj.ijo.0803196)
- Frey, G., Stanish, H., & Temple, V. (2008). Physical activity of youth with intellectual disability: Review and research agenda. *Adapted Physical Activity Quarterly*, *25*(2), 95-117. Doi: [10.1123/apaq.25.2.95](https://doi.org/10.1123/apaq.25.2.95)
- Gao, Z. & Lee, J. (2019). Emerging technology in promoting physical activity and health: challenges and opportunities. *Journal of Clinical Medicine*, *8*(11), 1830. Doi: [10.3390/jcm8111830](https://doi.org/10.3390/jcm8111830)
- Gapin, J. & Etnier, J. (2010). The relationship between physical activity and executive function performance in children with attention-deficit hyperactivity disorder. *Journal of Sport & Exercise Psychology*, *32*, 753-763. Doi: [10.1123/jsep.32.6.753](https://doi.org/10.1123/jsep.32.6.753)
- Georgia Department of Education. (2011). *Response to intervention: Georgia's student achievement pyramid of interventions*. www.gadoe.org
- Gerdes, J., Durden, T., & Manning, L. (2013). Materials and environments that promote learning in the primary years. *Faculty Publications from CYFS*. Retrieved May 16, 2021, from: <http://digitalcommons.unl.edu/cyfsafacpub/78>
- Gholamnezhad, Z., Boskabady, M., & Jahangiri, Z. (2020). Exercise and dementia. *Advances in Experimental Medicine and Biology*, *1228*, 303-315. Doi: [10.1007/978-981-15-1792-1_20](https://doi.org/10.1007/978-981-15-1792-1_20)
- Glass, G. (2006.) Meta-analysis: The quantitative synthesis of research findings. In J. Green, G. Camilli & P. Elmore (Eds.), *Handbook of complementary methods in education research* (pp. 427-438). Mahwah, NJ: Lawrence Erlbaum.
- Goodman R. (2010). *Youth in Mind*. <https://sdqinfo.org/>
- Grant, D. & Berg, E. (1981). *Wisconsin Card Sorting Test*. Odessa, FL : Psychological Assessment Resources, Inc.

- Graue, E. & Karabon, A. (2013). Standing at the corner of Epistemology Ave, Theoretical Trail, Methodology Blvd, and Methods Street: The intersections of qualitative research. In A. A. Trainor & E. Graue^[1] (Eds.), *Reviewing Qualitative Research in the Social Sciences* (pp. 11-20). New York: Routledge.
- Gresham, F. & Elliott, S. (1990). *Social skills rating system*. American Guidance Service, Inc. <https://pearsonclinical.in/solutions/social-skills-rating-system-ssrs/>
- Griffin, W., & Autism Focused Intervention Resources and Modules (AFIRM) Team. (2015). *Exercise*. <http://afirm.fpg.unc.edu/exercise>
- Guidelines for school and community programs to promote lifelong physical activity among young people. (1997). *Journal of School Health*, 67(6), 202-218. Doi: [10.1111/j.1746-1561.1997.tb06307.x](https://doi.org/10.1111/j.1746-1561.1997.tb06307.x).
- Harmon, B., Nigg, C., Long, C., Amato, K., Anwar, E., Kutchman, P., Anthamatten, R., Browning, L., Brink, J., & Hill, J. (2014). What matters when children play: Influence of Social Cognitive Theory and perceived environment on levels of physical activity among elementary-aged youth. *Psychology of Sport & Exercise*, 15(3), 272-279. Doi : 10.1016/j.psychsport.2014.02.001
- Humphries, K. M. (2008). Assessment of Aquatic Readiness. Retrieved from <https://www.yumpu.com/en/document/view/27404421/126umphries-assessmentof-aquatic-readiness-haar-a->.
- Hwang, J., & Kim, Y.H. (2013). Physical activity and its related motivational attributes in adolescents with different BMI. *International Journal of Behavioural Medicine*, 20(1), 106-113. Doi: [10.1007/s12529-011-9196-z](https://doi.org/10.1007/s12529-011-9196-z)
- Jensen, E. (2006). *Enriching the brain: How to maximize every learner's potential*. San Francisco, CA: Jossey-Bass, A John Wiley & Sons Imprint.
- Jensen, E. (2000). Moving with the brain in mind. *Educational Leadership*, 58(3), 34-37. <http://www.ascd.org/>
- Jowett, & Cockerill. (2003). Olympic medallists' perspective of the athlete-coach relationship. *Psychology of Sport & Exercise*, 4(4), 313-331. Doi: [10.1016/S1469-0292\(02\)00011-0](https://doi.org/10.1016/S1469-0292(02)00011-0)

