EXAMINATION OF THE RELATIONSHIPS BETWEEN YOUTH ADAPTIVE SPORTS PARTICIPATION FACTORS AND PHYSICAL ACTIVITY SELF-EFFICACY

by

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Due to increased limitations and barriers to physical activity, it is important for children with physical disabilities to develop physical activity self-efficacy (i.e., confidence that they can be active in the future despite barriers. The purpose of this study was to explore the relationship of demographic and physical activity participation variables with physical activity self-efficacy levels for youth participating in adaptive sports. Though not significant, results from the study appeared to be in line with some established research trends. Physical activity self-efficacy scores were higher for the percentage of youth who met physical activity recommendations (M = 4.96) than those who did not meet recommendations (M = 4.11). However, the percentage of children in this sample who met physical activity recommendations (33.3%) differed slightly from the national average (21.6%). The findings also deviated from the usual gender norms in that girls met recommendations more days out of the week than boys (4.75 and 4.56 days, respectively) and exhibited higher self-efficacy scores. Additional research with larger sample sizes is recommended to further investigate the impact physical activity participation has on physical activity self-efficacy in children with disabilities.

EXAMINATION OF THE RELATIONSHIPS BETWEEN YOUTH ADAPTIVE SPORTS PARTICIPATION FACTORS AND PHYSICAL ACTIVITY SELF-EFFICACY

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SECTION I: MANUSCRIPT

Introduction

To maintain physical and psychosocial well-being, it is vital for children with physical disabilities to regularly participate in physical activity (Murphy & Carbone, 2008; Shapiro & Martin, 2010a). Sport participation can lower obesity risks as well as increase psychosocial factors of self-esteem, social acceptance, independence, positive effects, peer relations, and athletic identity (Murphy & Carbone, 2008; Shapiro & Martin, 2010). Regular physical activity also helps slow the progression of chronic disease and maintains a child's muscular strength, flexibility and joint structure that typically decrease with physical disability (Murphy & Carbone, 2008).

One avenue for participating in physical activity is adaptive sports. Sports, like basketball, rock climbing, bowling, and many others, often include adaptations to make it possible for people with disabilities to fully engage in the sport. Such adaptations have made it easier for individuals with disabilities to have confidence in their own abilities to participate. Past research has indicated adaptive sport participation and increased overall physical activity significantly correlate with physical activity self-efficacy (Dwyer et al., 2013; Grover et al., 2016; Greenwood, Dzewaltowski, & French, 1990; Wickman, Nordlund, & Holm, 2016). Physical activity self-efficacy is "a youth's belief in his/her capability to participate in physical activity and to choose physical activity despite existing barriers" (Voskuil & Robbins, 2015, p. 2002). This research explores physical activity self-efficacy levels and its determinants in an adaptive sports program for youth ages 12-19.

Review of Literature

Physical Activity and Youth

Benefits. Physical activity, particularly at a moderate to vigorous level, provides children with several physical, psychological, and social health benefits (Janssen & LeBlanc, 2010; United States Department of Health and Human Services [USDHHS], 2008). Janssen and LeBlanc (2010) reviewed multiple research articles (n = 86) and found that aerobic activities at a moderate intensity or higher produce the highest health benefits (Janssen & LeBlanc, 2010). Children engaging in any type of regular physical exercise have better cardiorespiratory fitness, muscle strength, body fat levels, mental health, and probability of being healthy as an adult (USDHHS, 2008). Furthermore, physical activity in the form of a team sport may provide additional health benefits (Murphy & Carbone, 2008; Eime, Young, Harvey, Charity, & Paine, 2013). While team sports tend to increase life satisfaction, mental health, and social acceptance, they also can decrease feelings of hopelessness and suicidal ideation (Eime et al., 2013). However, there remains little research on the benefits of physical activity for youth with physical disabilities.

This study focuses specifically on children and adolescents with physical disabilities participating in sport. Although research is somewhat limited, few studies and articles discuss the effect of sport and physical activity with this population (Murphy & Carbone, 2008; Shapiro & Martin, 2010). Research suggests that children with disabilities are indeed more likely to be obese than their peers (Bandini et al., 2015), but sport participation can lower their obesity risks, as well as increase psychosocial factors of self-esteem, social acceptance, independence, positive effects, peer relations, and athletic identity (Murphy & Carbone, 2008; Shapiro & Martin, 2010). Regular physical activity also helps slow the progression of chronic disease and maintains a

child's muscular strength, flexibility and joint structure that typically decrease with physical disability (Murphy & Carbone, 2008). Given this information, there is sufficient need to investigate if children with disabilities are engaged in adequate levels of physical activity to receive associated health benefits.

Physical activity requirements. For children to receive optimal health benefits, the *United States Department of Health and Human Services (USDHHS)* developed physical activity guidelines (2008). According to the USDHHS, children and adolescents aged 6 to 17 should engage in at least 60 minutes of moderate to vigorous physical activity (MVPA) per day. The *National Institute of Health* suggests that children with disabilities should *also* aim to meet the USDHHS requirements when possible (NHLBI, 2008).

The 2016 United States Report Card for Physical Activity for Children and Youth states that only 21.6% of 6 to 19-year-old children meet the 60-minute daily requirements for physical activity (National Physical Activity Plan Alliance [NPAP Alliance], 2016). Based on data from the 2005-06 National Health and Nutrition Examination Survey, the NPAP Alliance (2016) reports that boys tend to meet the physical activity requirements more than girls (26% and 16.9%, respectively), and children 6 to 11 years old reach the requirements exponentially more than children 12 to 16 or 16 to 19 years old (42.5%, 7.5%, and 5.1%, respectively). Girls are also less likely to participate in extracurricular sports (Telford, Telford, Olive, Cochrane & Davey, 2016), and the largest declines in participation for both genders occur during the middle adolescence period when children are between the ages of 11 to 14 (Trost et al., 2002).

Barriers. Many barriers prevent or deter children from engaging in the required amount of physical activity. According to the CDC (2014), some schools do not require adequate amounts of physical activity, increasing the difficulty to meet recommendations. National health

organizations, including the CDC, the Institute of Medicine (IOM) and the Society of Health and Physical Educators (SHAPE) recommend students grades K to 12 engage in physical activity at school every day. Chances for physical education include recess, physical education, and before or after school activities. In 2014, approximately 90% of schools in the United States surveyed (*N* = 582) followed physical education requirements. However, though physical education was offered, it was not always required. Only 43 to 47% of elementary schools required physical education, with the numbers dropping to under nine percent for grade 11 and 12 (CDC, 2014).

Overall, the likelihood of children with disabilities meeting the standards is even lower than children without disabilities (Kim & Greaney, 2014). Of children aged 6 to 17 (*N* = 64,076), those with functional limitations reported 28% more screen time than children without special health care needs (SHCN). Children with functional limitations were also 83% more likely to be obese than children without SHCN (Kim & Greaney, 2014). Lower levels of physical activity are directly related to the fact that children with disabilities often engage in less vigorous activity (Kim & Greaney, 2014) and experience more restrictions to physical activity (Murphy & Carbone, 2008) than children without health conditions. Due to the numerous physical and psychosocial benefits of being physically active, it is important for adaptive sport programs to continue measuring and analyzing the degree to which they provide opportunities for children with disabilities to meet the recommended physical activity levels (Shapiro & Martin, 2010).

Physical Activity Self-Efficacy

One of the ways to further study and promote physical activity is to examine determinants that influence its participation. One such determinant of participation is physical activity self-efficacy. *Physical activity self-efficacy* is “a youth’s belief in his/her capability to participate in physical activity and to choose physical activity despite existing barriers” (Voskuil

& Robbins, 2015, p. 2002). Physical activity self-efficacy and participation are reciprocally related in that physical activity self-efficacy is both a determinant and consequence of participation (McAuly & Blissmer, 2000). Several studies confirm significant relationships between the two factors with able-bodied youth (Dwyer et al, 2013; Motl et al., 2002) and youth with disabilities (Grover et al., 2016); therefore, cultivating physical activity self-efficacy in children appears to be important for overall health and consistency of participation. If physical activity self-efficacy is related to participation, it is logical to further explore the many factors that comprise physical activity self-efficacy.