- Johnson, T. & Turner, L. (2016). The physical activity movement and the definition of physical education. *Journal of Physical Education, Recreation & Dance*, 87(4), 8-10. Doi: [10.1080/07303084.2016.1142192](https://doi.org/10.1080/07303084.2016.1142192)
- Kang, K., Choi, J., Kang, S., & Han, D. (2011). Sports therapy for attention, cognitions and sociality. *International Journal Of Sports Medicine*, 32(12), 953-959. Doi: [10.1055/s-0031-1283175](https://doi.org/10.1055/s-0031-1283175)
- Kendall, L. (2008). The conduct of qualitative interview: Research questions, methodological issues, and researching online. In J. Coiro, M. Knobel, C. Lankshear & D. Leu (Eds.), *Handbook of research on new literacies* (pp. 133-149). Lawrence Erlbaum Associates. Doi: [10.4324/9781410618894](https://doi.org/10.4324/9781410618894)
- Kiluk, B., Weden, S., & Culotta, V. (2008). Sport participation and anxiety in children with ADHD. *Journal of Attention Disorders*, 12(6), 499-506. Doi: [10.1177/1087054708320400](https://doi.org/10.1177/1087054708320400)
- Kline, R. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research*. Washington, DC: American Psychological Association.
- Koch, J. (2013). Linking physical activity with academics: Strategies for integration. *Strategies*, 26(3), 41-43. Doi: [10.1080/08924562.2013.782242](https://doi.org/10.1080/08924562.2013.782242)
- Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage Publications.
- Lambek, R., Tannock, R., Dalsgaard, S., Trillingsgaard, A., Damm, D., & Thomsen, P. (2011). Executive dysfunction in school-age children with ADHD. *Journal of Attention Disorders*, 15(8), 646-655. Doi: [10.1177/1087054710370935](https://doi.org/10.1177/1087054710370935)
- Landsberger, H. A. (1958). *Hawthorne revisited*. Ithaca, N.Y.: Cornell University.
- Lassi, Z., Moin, A. & Bhytta, Z. Nutrition in middle childhood and adolescence. In D. Bundy, N. Silva, S. Horton, D. Jamison, & G. Patton (3rd ed.), *Child and Adolescent Health and Development* (pp. 133-146). International Bank for Reconstruction and Development/The World Bank. doi: [10.1596/978-1-4648-0423-6_ch11](https://doi.org/10.1596/978-1-4648-0423-6_ch11)
- Lazarsfeld, P. (1950). The logical and mathematical foundation of latent structure analysis. In Stouffer et al., *Measurement and Prediction* (pp.362-412). Princeton University Press.
- Learning Disabilities Association of Canada. (2017). *LD basics*. <https://www.ldac-acta.ca/learn-more/ld-basics/>

- Learning Disabilities Association of Ontario. (2015). *Learning disabilities statistics: Some recent Canadian sources for statistics on learning disabilities*. <https://www.ldao.ca/introduction-to-ldsadhd/articles/about-lds/learning-disabilities-statistics/>
- Levine, L. & Munsch, J. (2019). *Childhood development from infancy to adolescence: An active learning approach* (2nd ed.). SAGE Publications Inc.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.
- Llorente, A.M., Williams, J., Satz, P., & D'Elia, L.F. (2003). Children's Color Trails Test: Professional manual. Lutz, FL: Psychological Assessment Resources.
- Martin, J., Mccaughy, N., Flory, S., Murphy, A., & Wisdom, K. (2011). Using social cognitive theory to predict physical activity and fitness in underserved middle school children. *Research Quarterly for Exercise and Sport*, 82(2), 247-255. doi: [10.1080/02701367.2011.10599752](https://doi.org/10.1080/02701367.2011.10599752)
- Mash, E. & Wolfe, D. (2016). *Abnormal Child Psychology* (6th ed.). Belmont, CA: Wadsworth.
- Matell, M. & Jacoby, J. (1972). Is there an optimal number of alternatives for Likert-scale items? Effects of testing time and scale properties. *Journal of Applied Psychology*, 56(6), 506-509. doi: [10.1177/001316447103100307](https://doi.org/10.1177/001316447103100307)
- McAuley, E. & Courneya, K. (1994). The subjective exercise experiences scale (SEES): Development and preliminary validation. *Journal of Sport & Exercise Psychology*, 16(2), 163-177.
- McCoy, S., Jakicic, J., & Gibbs, B. (2016). Comparison of obesity, physical activity, and sedentary behaviours between adolescents with autism spectrum disorders and without. *Journal of Autism and Developmental Disorders*, 46(7), 2317-2326. doi: [10.1007/s10803-016-2762-0](https://doi.org/10.1007/s10803-016-2762-0)
- McGarty, A., Downs, S., Melville, C., & Harris, L. (2018). A systematic review and meta-analysis of strategies to increase physical activity in children and adolescents with intellectual disabilities. *Journal of Intellectual Disability Research*, 62(4), 312-329. doi: [10.1111/jir.12467](https://doi.org/10.1111/jir.12467)
- McMahon, D., Barrio, B., McMahon, A., Tutt, K., & Firestone, J. (2019). Virtual reality exercise games for high school students with intellectual and developmental disabilities. *Journal of Special Education Technology*, 35(2), 87-96. doi: [10.1177/0162643419836416](https://doi.org/10.1177/0162643419836416)

- McNair, D., Lorr, M., & Droppleman, L. (1971). *Manual for the Profile of Mood States*. Educational and Industrial Service.
- Memari, A., Ghaheri, B., Ziaee, V., Kordi, R., Hafizi, S., & Moshayedi, P. (2013). Physical activity in children and adolescents with autism assessed by triaxial accelerometry. *Pediatric Obesity*, 8(2), 150-158. doi: 10.1111/j.2047-6310.2012.00101.x
- Merrell, K.W. (2008). *School social behavior scales* (2nd ed.). Eugene, OR: Assessment Intervention Resources.
- Merriam, S. B. (2002). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco: Jossey-Bass.
- Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.
- Mowling, C., Brock, S., Eiler, K., & Rudisill, M. (2004). Student motivation in physical education: Breaking down barriers. *Journal of Physical Education, Recreation & Dance*, 75(6), 40-45,51. doi: [10.1080/07303084.2004.10607256](https://doi.org/10.1080/07303084.2004.10607256)
- Nakutin, S., Gutierrez, G., & Campbell, J. (2019). Effect of physical activity on academic engagement and executive functioning in children with ASD. *School Psychology Review*, 48(2), 177-184, doi: [10.17105/SPR-2017-0124.V48-2](https://doi.org/10.17105/SPR-2017-0124.V48-2)
- National Autism Spectrum Disorder Surveillance System (NASS) Report. (2018). Retrieved from <https://www.canada.ca/en/public-health/services/diseases/autism-spectrum-disorder-asd/surveillance-autism-spectrum-disorder-asd.html>
- National Center for Educational Statistics. (2020, May). *Students with disabilities*. The Condition of Education. https://nces.ed.gov/programs/coe/indicator_cgg.asp
- National Institute of Mental Health. (2018). *Autism spectrum disorder*. <https://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd/index.shtml#:~:text=Autism%20is%20known%20as%20a,symptoms%20and%20ability%20to%20function>
- Nigg, J., Lewis, K., Edinger, T., & Falk, M. (2012). Meta-analysis of attention-deficit/hyperactivity disorder or attention-deficit/hyperactivity disorder symptoms, restriction diet, and synthetic food color additives. *Journal of the American Academy of Child & Adolescent Psychiatry*, 51(1), 86-97. doi: [10.1016/j.jaac.2011.10.015](https://doi.org/10.1016/j.jaac.2011.10.015)