Social Cognitive Theory. Physical activity self-efficacy originates from the concept of personal self-efficacy, which was introduced by Albert Bandura. Bandura (1977) defined *self-efficacy* as "belief in one's capabilities to organize and execute courses of action required to produce given attainments" (p. 3). The concept of self-efficacy is central to Social Cognitive Theory (SCT), in which behavior is reciprocally related to both environmental factors and personal cognitive processes (Bandura, 1999; Stajkovic & Luthans, 2003). Determinants of SCT include using symbols and visual experiences to give meaning to personal experiences (i.e., symbolizing), to plan and anticipate the future (i.e., forethought), to learn from observation of others (i.e., vicarious learning), to set self-standards (i.e., self-regulation), and to use personal experience to reflect on and analyze personal abilities (i.e., self-reflection). Self-efficacy is a form of self-reflection. Experiences that affect self-efficacy development include performance accomplishments, vicarious experiences, verbal persuasion, and physiological states, such as fear, anxiety or health (Bandura, 1977). See Figure 1 for an illustration of SCT determinants. These SCT determinants, along with other demographic and physical activity participation factors, can affect the development of youths' physical activity self-efficacy.

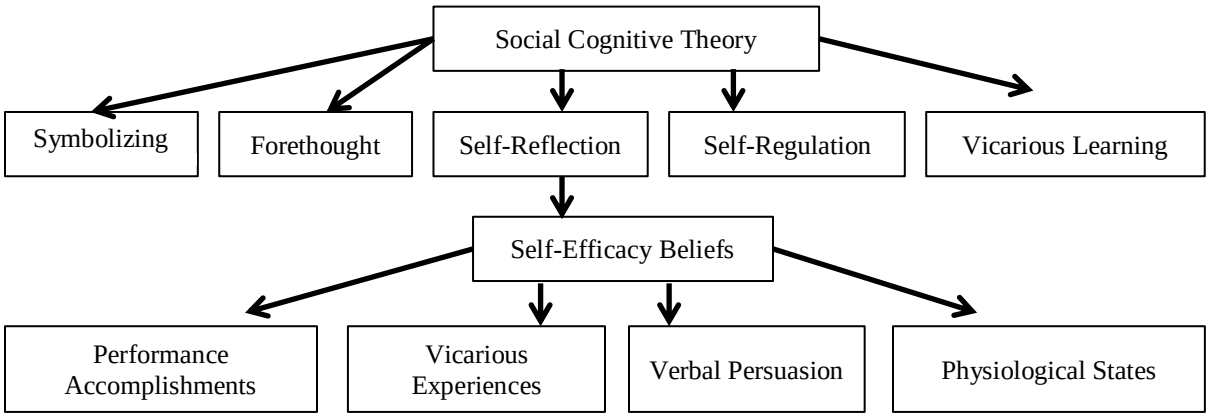


Figure 1. Relationships of Social Cognitive Theory Determinants

Multidimensional influences on physical activity self-efficacy. Youth physical activity self-efficacy is dynamic and multi-dimensional, with several factors influencing development (Voskuil & Robbins, 2015). Self-efficacy levels typically increase from childhood to early adulthood, reaching a maximum level when an individual is in middle age and then starting to decline around 60 years of age (Grecas, 1989). Males usually have higher self-efficacy than females (Bandura, 1977; Grecas, 1989), but physical activity self-efficacy appears to be more influential to a female's participation (Spence et al., 2010). Furthermore, youth with chronic conditions and physical disabilities tend to experience *lower* physical activity self-efficacy (Moola et al., 2008).

Other possible influential factors include frequency, duration, and intensity of physical activity. These factors have been found to increase positive health outcomes and exercise adherence (Telama et al., 2005; USDHHS, 2008); therefore, it is hypothesized that increases in frequency, duration, and intensity may also correlate with higher physical activity self-efficacy. This study examined variation of duration and frequency within different physical activity intensity levels (light, moderate, and vigorous) in the context of adaptive sport.

Adaptive sport and physical activity self-efficacy. One form of physical activity offered to youth with physical disabilities is adaptive sports (Winnick & Poretta, 2016). Adaptive sport is defined as "sport modified or created to meet the unique needs of individuals" (Winnick & Porretta, 2016, p.6). Research demonstrates that adaptive sports programs can improve certain factors of psychosocial and physical well-being, such as social acceptance, independence, self-esteem, flexibility, and strength (Murphy & Carbone, 2008; Shapiro & Martin, 2010). Some research suggests a positive association between adaptive sport participation and higher physical activity self-efficacy levels (Greenwood et al., 1990; Grover et al., 2016; Wickman et al., 2016). While there is certainly growing evidence regarding the association of adaptive sports participation and physical activity self-efficacy, there is still much to learn about the many potential factors that are embedded within sport, and in particular adaptive sport, that might impact self-efficacy in children. Therefore, there is a need for further research to investigate factors that influence the relationship between adaptive sport and physical activity self-efficacy in children with physical disabilities.

Research Methods

Research Questions

This research study examined the associations among participation in adaptive sports, fulfillment of physical activity national standards, and physical activity self-efficacy in youth with physical disabilities. The research questions for this study were:

1. What proportion of youth in an adaptive sports program meet the recommended national physical activity guideline?

2. How does the physical activity self-efficacy of youth with physical disabilities who meet the recommended national physical activity guidelines compare to those who do not meet the guidelines?
3. Is there a relationship between different physical activity levels (light, moderate, vigorous) and physical activity self-efficacy scores?

Participants

The sample for this study was selected from youth enrolled in an adaptive sports program in the Southeastern United States. The participating adaptive sports program is an affiliate of Disabled Sports USA and offers different sports opportunities to youth with physical disabilities. The criteria for participation in this research was: (a) youth aged 12 to 19 with physical disabilities, (b) participation in at least one of the programs offered by the agency, (c) provision of child written assent (see Appendix D) and (d) parental consent for all participants (see Appendix E). The program staff initially sent the survey to 79 participants. Of the 79 participants, six people were eliminated because they did not participate in a sport during the designated time frame and two others were eliminated because they only participated in camp, not a team sport. A minimum sample size of 30 participants was sought for this study to increase the probability of a meaningful statistical analysis. However, changes in staff and low participation rates resulted in only 11 completed surveys after a three-month data collection period. Of these eleven completed surveys, two were eliminated for being under the 12 to 19 age range. Therefore, only nine completed surveys were evaluated for this study (11.4% response rate).

Data Collection

Setting. Questionnaires were distributed to youth participating in an adaptive sports program in the Southeastern United States. The frequency and duration of each sport offered varies within the program depending on if (a) the particular sport is seasonal or year-long, or (b) the nature of sport participation (i.e., number of available practices or games offered during the sport season). Sports programs for youth currently offered at the agency include: swimming (year-long - three times per month), wheelchair basketball (seasonal - weekly), track and field (10 months – one to two times per week), table tennis (year-long - two times per week), archery (seasonal- two to three five-week clinics per year), rock climbing (seasonal - four weekly indoor practice sessions with a final outdoor event), water sports (seasonal - two times per summer), and bowling (seasonal – three to four times per summer). Despite variation in times offered, all sports were included in this study. Intensity of sport and time spent in each intensity level was considered in the analysis.

Procedures. Data were collected using two methods: (a) a questionnaire completed by the child/parent and (b) records kept by the facility for frequency and duration of sport participation. Records and questions were assessed from experiences in the past year (January 1, 2017 to December 31, 2017). The Director of Operations and Evaluation at the adaptive sports program distributed a one-time administered comprehensive questionnaire to youth with physical disabilities participating in the program. Parents were asked to assist the youth participant in answering questions unless otherwise instructed. The questionnaire for this study (see Appendix C) was the result of collaboration between the primary investigator and the staff at the participating adaptive sports program. The program staff also recommended that they personally administer questionnaires due to their pre-established rapport with participants. The

questionnaire was available in both a written and electronic format, but due to parental preference all questionnaires were completed online.

Before completing the questionnaire, electronic parental permission (Appendix D) and youth participant assent (Appendix E) were required. Parents and children completed the questionnaire together, with the exception of the eight item physical activity self-efficacy portion (Appendix C, section 7) as per the developer of the self-efficacy scale; the youth athlete was asked to complete the assessment without assistance in order to ensure accurate feelings of self-efficacy (Saunders et al., 1997).

Questionnaires did not ask for participants' names; however, each had a 2-digit ID code for identification and data analysis. The participating youth adaptive sports program determined this code and provided participants with their individual code. This process helped maintain, to an extent, the anonymity and confidentiality of participants. Because the primary investigator received other personal identifiers such as age and disability, true anonymity was not possible. However, the use of a participant ID code helped protect the identity of each participant. Only the agency staff member knew which questionnaire each participant completed. With this knowledge, agency staff also calculated the response rate for the questionnaire by calculating the percentage of responses in comparison to the total youth approached to participate in the study.

Once questionnaires were completed, the agency staff used pre-existing data to record the frequency and duration of involvement in the youth adaptive sports program for each participant. These data were recorded using a provided Excel sheet. All questionnaires and Excel sheet information were de-identified with only the participant ID before being provided to the primary investigator.