- Norris, M. & Columna, L. (2016). Physical activity experiences of families of children with visual impairments. *Research Quarterly for Exercise and Sport*, 87, 1. doi: [10.1080/09638288.2017.1390698](https://doi.org/10.1080/09638288.2017.1390698)
- Obrusnikova, I., & Cavalier, A. (2011). Perceived barriers and facilitators of participation in after-school physical activity by children with Autism spectrum disorders. *Journal of Developmental and Physical Disabilities*, 23(3), 195-211. doi: [10.1007/s10882-010-9215-z](https://doi.org/10.1007/s10882-010-9215-z)
- Ozonoff S. & Strayer, D. (1997). Inhibitory function in nonretarded children with autism. *Journal of Autism and Developmental Disorders*, 27(1), 59–77. doi: [10.1023/a:1025821222046](https://doi.org/10.1023/a:1025821222046)
- Pan, C. (2008). Objectively measured physical activity between children with autism spectrum disorders and children without disabilities during inclusive recess settings in Taiwan. *Journal of Autism and Developmental Disorders*, 38(7), 1292-1301. doi: [10.1007/s10803-007-0518-6](https://doi.org/10.1007/s10803-007-0518-6)
- Pan, C. (2010). Effects of water exercise swimming program on aquatic skills and social behaviours in children with Autism spectrum disorders. *Autism: The International Journal of Research and Practice*, 14(1), 9-28. doi: [10.1177/1362361309339496](https://doi.org/10.1177/1362361309339496)
- Pastor P., Reuben C., Duran C., & Hawkins L. (2015). Association between diagnosed ADHD and selected characteristics among children aged 4–17 years: United States, 2011–2013. *NCHS data brief*, 201. Hyattsville, MD: National Center for Health Statistics.
- Pastula, R., Stopka, C., Delisle, A., & Hass, C. (2012). Effect of moderate-intensity exercise training on the cognitive function of young adults with cognitive disabilities. *Journal of Strength and Conditioning Research*, 26(12), 3441-3448. doi: [10.1519/JSC.0b013e318270fc83](https://doi.org/10.1519/JSC.0b013e318270fc83)
- Pham, T., Huang, H., Cheng, T., Wong, M., Liao, Y., Yang, Y., & Teng, C. (2020). The need for exercise in exergaming perspective of the uses and gratifications theory. *Industrial Management & Data Systems*, 120(6), 1085-1099. doi: [10.1108/IMDS-07-2019-0377](https://doi.org/10.1108/IMDS-07-2019-0377)
- Phillips, B., & Lonigan, C. (2005). Social correlates of emergent literacy. In M. J. Snowling & C. Hulme (Eds.), *The Science of Reading: A Handbook* (pp. 173–187). Oxford: Blackwell.
- Piers, E. & Harris, D. (1984). *The Piers-Harris children's self-concept scale*. Los Angeles, CA.: Western Psychological Service, Inc.

- Pires, T., DaSilva, C., & DeAssis, S. (2012). Association between family environment and attention deficit hyperactivity disorder in children – mothers' and teachers' views. *BMC Psychiatry*, 13(1). doi: [10.1186/1471-244X-13-215](https://doi.org/10.1186/1471-244X-13-215)
- Power, T., Watkins, M., Anastopoulos, A., Reid, R., Lambert, M., & DuPaul, G. (2017). Multi-informant assessment of ADHD symptom-related impairments among children and adolescents. *Journal of Clinical Child & Adolescent Psychology*, 46(5), 661-674. doi: [10.1080/15374416.2015.1079781](https://doi.org/10.1080/15374416.2015.1079781)
- Preston, & Colman. (2000). Optimal number of response categories in rating scales: Reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica*, 104(1), 1-15. doi: 10.1016/S0001-6918(99)00050-5
- Purugganan, O. (2018). Intellectual disabilities. *Pediatrics in Review*, 39(6), 299-309. doi: [10.1542/pir.2016-0116](https://doi.org/10.1542/pir.2016-0116)
- Quine, L. (2001). Sleep problems in primary school children: Comparison between mainstream and special school children. *Child: Care, Health and Development*, 27(3), 201-221. doi: 10.1046/j.1365-2214.2001.00213.x
- Ratey, J. (2008). *Spark: The revolutionary new science of exercise and the brain*. Little Brown and Company.
- Ratey, J. (n.d.). *Biography: John Ratey M.D.* <http://www.johnratey.com>
- Rattigan, P., Blair, P., & Hickson, C. (2016). International approaches to physical education: A comparison. PHE America. <http://www.pelinks4u.org/articles/rattigan0210.htm>
- Rauworth, A., Rimmer, J., Wang, E., & Riley, B. (2003). A national study of assessing the accessibility of fitness facilities for people with disabilities. *Medicine & Science in Sports & Exercise*, 35 (Supplement 1), S65. doi: 10.2105/AJPH.2004.051870
- Re, A., Capodici, A., & Cornoldi, C. (2015). Effect of training focused on executive functions (attention, inhibition, and working memory) in preschoolers exhibiting ADHD symptoms. *Frontiers in Psychology*, 6, 1161. doi: 10.3389/fpsyg.2015.01161
- Rimmer, J. (2005). The conspicuous absence of people with disabilities in public fitness and recreation facilities: Lack of interest or lack of access? *The Science of Health Promotions*, 19(5), 327-329. doi: 10.4278/0890-1171-19.5.327