Dependent Variable

The dependent variable and central focus of this study was physical activity self-efficacy for youth with physical disabilities. Physical activity self-efficacy was measured using the Physical Activity Self-Efficacy Scale (PASES eight item version), which originated from a 17-item questionnaire developed by Saunders et al. (1997). Saunders and colleagues based the scale on Social Cognitive Theory, with 17 items representing the three factors of support seeking, barriers, and positive alternatives. Motl et al. (2000) subsequently revised Sauder's self-efficacy scale for an older population and included 15-items, one factor, and a five-point Likert Scale. After analyzing the psychometrics, Motl et al. (2000) decided the long one-factor version was not acceptable and concluded that the best fit was an eight item assessment. Bartholomew, Loukas, Jowers, and Allua (2006) also confirmed that the one factor 17-item model and the three factor 17-item model were poor fits, recommending the eight item model instead. Bartholomew et al. referred to the scale as the Physical Activity Self-Efficacy Scale (PASES), as it is also referred to in this study.

Not only is the eight item PASES a better fit for multiple populations (Bartholomew et al., 2006), but researchers have also used the PASES with children with physical disabilities (Grover et al., 2016). Grover et al. utilized the PASES to measure physical activity self-efficacy for youth with multiple sclerosis. Grover et al. found a positive correlation between the PASES scores and vigorous physical activity ($r = 0.44$, $p = .02$). Due to the improved psychometrics and the brief background of use with youth with physical disabilities, the eight item PASES was chosen for use in this study.

The eight item version of the PASES used in this study has a five-point Likert scale ranging from (1) "disagree a lot" to (5) "agree a lot." The total points from the eight items are

added together and then divided by eight to calculate one total average score. Final scores will range between one and five, with a higher score indicating a higher level of physical activity self-efficacy (R. P. Saunders, personal communication, May 31, 2017).

Independent Variables

This study used the Center for Disease Control and Prevention (CDC) definition of *Physical Activity*: "any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level" (CDC, 2015, para. 17). The *Department of Health and Human Services (USDHHS) Physical Guidelines for Americans* defined physical activity as "bodily movement that enhances health" (United States Health and Human Services (USDHHS), 2008, p.2). The first independent variable focused on general fulfillment of national physical activity recommendations. Physical activity for this variable included anything applying to the CDC definition.

Another focus of this research was physical activity by means of *adaptive sport participation,* defined as "sport modified or created to meet the unique needs of individuals" (Winnick & Porretta, 2016, p.6). For this study, adaptive sport specifically referred to any competitive or uncompetitive sport adapted for and performed by youth with physical disabilities. The independent variable measuring adaptive sport participation in this study included *frequency and duration of time spent in sport* with different intensities of physical activity (light, moderate, and vigorous).

Fulfillment of national physical activity requirements. According to the *United States Department of Health and Human Services* (*USDHHS) Physical Guidelines* (2008), children and adolescents aged 6 to 17 should engage in at least 60 minutes of "moderate to vigorous" physical activity (MVPA) per day. Additionally, the USDHHS recommends that vigorous-intensity

physical activity, that is both bone and muscle strengthening, should occur at least three days weekly. USDHHS defines *aerobic activity* as rhythmic movement of large muscles that increases cardiovascular fitness, such as running, basketball, and swimming; *bone strengthening activity* as executing a force or bodily impact that stimulates bone growth or strength, such as running and jumping rope; and *muscle strengthening activity* as exerting increased muscle work in comparison to average daily activities, such as rock climbing or push-ups (USDHHS, 2008). The National Institute of Health stated that children with disabilities should also meet the USDHHS requirements, when possible (NHLBI, 2008). In this questionnaire (see Appendix C), a question drawn from the National Youth Physical Activity and Nutrition Survey measured the fulfillment of national physical activity requirements. The item only measured whether the youth fulfilled the suggested 60 minutes of MVPA (CDC, 2010). According to USDHHS, the total amount of MVPA is more important than achieving the prescribed mix of aerobic, bone strengthening and muscle strengthening exercises. Furthermore, there is also a large overlap in aerobic, muscle strengthening, and bone strengthening activities, making it hard to differentiate among activity classifications (USDHHS, 2008). With parental help, participants self-reported if they met the 60 minutes of MVPA per day. For optimal benefits, the USDHHS recommends that adults (18 years and older) engage in five hours of moderate intensity or 2.5 hours of vigorous intensity exercise per week, or an equivalency of both intensity types (USDHHS, 2008). The oldest participant in this study was 19, and this difference in age requirements was considered in results.

Intensity of physical activity. In this study, *intensity of physical activity* was defined as the energy cost of performing a specific activity. There have been several studies that quantify the amount of energy disbursed as a metabolic equivalent (MET) (Ainsworth et al., 2011; Clevenger et al., 2016; Ridley, Ainsworth, & Olds, 2008). A MET value is determined by the

ratio of the specific activities metabolic rate to the standard resting metabolic rate (RMR). The average RMR for an adult ($3.5ml*kg^{-1}*min^{-1}$) is less than the average RMR for children ($4-7ml*kg^{-1}*min^{-1}$) (McMurray et al., 2015). However, the energy expenditure (EE) of activities for children is generally higher than EE for adults as well due to lower economy of movement and underdeveloped motor skills (McMurray et al., 2015).

The Compendium of Energy Expenditures for Youth (Ridley et al., 2008) and *A Youth Compendium of Physical Activities: Activity Codes and Metabolic Intensities* (Butte et al., 2018) both provided MET measurements for activities performed by youth without disabilities. It would be most appropriate to solely use the youth compendiums in this study; however, the selection of activities does not entirely cover the programs evaluated in the participating adaptive sports program. Ridley and Olds (2008) performed an extensive literature review, justifying the substitution of adult MET values in the absence of youth MET values for everyday activities, excluding running and walking which significantly differ with age. Therefore, some adult MET values from the 2011 Compendium of Physical Activities (Ainsworth et al., 2011) were used to provide a more comprehensive list.

Though substitution is permissible, using directly measured youth MET values is still a more preferable and accurate method (Ridley & Olds, 2008). In this study, youth MET values from the *Compendium of Energy Expenditures for Youth* (2018) included running/jogging moderate to hard effort (MET 8.5 – 9.3) and swimming moderate to hard effort (MET 9.9 – 11.6) (Ridley et al., 2008). Youth MET values from the *Youth Compendium of Physical Activities: Activity Codes and Metabolic Intensities* included table tennis (MET 4.2), swimming front crawl (MET 8.6 – 10.4), and bowling (MET 5.4 – 5.7) (Butte et al., 2018). Clevenger et al. (2016) measured energy costs of 10 additional activities for children ages 5 to 15 and reported a bowling

MET of 3.6. However, the bowling MET reported by Butte et al. (2018) was used in this study instead because its research was based on ages of youth more similar to this study's participants. Ridley et al., Butte et al., and Clevenger et al. measured youth MET for basketball; however, the wheelchair basketball measurement from the adult compendium (MET 7.8) was used instead, as it was more representative of the adaptive sport offered. Nine additional adaptive sports from this study were not represented with youth METs, and therefore utilized the adult METs. These activities included shot put (MET 4.0), javelin (MET 6.0), discus (MET 4.0), archery (MET 4.3), rock climbing (moderate level - MET 5.8), water skiing (MET 6.0), sailing (MET 3.0), kayaking (MET 5.0), and jet skiing (MET 7.0) (Ainsworth et al., 2011). See Table 1 for selected MET values and intensity classifications.

Caution should be taken in interpreting exact MET values, as the MET values still change as children develop and age (Trost, Drovandi, & Pfeiffer, 2016). Trost et al. (2016) found MET values for sedentary and low-intensity activities remained stable with age, but values for moderate to vigorous-intensity activity increased with age. Significant evidence for differences in sex-specific MET values did not occur (Trost et al., 2016). To account for this variability, intensity levels for this thesis were compartmentalized into categories of light, moderate, and vigorous activity instead of examining exact MET values (see Table 1).

Table 1

Selected MET Values

Youth Sport/Adaptive Sport	MET Values	Intensity Levels
Running/Jogging (moderate / hard effort)	8.5 – 9.3[a]	Vigorous
Swimming (moderate / hard effort)	8.6 – 11.6[ab]	Vigorous
Bowling	5.4 - 5.7[b]	Moderate
Wheelchair basketball	7.8[c]	Vigorous
Table tennis (moderate effort)	4.2[b]	Moderate
Shot Put	4.0[c]	Moderate
Javelin	6.0[c]	Moderate
Discus	4.0[c]	Moderate
Archery	4.3[c]	Moderate
Rock climbing (moderate effort)	5.8[c]	Moderate
Water skiing	6.0[c]	Moderate
Sailing	3.0[c]	Light
Kayaking	5.0[c]	Moderate
Jet Skiing	7.0[c]	Vigorous

Note. MET values for running/jogging, swimming, bowling, and table tennis are derived using directly measured EE of youth. All other values utilize EE measurements of adults.

[a] Ridley et al. (2008)

[b] Butte et al. (2018)

[c] Ainsworth et al. (2011)

Child intensity levels differ from those of adults due to a higher RMR. Intensity levels for youth are classified as “light” (1.5 - 3.9 METs), “moderate” (4.0 – 6.9 METs), and “vigorous” (≥7 METs) (Chung, Skinner, Steiner, & Perrin, 2012; Trost et al., 2016). It was assumed that while energy expended by youth with physical disabilities were indeed different than the MET values utilized to represent them in this study (see Table 1), the continuum of intensities still provided value in their relationship to physical activity self-efficacy. For example, were activities that required *higher* physical exertion (e.g., wheelchair basketball) associated with higher levels

of physical activity self-efficacy than those activities that required *less* physical exertion (e.g., table tennis)?

To further differentiate level of sport participation, frequency and duration at each level of intensity were calculated. Since none of the nine participants were engaged in sailing, only the frequency and duration of moderate and vigorous intensities were considered. The participating agency had pre-existing data for each athlete and sport. This study used that data to collect specific information on the frequency of participation for each athlete, as well as a general approximation of duration of practices or games attended.

In this study, *frequency of participation* was defined as the number of times an individual participated in adaptive sport over a one-year period. In order to provide more accurate results, employees of the adaptive sports program used previously collected attendance data to determine the individuals' participation from January 1, 2017 to December 31, 2017.

In this study, *duration of participation* was defined as the number of hours an individual participated in each sport during the past year. Employees of the participating adaptive sports program approximated the hourly duration of each program offered. On the questionnaire, participants indicated which sports they were involved in during the year beginning January 1, 2017 and ending December 31, 2017. Using the athlete's name and sport participation, employees from the adaptive sports program approximated the number of hours completed in all adaptive sports provided through the agency using previously collected program data during this time period. An exact number could not be provided as practices and games vary slightly in duration.

Control Variables

This study measured amount of physical education in school and frequency of participation outside of the adaptive sports program as control variables. These variables captured total adaptive sports participation and required physical education, while also acted as potential control measures for analyzing adaptive sport participation exclusively within the cooperating agency.

Frequency of participation in sports outside of the program was a self-reported item in the questionnaire asking the level of involvement in other sports (see Appendix C). Participants were asked to recall the extent of their participation and level of involvement in other sports from January 1, 2017 to December 31, 2017, as it is the most recent year-long time period. Adaptive sport participation outside of the program was not factored into the intensity level calculations.

The *amount of physical education in school* was a self-reported measure on the questionnaire (see Appendix C) indicating the number of hours a child participated in physical education classes each week based on current involvement. This information was gathered in an attempt to measure the influence of school education on youths' ability to meet physical activity requirements and increase physical activity self-efficacy.

Descriptive Variables

Descriptive variables for this study included experience in adaptive sport, age/school grade, gender, race, type of disability, level of mobility, and family structure. Each of these concepts has been previously found to relate to either physical activity self-efficacy or participation (Bandura, 1977; Bartholomew et al., 2006; Grecas, 1989; Grover et al., 2016; Harmon et al., 2014; Law et al., 2006; Spence et al, 2010; Wilson, Haegele, & Zhu, 2016).

Descriptive variables were used to provide more detailed information about the study and its participants.

Experience in adaptive sport was defined as the amount of sport experience measured in months/years that an individual had collectively engaged in a particular sport. The participant self-reported their previous experience in sports offered by the adaptive sports program, with a general option for sports unaffiliated with the program (see Appendix C). Bandura (1977) suggested that positive performance accomplishments increase self-efficacy; therefore, collecting a participant's previous sport experience was important as it potentially reflects meaningful opportunities for positive accomplishments which may in turn influence self-efficacy.

This study measured *age/school grade* as continuous variables, limited to the participant age range of 12 to 19. Age was included as a descriptive variable because research indicates that self-efficacy is developmental and therefore increases with age (Bandura, 1977). However, physical activity participation declines with age (NPAP Alliance, 2016), possibly indicating a consequential decline in physical activity self-efficacy due to the frequent correlation between the two variables. School grade was also measured to show any differentiations between age and typical grade.

Gender was collected in this study as a dichotomous variable of "female" or "male" and *race* was collected as a nominal measure. Race categories included Caucasian, African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, Native American, and an option of other race.

Physical disability was also assessed as a nominal measure, with the most common physical disabilities pertaining to participants in the adaptive sport program listed (i.e. traumatic brain injury, cerebral palsy, spinal cord injury, dwarfism, spina bifida, amputations, and visual

impairments) and an option of "other" provided for participants to report different diagnoses and conditions (see Appendix C).

Level of mobility was measured by a dichotomous yes/no question asking if the individual used a wheelchair or mobility device for over half the day. *Family structure* was assessed by asking if the individual lived in a two-parent, one-parent, or other type of household.

Data Analysis

Questionnaire data were entered into SPSS (version 24) by the primary investigator. To address research question one, the percentage of the participants meeting the *USDHHS Guidelines for Physical Activity* recommendations was calculated by dividing the total number of those meeting the standard by the total number of participants in study. A comparison of the percentage from this sample was made to the national norms of children.

To address research question two, the primary investigator planned to perform a t-test to determine if there was a significant difference ($p < .05$) in physical activity self-efficacy scores between participants that met the MVPA standard and those participants that did not meet the MVPA standard. Caution in determining causality would have been taken as physical activity self-efficacy and physical activity participation have a reciprocal relationship, thus physical activity self-efficacy can be both a cause and result of physical activity participation (McAuly & Blissmer, 2000). However, due to the low sample size and increased probability of Type I and Type II error, a descriptive comparison of means for this question was performed instead. A descriptive comparison of means for these participants cannot be generalized to all adaptive sports participants and no general trends were concluded.

To address research question three, the primary investigator planned to use a hierarchal linear regression analysis to determine the extent of the relationships among physical activity

self-efficacy levels and time spent in light, moderate and vigorous physical activity. This analysis would have controlled for extraneous variables, while simultaneously identifying adaptive sport participation variables that explained variance within the predictive model. However, due to the low sample size and lack of light and moderate intensity physical activity reported, only the cumulative hours identified by participants in each intensity level were reported. Further analysis was not conducted.

Results

Examination of Control and Descriptive Variables

This study collected the amount of physical education received in school and the youths' frequency of participation outside of the adaptive sports program as control variables. Since t-tests and hierarchal linear regression tests were not performed, these variables were not used in this capacity. However, results indicated that of the nine participants, over half (55.5%) partook in at least 4 hours of physical education per week. Eight of the nine participants (88.9%) were involved in sports outside of the affiliated adaptive sports program, with participation ranging from infrequently (one to five times per year) to every day.

Descriptive variables collected for this study included gender, school grade, age, type of disability, race, level of mobility, family structure, and experience in adaptive sport. Of the nine participants, 55.6% were male and 44.4% were female. This is representative of the gender distribution for the participating adaptive sports program population (60% male and 40% female). The ages of participants in this study were 12 years (n = 1), 14 years (n = 3), 16 years (n = 1), 17 years (n = 2), 18 years (n = 1), and 19 years (n = 1) with two participants attending middle school and seven participants attending high school. The physical disabilities of participants included spina bifida (n = 4), amputations (n = 3), visual impairments (n = 2),

traumatic brain injury (*n* = 1), and spinal cord injury (*n* =1). One individual reported having three different disabilities (traumatic brain injury, spinal cord injury, and visual impairments); all other participants only reported one. Races of participants were Caucasian (*n* = 6), African American (*n* = 1), Native American (*n* = 1), and Asian (*n* = 1). Less than half of participants used a wheelchair or other mobile device for at least half of the day (44.4%). The majority of the sample came from a two-parent household (88.9%). While years participated in adaptive sport varied among participants, experience in their primary sport(s) ranged from 3 to 10.5 years (*M* = 6.94, *SD* = 2.35).

Participants Meeting Physical Activity Guidelines (Research Question 1)

For optimal benefits, The *United States Department of Health and Human Services (USDHHS) Physical Guidelines* (2008) states children and adolescents aged 6 to 17 should engage in at least 60 minutes of "moderate to vigorous" physical activity (MVPA) per day. For adults (18 years and older), the recommendation for optimal benefits changes to 5 hours of moderate intensity or 2.5 hours of vigorous intensity exercise per week, or an equivalency of both intensity types (USDHHS, 2008). The proportion of youth meeting the recommended national physical activity guidelines of 60 minutes of moderate to vigorous activity per day in this study was self-reported on a daily and weekly basis. Although there was a small sample size, the findings provide a descriptive picture of this sample. However, these results are purely descriptive. Direct comparisons and significance of results were *not* considered due to the high probability of Type I and Type II errors occurring. Of the nine participants, over 75% of youth engaged in 60 minutes or more of physical activity the day prior to completing the questionnaire (see Table 2).