- Rodrigues, D., Padez, C., & Machado-Rodrigues, A. (2017). Active parents, active children: The importance of parental organized physical activity in children's extracurricular sport participation. *Journal of Child Health Care*, 22(1), 159-170. doi: [10.1177/1367493517741686](https://doi.org/10.1177/1367493517741686)
- Ross, P. & Zaidi, N. (2019). Limited by our limitations. *Perspectives on Medical Education*, 8(4), 261-264. doi: [10.1007/s40037-019-00530-x](https://doi.org/10.1007/s40037-019-00530-x)
- Rubin, H. & Rubin, J. (2005). *Qualitative interviewing: The art of hearing data* (2nd ed.). Sage.
- Rudella, J. & Butz, J. (2015). EXERGAMES: Increasing physical activity through effective instruction. *Journal of Physical Education, Recreation & Dance*, 86(6), 8-15. doi: [10.1080/07303084.2015.1022672](https://doi.org/10.1080/07303084.2015.1022672)
- Ruggiero, L., Seltzer, E., Dufelmeier, D., Montoya, A., & Chebli, P. (2020). Development and initial evaluation of feasibility, acceptability, and impact of an educational exergame to help promote healthy eating and physical activity in children. *Games Health Journal*, 9(3), 197-207. doi: [10.1089/g4h.2019.0056](https://doi.org/10.1089/g4h.2019.0056)
- Rutter, M., Cox, A., Tupling, C., Berger, M., & Yule, W. (1975). Attainment and adjustment in two geographical areas. *The British Journal of Psychiatry*, 126(6), 493-509. doi: [10.1192/bjp.126.6.493](https://doi.org/10.1192/bjp.126.6.493)
- Sandman, C. (1990-1991). The opiate hypothesis in autism and self-injury. *Journal of Child and Adolescent Psychopharmacology*, 1(3), 237-248. doi: [10.1089/cap.1990.1.237](https://doi.org/10.1089/cap.1990.1.237)
- Sandman, C. A., Barron, J. L., & Colman, H. (1990). An orally administered opiate blocker, naltrexone, attenuates self-injurious behavior. *American Journal on Mental Retardation*, 95(1), 93-102.
- Schneider-Momm, K., Kaiser, I., Overdick, L., Blazynski, N., Clement, C., Clement, H., Schulz, E., & Fleischhaker, C. (2018). Food intolerance and ADHD. *Neurology, Psychiatry and Brain Research*, 29(22). doi: [10.1016/j.npbr.2018.01.103](https://doi.org/10.1016/j.npbr.2018.01.103)
- Schwarz, L., & Kindermann, W. (1990). β -Endorphin, adrenocorticotrophic hormone, cortisol and catecholamines during aerobic and anaerobic exercise. *European Journal of Applied Physiology and Occupational Physiology*, 61(3), 165-171. doi: [10.1007/BF00357593](https://doi.org/10.1007/BF00357593)
- Seidler, T., Turner, E., & Horine, L. (1993). Promoting active lifestyles through facilities and equipment – A look at children, seniors, and people with disabilities. *Journal of Physical Education, Recreation & Dance*, 64(1), 39. doi: [10.1080/07303084.1993.10606671](https://doi.org/10.1080/07303084.1993.10606671)

- Shapiro, E. S. (2003). *Behavioral observation of students in schools (BOSS)* [Computer Software]. San Antonio, TX: Psychological Corporation.
- Shapiro, E. S. (2011). Behavior observations of students in schools. In E. S. Shapiro (Ed.), *Academic skills problems fourth edition workbook* (pp. 35–56). New York: Guilford Press.
- Shareghfarid, E., Sangsefidi, Z., Salehi-Abargouei, A., & Hosseinzadeh, M. (2020). Empirically derived dietary patterns and food groups intake in relation with Attention Deficit/Hyperactivity Disorder (ADHD): A systematic review and meta-analysis. *Clinical Nutrition ESPEN*, *36*, 28-35. doi: [10.1016/j.clnesp.2019.10.013](https://doi.org/10.1016/j.clnesp.2019.10.013)
- Sibley, B. & Etnier, J. (2003). The relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science*, *15*, 243-256. doi: [10.1515/ijsl.2000.143.183](https://doi.org/10.1515/ijsl.2000.143.183)
- Society of Health and Physical Educators or SHAPE America. (2018). *Standards*. <https://www.shapeamerica.org/standards/pe/>
- Statistics Canada. (2008, November 17). *Participation and activity limitation survey of 2006: A profile of education for children with disabilities in Canada*. <https://www150.statcan.gc.ca/n1/pub/89-628-x/89-628-x2008004-eng.htm>
- Statistics Canada. (2015, November 27). *Section C – Childhood conditions*. <https://www150.statcan.gc.ca/n1/pub/82-619-m/2012004/sections/sectionc-eng.htm>
- Stone, A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavioral medicine. *Annals of Behavioral Medicine*, *16*(3), 199–202. doi: 10.1093/abm/16.3.199
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *J. Exp. Psychol.* *18*, 643–662. doi: [10.1037/h0054651](https://doi.org/10.1037/h0054651)
- The International Physical Literacy Association. (2017). Retrieved from <https://www.physical-literacy.org.uk/>
- The many benefits of aerobic exercise. (2017). *Chronicle - Herald*, p. S15.
- Tobin, G., & Begley, C. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, *48*(4), 388-396. doi: 10.1111/j.1365-2648.2004.03207.x
- Trainor, A. (2013). Interview research. In A. A. Trainor & E. Graue (Eds.), *Reviewing qualitative research in the social sciences* (pp. 125-138). New York, NY: Routledge.