Table 2

Physical Activity Recommendations (Did You Meet Recommendations YESTERDAY)

Met Recommendations	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	7	77.8	77.8	77.8
No	2	22.2	22.2	100.0
Total	9	100.0	100.0	

However, only one participant engaged in 60 minutes or more of physical activity for all seven days of the week prior to completing the questionnaire (see Table 3). The mean days met for the entire sample was 4.22 days (*SD* = 1.86).

Table 3

Physical Activity Recommendations (How Many Days in the Last Week Did You Meet Recommendations)

Days	Frequency	Percent	Valid Percent	Cumulative Percent
0	0	0	0	0
1	0	0	0	0
2	2	22.2	22.2	22.2
3	2	22.2	22.2	44.4
4	1	11.1	11.1	55.6
5	1	11.1	11.1	66.7
6	2	22.2	22.2	88.9
7	1	11.1	11.1	100.0
Total	9	100.0	100.0	

With age in consideration, the 18 and 19-year-old participants both reported six days of 60 minutes of physical activity (see Table 3). This meets the 5-hour per week recommendation for their age range.

Therefore, in this sample three out of the nine participants met the physical activity recommendations for the week (33.3%). Females engaged in more days of physical activity than males (see Table 4).

Table 4

Physical Activity Recommendations (Gender)

Gender	Days Met Recommendations (Mean)	N	Std. Deviation
Male	3.80	5	2.05
Female	4.75	4	1.71
Total	4.22	9	1.86

Overall, older participants tended to engage in more days of physical activity than younger participants (see Table 5).

Table 5

Physical Activity Recommendations (Age)

Age	Days Met Recommendations (Mean)	N	Std. Deviation
12	2.00	1	
14	3.00	3	1.00
16	5.00	1	
17	5.00	2	2.83
18	6.00	1	
19	6.00	1	
Total	4.22	9	1.86

Meeting Physical Activity Guidelines and Physical Activity Self-Efficacy Levels (Research Question 2)

The primary investigator compared the means of physical activity self-efficacy scores with number of days the participants met the physical activity recommendations per week (see

Table 6). Individuals meeting more days of 60 minutes of physical activity had higher physical activity self-efficacy scores. However, due to low sample size generalizations, significance, and direct comparisons could not be made.

Table 6

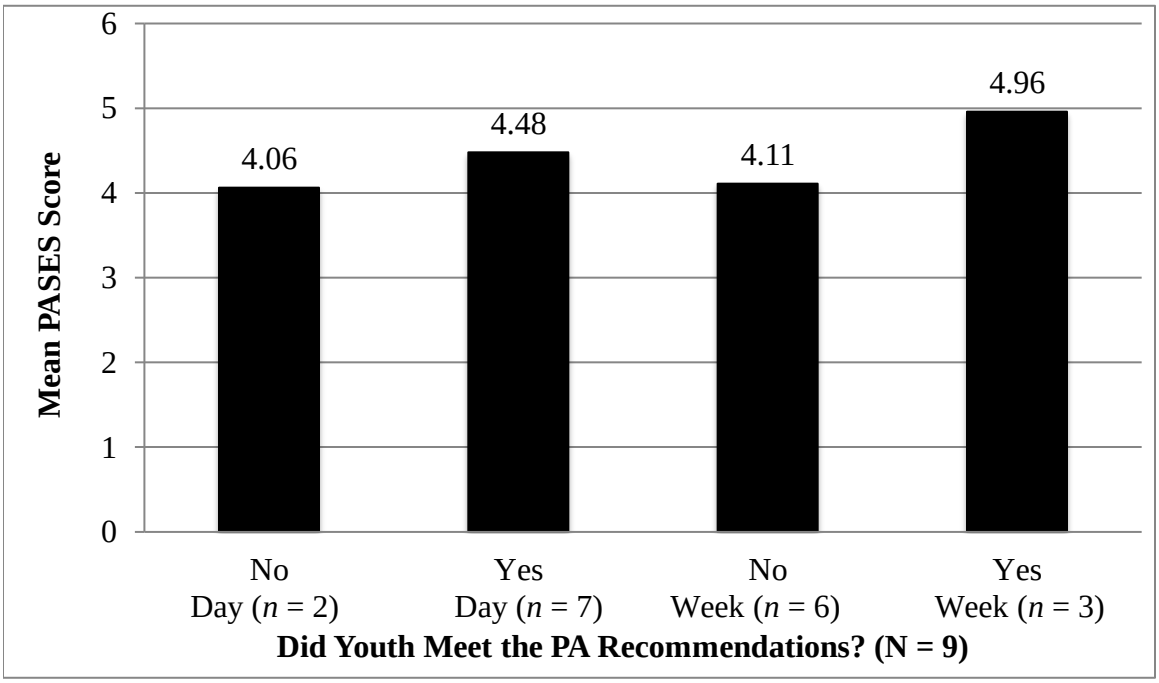
Physical Activity Self-Efficacy Score Compared to Days Met of Recommendations

Days Met Recommendations	Physical Activity Self-Efficacy Score (Mean)	N	Std. Deviation
0	0	0	
1	0	0	
2	4.06	2	0.62
3	3.94	2	0.97
4	4.38	1	
5	4.25	1	
6	4.94	2	0.09
7	5.00	1	
Total	4.39	9	0.61

As mentioned, seven out of nine participants met the physical activity recommendations for the day prior to completing the survey and three out of nine participants met the physical activity recommendations for the week prior to completing the survey (60 minutes per day for ages 12-17 and five hours per week for ages 18–19). Figure 2 presents the mean PASES scores for those youth who met and did not meet the physical activity recommendations.

Figure 2

Physical Activity Self-Efficacy of Athletes Who Did and Did Not Meet Physical Activity Recommendations



Meeting Physical Activity Guidelines and Physical Activity Self-Efficacy Levels (Research Question 3)

Participation in the specific adaptive sports program was considered for this research question. Involvement in sports outside the program was not considered because investigators did not have access to the exact duration and frequency of the youths' participation. The participating adaptive sports program provided the frequency and estimated duration of each participant's engagement in their programs. Eight out of nine participants were mainly involved in wheelchair basketball. They had a mean basketball attendance of 18 practices for the given year at approximately two hours each practice. The other participant was predominantly involved in swimming, attending 18 practices for the given year at two hours per practice. Both of these sports have a vigorous intensity level. One individual also engaged in track and field for three

practices at two hours each. This individual participated equally in running and field events, so the six hours were split into both moderate and vigorous intensity (three hours moderate and three hours vigorous). Another individual engaged in archery for two practices at two hours each. Archery is a moderate intensity sport.

After calculating the frequency and duration, the nine participants cumulatively participated in 329 hours per year of vigorous activity (*M* = 36.56; *n* = 9; *SD* = 8.73) and seven hours per year of moderate activity *(M* = 3.50; *n* = 2; *SD* = 0.71) . No one engaged in light intensity physical activity within the adaptive sports program. Since the quantity of vigorous activity exponentially outweighed the amount of light or moderate activity reported, this research question was not examined.

Other Factors and Physical Activity Self-Efficacy

Though not part of the initial research questions, the self-efficacy scores of the participants were also explored by age (Table 7) and gender (Figure 3). Older participants and females had higher self-efficacy scores than younger participants and males.

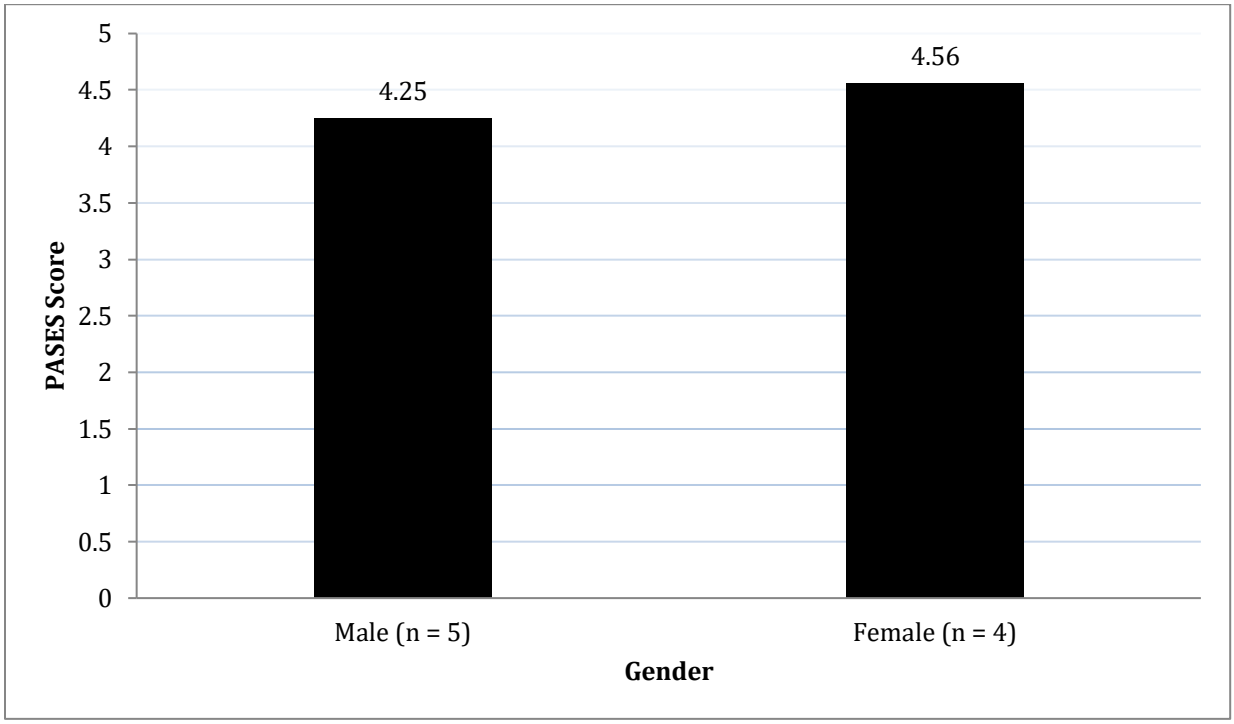
Table 7

Age and PASES Scores

Age	PASES Score (Mean)	N	Std. Deviation
12	4.50	1	
14	3.75	3	0.57
16	4.25	1	
17	4.81	2	0.27
18	5.00	1	
19	4.88	1	
Total	4.39	9	0.61

Figure 3

Gender and PASES Scores



Discussion

Explanation of Findings

Physical activity guidelines. Research suggests that on average only 21.6% of 6 to 19-year-old children meet the 60-minute daily requirements for physical activity (National Physical Activity Plan Alliance (NPAP Alliance, 2016). This percentage is typically lower for children with disabilities (Kim & Greaney, 2014). However, in this study, 77.8% met the recommendations for the day prior to taking the questionnaire and 33.3% met the recommendations for the whole week prior to taking the questionnaire. Due to a low sample size, generalizations of these outcomes cannot be made. However, a higher percentage than the national average may be a result of only surveying athletes. It is also possible that with a larger

sample size and more longitudinal approach to measuring physical activity, the percentage from this study may decrease and closer resemble the typical percentage for children with disabilities.

Research suggests that boys tend to meet physical activity requirements and participate in extracurricular sports more often than girls (NPAP Alliance, 2016; Telford et al., 2016). Furthermore, research indicates that younger children tend to meet physical activity requirements more than older children (NPAP Alliance, 2016), with the largest declines occurring in middle adolescence (Trost et al., 2002). Neither of these findings applied to participants in this study. On average, in this study, girls engaged in more physical activity than boys and older athletes engaged in more physical activity than younger athletes. However, though the sample in this study did not appear to decline in participation with age, the lowest physical activity reported was for participants between the ages of 12 and 14. This age range closely aligns with the middle adolescence period when higher declines typically occur (Trost et al., 2002).

Physical self-efficacy levels. Physical activity self-efficacy is both a determinant and consequence of participation (McAuly & Blissmer, 2000). Several studies confirm significant positive relationships between the two factors (Dwyer et al., 2013; Grover et al., 2016). In this study, Figure 2 shows the PASES scores were slightly higher for those who met the physical activity recommendations. Furthermore, the scores for the three participants that met the weekly recommendations were higher than the scores for those that only exercised the suggested amount for one day during the week. Though significance could not be determined due to small sample size, these results appeared to follow trends reported in research on adolescents (Dwyer et al, 2013) and youth with disabilities (Grover et al., 2016).

Overall, PASES scores for all participants in this study regardless of physical activity levels were a lot higher than scores reported in past research on children without disabilities

(Bartholomew et al., 2006) and children with disabilities (Grover et al., 2016). Mean PASES scores in these studies did not exceed 2.00; however, the mean score for participants in this study was 4.29 (*SD* = 0.66, *n* = 9). This score may be higher because all participants in this study were athletes and engaged in higher amounts of vigorous activity than participants in past research.

Intensity, frequency, and duration of sport. These factors were included in the study because the U.S. Department of Health and Human Services and other research studies state that higher frequency, intensity, and/or duration of physical activity may increase positive health outcomes (Jannsen & LeBlanc, 2010; Telama et al., 2005; USDHHS, 2008). Since the participants in this study engaged mostly in high intensity sports (wheelchair basketball and swimming), it is possible that they may have more positive health outcomes than peers that engage in low to moderate intensity sports (i.e. sailing or bowling). However, this could not be determined in the current study. In future research, it would be important to include participants from sports with different intensity levels in order to test this hypothesis. The duration and frequency of participation were also similar for all participants. All practices were approximately 2 hours and frequency of participation ranged from 18 to 25 times in the past year (January 1, 2017 to December 31, 2017). It is recommended that future studies include participants with a higher greater variation in the duration and frequency of their physical activity and sport involvement.

Age, gender, and self-efficacy. Fundamental research indicates that self-efficacy is developmental for the general population, and therefore, increases with age (Bandura, 1977). In this sample, the PASES scores for individuals ages 17 to 19 were higher than the PASES scores for youth ages 12 to 16. Though significance cannot be determined, these results for participants

with disabilities in this study appear to follow the trend reported in prior research for a general population (Bandura, 1977).

Research also indicates that females tend to have less physical activity self-efficacy than males, but that level of self-efficacy is a greater determinant of physical activity in girls than boys (Harmon et al., 2014; Spence et al, 2010). Female and male PASES scores in this study were similar; however, the girls did have slightly higher PASES scores than the boys. It is important to note that this sample only consisted of adaptive sports athletes. Therefore, the higher self-efficacy scores may have been a factor of their increased physical activity and sport participation as an athlete. The research used to compare these results (Harmon et al., 2014; Spence et al, 2010) also focuses solely on children without disabilities; therefore, any differentiation may be a result of the dissimilarities in population.

Limitations

Many limitations occurred throughout this research process. First, the participating adaptive sports program experienced staff loss during the planned data collection period. Prior to this loss, it was decided that the program staff would distribute the questionnaire and collect data. Eliminating the primary investigator from this process was predicted to increase participant confidentiality and response rate due to familiarity with staff. However, ability to commit time to data collection significantly lowered when staff numbers decreased.

Therefore, the sample size for this study was only nine participants. According to Bartlett, Kotrlik, and Higgins (2001), adequate sample size can be estimated using several different methods (e.g. multiple-step research approach, pilot study results, data from similar studies, or mathematical estimation). For a population of 100, the authors predict that a sample size of 46 individuals for studies using continuous data (margin of error = .03) and 74 for studies

with categorical data (margin of error = .05) may avoid usual statistical errors (Bartlett, Kotrlik, & Higgins, 2001). Another study using the PASES to measure physical activity self-efficacy with a similar population (youth with multiple sclerosis) utilized a sample size of 68 with a control sample of 37 (Grover et al., 2016). Although this study used the same assessment, in contrast, research participants varied in disability resulting in an even greater need for a larger sample size. Nine responses were not an adequate amount to make any inferences or conclusions without avoiding statistical error. Furthermore, these nine responses may not be representative of the participating adaptive sports program. According to program records, the gender distribution is similar, but it is possible that other variables may not be similar.

The response rate for this research questionnaire was 11.4%. There were several possible contributing factors to this low response rate (Fan & Yan, 2010). The online format was provided for convenience of participants; however, online questionnaires typically have an approximately 11% lower response rate than other methods (Fan & Yan, 2010). The topic of the research also influences response rate. It is possible that the topic of physical activity self-efficacy did not seem pertinent or pressing to the given population. Further education on the topic and its relevancy might increase interest. Fan and Yan suggest that length of questionnaire also affects response rate. The research questionnaire for this study took approximately 5 to 20 minutes for each participant, with the majority completing in less than 10 minutes. However, it also required assent forms and 27 questions were included which may have appeared time-consuming and subsequently a deterrent to completion. The website used for data collection indicated that many participants started the questionnaire but did not complete it. This trend may have occurred due to an appearance of length and not the actual time commitment needed.