- Tremblay, M., Inman, J., & Willms, J. (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatric Exercise Science*, 12(3), 312-323. Retrieved from <https://www.jstor.org/stable/20056429>
- Vannest, K., Parker, R., Gonen, O., & Adiguzel, T. (2016). Single case research: Web based calculators for SCR analysis (Version 2.0). [Web-based application]. College Station, TX: Texas A&M University. Retrieved from <http://www.singlecaseresearch.org>
- Wachob, David, & Lorenzi, David G. (2015). Brief report: Influence of physical activity on sleep quality in children with Autism. *Journal of Autism and Developmental Disorders*, 45(8), 2641-2646. doi: [10.1007/s10803-015-2424-7](https://doi.org/10.1007/s10803-015-2424-7)
- Walker, A., Colquitt, G., Elliott, S., Emter, M., & Li, L. (2020). Using participatory action research to examine barriers and facilitators to physical activity among rural adolescents with cerebral palsy. *Disability and Rehabilitation*, 42(26), 3838-3849. doi: [10.1080/09638288.2019.1611952](https://doi.org/10.1080/09638288.2019.1611952)
- Wechsler, D. (2003). WISC-IV administration and scoring manual. San Antonio: The Psychological Corporation.
- Weiss, R. S. (1991). The attachment bond in childhood and adulthood. In C. M. Parkes, J. Stevenson-Hinde, & P. Marris (Eds.), *Attachment across the life style* (pp. 66–76). New York, NY: Routledge.
- Welsh and Pennington (1988) EF definition
- Wetterer, L. (2020). Attention-Deficit/Hyperactivity Disorder: AAP updates guideline for diagnosis and management. *American Family Physician*, 102(1), 58-60.
- Whitehead, M. (2013). Definition of physical literacy and clarification of related issues. *Journal of Sport Science and Physical Education*, 65, 28-33.
- Wilk, P., Clark, A., Maltby, A., Tucker, P., & Gilliland, J. Exploring the effect of parental influence on children's physical activity: The mediating role of children's perceptions of parental support. *Preventative Medicine*, 106, 79-85. doi: [10.1016/j.ypmed.2017.10.018](https://doi.org/10.1016/j.ypmed.2017.10.018)
- Willcutt, E., Doyle, A., Nigg, J., Faraone, S., & Pennington, B. (2005). Validity of the executive function theory of Attention-deficit/hyperactivity disorder: A Meta-Analytic Review. *Biological Psychiatry*, 57(11), 1336-1346. doi: [10.1016/j.biopsych.2005.02.006](https://doi.org/10.1016/j.biopsych.2005.02.006)
- Woodcock, R. W., & Johnson, M. B. (1977). *Woodcock-Johnson psycho-educational battery*. Allen, TX: DLM.

Woodcock, R. W., et al. (2001). *Woodcock-Johnson III tests of cognitive abilities*. Itasca, IL: Riverside Publishing.

World Health Organization. (2019). Retrieved from

https://www.who.int/mental_health/maternal-child/child_adolescent/en/

Wouters, M., Evenhuis, H., & Hilgenkamp, T. Physical activity levels of children and adolescents with moderate-to-severe intellectual disability. *Journal of Applied Research in Intellectual Disabilities*, 32(1), 31-142. doi: [10.1111/jar.12515](https://doi.org/10.1111/jar.12515)

Yilmaz, I., Yanardag, M., Birkan, B., & Bumin, G. (2004). Effects of swimming training on physical fitness and water orientation in autism. *Pediatrics International*, 46(5), 624-626. doi: [10.1111/j.1442-200x.2004.01938.x](https://doi.org/10.1111/j.1442-200x.2004.01938.x)