Having participants self-report questions was another limitation as it can possibly affect accuracy of response. Specifically, questions pertaining to meeting physical activity recommendations were self-reported. Children may have more difficulty accurately remembering amount of physical activity due to higher activity variability and differences in cognitive development compared to adults. In addition, it may be difficult for adults to recall the physical activity of a child (Corder, Ekelund, Steele, Wareham, & Brage, 2008). Therefore, even with parental assistance, recall may not be precise. To avoid self-report limitations for the amount of physical activity within the adaptive sports program, this study used past records of participation frequency and duration. One potential solution to increase the accuracy of reporting variables without past records is the use of activity diaries; these may help with recall but add additional burden to the participant. Using physiological and objective measures of physical activity, such as heart rate or accelerometry, is another option to increase accuracy (Corder et al., 2008). However, these methods cost more and may be time consuming.

Another limitation concerning this study's research methods is the use of energy expenditure studies as they often exclude adults and youth with disabilities. While a few published studies calculate MET values for individuals with disabilities, these studies were specific to adults with spinal cord injury (Collins et al., 2010) and paraplegia (Lee, Zhu, Hedrick, & Fernhall, 2010). Youth participants in this study reported a wide range of physical disabilities not yet measured. Furthermore, Collins et al. and Lee et al. did not report MET values for the sports and activities observed in this study. Therefore, this study utilized the able-bodied MET values instead based on reports from Ainsworth et al. (2011), Ridley et al. (2008), and Butte et al. (2018), prioritizing directly-measured *youth* MET values when available. While certainly recognized as a significant limitation due to the lack of existing MET values specific to youth

with physical disabilities, the intent of using MET values as a variable in this study was to look at the value of a continuum of physical intensities rather than the *actual* energy expended.

Directions for Future Research

The limitations mentioned above restricted this research from providing meaningful statistical deductions. As this research remains important for the participating adaptive sports program, staff plans to continue collecting research with the university to increase the probability of attaining meaningful and generalizable results. Moving forward, a longitudinal study of participants may present insight into any change in variables and the relationships among adaptive sports participation factors, self-efficacy and physical activity levels. Adjusting the questionnaire to apply to similar organizations outside the participating adaptive sports program may also increase sample size and the generalizability of findings to all youth adaptive sports programs.

Having a control sample to compare the findings would also provide further insight to results. Children with chronic conditions and disabilities are less likely to meet physical activity recommendations or have high physical activity self-efficacy in comparison to children without disabilities (Kim & Greaney, 2014; Moola et al., 2008). Useful control samples would include athletes without disabilities, non-athletes with disabilities, and non-athletes without disabilities. Having these control groups would improve the ability to compare and evaluate the effect of adaptive sports on participants. Furthermore, as mentioned, these samples should be representative of a wide range of frequency, duration, and physical activity intensity levels in order to analyze all research questions.

Implications for Practice

Practitioners working in the adaptive sports sector should be concerned with the physical activity self-efficacy levels of their participants. Children with physical disabilities have more restrictions to their physical activity (Murphy & Carbone, 2008). However, with greater self-efficacy, these same children feel equipped to overcome barriers and participate in future physical activity. Physical activity self-efficacy should be further researched within multiple organizations in order to determine ways to increase self-efficacy feelings among participants. If physical activity self-efficacy increases, physical activity participation may also increase. For children with disabilities, physical activity participation has numerous benefits to their physical and mental health (Murphy & Carbone, 2008; Shapiro & Martin, 2010). Therefore, when considering the health of youth, physical activity participation and physical activity self-efficacy should be primary focal points within the recreational therapy practice.

Conclusion

Though this study did not have a large enough sample size to explore significant findings and relationships, the data collected were still compared to physical activity trends found in the research. First, the percentage of children in this sample who met physical activity recommendations (33.3%) was slightly higher than the national average of 21.6 % (NPAP Alliance, 2016). This may have been a result of surveying only athletes, having too small of a sample size, or looking at too limited of a time period. In this study, girls and older athletes met recommendations more often than boys and younger athletes. Though these findings also contradicted past research (NPAP Alliance, 2016), the younger athletes fell into the middle adolescence category where the largest drops in physical activity typically occur (Trost et al. 2002).

Results from this study also mirrored several physical activity self-efficacy trends. Physical activity self-efficacy scores were higher for youth who met physical activity recommendations than those who did not meet the recommendations, similar to the study by McAuly and Blissmer (2000). Older athletes also showed higher self-efficacy scores, aligning to research based on the self-efficacy theory (Bandura, 1977). However, females exhibited higher self-efficacy scores than males. These results were not similar to past research (Spence et al, 2010; Harmon et al., 2014); however, self-efficacy is a determinant of physical activity, especially for girls. Since, these girls engaged in higher amounts of physical activity, it made sense that they had higher self-efficacy. Despite some alignment with past research trends, additional research is recommended to further investigate results and establish significance.

References

Ainsworth, B. E., Haskell, W. L., Herrmann, S. D., Meckes, N., Bassett Jr, D. R., Tudor-Locke, C., ... & Leon, A. S. (2011). 2011 Compendium of Physical Activities: A second update of codes and MET values. *Medicine and Science in Sports and Exercise*, *43*(8), 1575-1581.

Bandini, L., Danielson, M., Esposito, L. E., Foley, J. T., Fox, M. H., Frey, G. C., . . . Humphries, K. (2015). Obesity in children with developmental and/or physical disabilities. *Disability and Health Journal*, *8*(3), 309-316.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215.

Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, *2*(1), 21-41.

Bartholomew, J. B., Loukas, A., Jowers, E. M., & Allua, S. (2006). Validation of the physical activity self-efficacy scale: Testing measurement invariance between Hispanic and Caucasian children. *Journal of Physical Activity and Health, 3*(1), 70-78.

Bartlett, J.E., & W. Kotrlik, J., & C. Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal.* 19(1), 43-50

Butte, N. F., Watson, K. B., Ridley, K., Zakeri, I. F., Mcmurray, R. G., Pfeiffer, K. A., ... & Berhane, Z. (2018). A youth compendium of physical activities: Activity codes and metabolic intensities. *Medicine and Science in Sports and Exercise, 50*(2), 246.

Center for Disease Control and Prevention (CDC). (2010). *National Youth Physical Activity and Nutrition Survey.* Retrieved from ftp://ftp.cdc.gov/pub/data/yrbs/nypans/2010nypans_questionnaire.pdf.

Centers for Disease Control and Prevention (CDC) (2014). *School Health Policies and Practices Study.* Retrieved from https://www.cdc.gov/healthyyouth/data/shpps/pdf/shpps-508-final_101315.pdf.

Center for Disease Control and Prevention (CDC) (2015). *Glossary of Terms*. Retrieved from https://www.cdc.gov/physicalactivity/basics/glossary/index.htm.

Chung, A. E., Skinner, A. C., Steiner, M. J., & Perrin, E. M. (2012). Physical activity and BMI in a nationally representative sample of children and adolescents. *Clinical Pediatrics, 51*(2), 122-129.

Clevenger, K. A., Aubrey, A. J., Moore, R. W., Peyer, K. L., Suton, D., Trost, S. G., & Pfeiffer, K. A. (2016). Energy cost of children's structured and unstructured games. *Journal of Physical Activity and Health, 13*(6 Suppl. 1), S44-S47.

Collins, E. G., Gater, D., Kiratli, J., Butler, J., Hanson, K., & Langbein, W. E. (2010). Energy cost of physical activities in persons with spinal cord injury. *Medicine and Science in Sports and Exercise*, *42*(4), 691-700.

Corder, K., Ekelund, U., Steele, R. M., Wareham, N. J., & Brage, S. (2008). Assessment of physical activity in youth. *Journal of Applied Physiology*, *105*(3), 977-987.

Dwyer, J. J., Chulak, T., Maitland, S., Allison, K. R., Lysy, D. C., Faulkner, G. E., & Sheeshka, J. (2012). Adolescents' self-efficacy to overcome barriers to Physical Activity Scale. *Research Quarterly for Exercise and Sport*, *83*(4), 513-521.

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 98.

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*(2), 132-139.

Gecas, V. (1989). The social psychology of self-efficacy. *Annual Review of Sociology*, *15*(1), 291-316.

Greenwood, C. M., Dzewaltowski, D. A., & French, R. (1990). Self-efficacy and psychological well-being of wheelchair tennis participants and wheelchair non-tennis participants. *Adapted Physical Activity Quarterly*, *7*(1), 12-21.

Grover, S. A., Sawicki, C. P., Kinnett-Hopkins, D., Finlayson, M., Schneiderman, J. E., Banwell, B., ... & Yeh, E. A. (2016). Physical activity and its correlates in youth with multiple sclerosis. *The Journal of Pediatrics*, *179*, 197-203.

Harmon, B. E., Nigg, C. R., Long, C., Amato, K., Kutchman, E., Anthamatten, P., ... & Hill, J. O. (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 and Exercise*, *15*(3), 272-279.

Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, *7*(1), 40.

Kim, J., & Greaney, M. L. (2014). Prevalence of physical activity, screen time, and obesity among US children by the service type of special health care needs. *Disability and Health Journal*, *7*(3), 318-324.

Lee, M., Zhu, W., Hedrick, B., & Fernhall, B. (2010). Estimating MET values using the ratio of HR for persons with paraplegia. *Medicine and Science in Sports and Exercise*, *42*(5), 985-990.

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise and Sport Sciences Reviews*, *28*(2), 85-88.

McMurray, R. G., Butte, N. F., Crouter, S. E., Trost, S. G., Pfeiffer, K. A., Bassett, D. R., ... & Fulton, J. E. (2015). Exploring metrics to express energy expenditure of physical activity in youth. *Public Library of Science (PLOS) ONE*, *10*(6).

Moola, F., Faulkner, G. E., Kirsh, J. A., & Kilburn, J. (2008). Physical activity and sport participation in youth with congenital heart disease: Perceptions of children and parents. *Adapted Physical Activity Quarterly*, *25*(1), 49-70.

Motl, R. W., Dishman, R. K., Trost, S. G., Saunders, R. P., Dowda, M., Felton, G., ... & Pate, R. R. (2000). Factorial validity and invariance of questionnaires measuring social-cognitive

determinants of physical activity among adolescent girls. *Preventive Medicine*, *31*(5), 584-594.

Motl, R. W., Dishman, R. K., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., & Pate, R. R. (2002). Examining social-cognitive determinants of intention and physical activity among black and white adolescent girls using structural equation modeling. *Health Psychology*, *21*(5), 459.

Murphy, N. A., & Carbone, P. S. (2008). Promoting the participation of children with disabilities in sports, recreation, and physical activities. *Pediatrics*, *121*(5), 1057-1061.

National Heart, Lung, and Blood Institute (NHLBI). (2008). *Recommendations for Physical Activity.* Retrieved from https://www.nhlbi.nih.gov/health/health-topics/topics/phys/recommend.

National Physical Activity Plan Alliance (NPAP Alliance) (2016). *The 2016 United States Report Card on Physical Activity for Children and Youth.* Retrieved from http://www.physicalactivityplan.org/reportcard/2016FINAL_USReportCard.pdf.

Ridley, K., Ainsworth, B. E., & Olds, T. S. (2008). Development of a compendium of energy expenditures for youth. *International Journal of Behavioral Nutrition and Physical Activity*, *5*(1), 45.

Ridley, K., & Olds, T. (2008). Assigning energy costs to activities in children: A review and synthesis. *Medicine & Science in Sports & Exercise*, *40*(8), 1439-1446.

Saunders, R. P., Pate, R. R., Felton, G., Dowda, M., Weinrich, M. C., Ward, D. S., ... & Baranowski, T. (1997). Development of questionnaires to measure psychosocial influences on children's physical activity. *Preventive Medicine*, *26*(2), 241-247.

Shapiro, D., & Martin, J. J. (2010b). Multidimensional physical self-concept of youth athletes with disabilities. *Adapted Physical Activity Quarterly*, *27*(4), 294-307.

Shapiro, D. R., & Martin, J. J. (2010a). Athletic identity, affect, and peer relations in youth athletes with physical disabilities. *Disability and Health Journal, 3*(2), 79-85.

Spence, J. C., Blanchard, C. M., Clark, M., Plotnikoff, R. C., Storey, K. E., & McCargar, L. (2010). The role of self-efficacy in explaining gender differences in physical activity among adolescents: A multilevel analysis. *Journal of Physical Activity and Health*, *7*(2), 176-183.

Stajkovic, A. D., & Luthans, F. (2003). Social cognitive theory and self-efficacy: Implications for motivation theory and practice. In R. M. Steers & L. W. Porter (Eds.), *Motivation and Work Behavior* (5th ed.) (pp. 126-140). New York, NY: McGraw-Hill Irwin.

Telama, R., Yang, X., Viikari, J., Välimäki, I., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21-year tracking study. *American Journal of Preventive Medicine*, *28*(3), 267-273.

Telford, R. M., Telford, R. D., Olive, L. S., Cochrane, T., & Davey, R. (2016). Why are girls less physically active than boys? Findings from the LOOK longitudinal study. *PloS One*, *11*(3).

Trost, S. G., Drovandi, C. C., & Pfeiffer, K. (2016). Developmental trends in the energy cost of physical activities performed by youth. *Journal of Physical Activity and Health*, *13*(6 Suppl. 1), S35-S40.

Trost, S. G., Pate, R. R., Sallis, J. F., Freedson, P. S., Taylor, W. C., Dowda, M., & Sirard, J. (2002). Age and gender differences in objectively measured physical activity in youth. *Medicine & Science in Sports & Exercise*, *34*(2), 350-355.

United States Department of Health and Human Services (USDHHS). (2008). *2008 Physical Activity Guidelines for Americans.* Retrieved from https://health.gov/paguidelines/pdf/paguide.pdf.

Winnick, J., & Porretta, D. (2016). *Adapted Physical Education and Sport (6th ed.)*. Champaign, IL: Human Kinetics.

Wickman, K., Nordlund, M., & Holm, C. (2016). The relationship between physical activity and self-efficacy in children with disabilities [Special Issue]. *Sport in Society*, 1-14.

Voskuil, V. R., & Robbins, L. B. (2015). Youth physical activity self-efficacy: A concept analysis. *Journal of Advanced Nursing*, *71*(9), 2002-2019.

SECTION II: EXTENDED LITERATURE REVIEW

Physical Activity and Youth

Benefits. Physical activity, particularly that at a moderate to vigorous level, provides children with several physical, psychological, and social health benefits (Janssen & LeBlanc, 2010; United States Department of Health and Human Services [USDHHS], 2008). Benefits include, but are not limited to, decreases in blood pressure, obesity, and depression (Janssen & LeBlanc, 2010), as well as increases in cardiorespiratory and muscular fitness, bone health, metabolic health, and body composition (USDHHS, 2008). Furthermore, physical activity in the form of a team sport may provide additional health benefits. Participation in team sports tends to better increase life satisfaction, mental health, and social acceptance; it also can decrease feelings of hopelessness and suicidal ideation (Eime, Young, Harvey, Charity, & Paine, 2013).

The benefits of physical activity apply to individuals with physical disabilities, as well. Decreased levels of mobility may increase the risk of osteoporosis, obesity, high blood pressure, and secondary chronic conditions (Mobily, 2009). However, Hicks et al. (2003) studied the effects of long-term exercise on adults with spinal cord injuries (N = 34) and found that a 9-month exercise program significantly increased muscle strength, arm ergometry power output, and overall quality of life, while decreasing pain and stress. Other studies confirmed a higher quality of life for adults with physical disabilities who participated in adaptive sport when compared to those who do not participate in adaptive sport (Côté-Leclerc et al., 2017; Yazicioglu, Yavuz, Goktepe & Tan, 2012).

Though research is limited, there are some studies and articles discussing the effect of sport and physical activity with children and adolescents with physical disabilities (Murphy & Carbone, 2017; Shapiro & Martin, 2010a). Research shows that children with disabilities are

more likely to be obese than their peers (Bandini et al., 2015). Sport participation can lower their obesity risks, as well as increase psychosocial factors of self-esteem, social acceptance, independence, positive effects, peer relations, and athletic identity (Murphy & Carbone, 2008; Shapiro & Martin, 2010a). Regular fitness also helps slow the progression of chronic disease and maintains a child's muscular strength, flexibility, and joint structure that typically decrease with physical disability (Murphy & Carbone, 2008).

Physical activity requirements. In order for children to receive these optimal health benefits, the *United States Department of Health and Human Services (USDHHS)* developed physical activity guidelines (2008). According to the USDHHS, all children and adolescents aged 6 to 17 should engage in at least 60 minutes of moderate to vigorous physical activity (MVPA) per day. Additionally, vigorous-intensity physical activity, bone strengthening activity, and muscle strengthening activity should all occur at least three days a week. The USDHHS defines *aerobic activity* as rhythmic movement of large muscles that increases cardiovascular fitness, such as running, basketball, and swimming; *bone strengthening activity* as executing a force or bodily impact that stimulates bone growth or strength, such as running and jumping rope; and *muscle strengthening activity* as exerting increased muscle work in comparison to average daily activities, such as rock climbing or push-ups (USDHHS, 2008). The National Institute of Health states that children with disabilities should also meet the USDHHS requirements when possible (NHLBI, 2008).

The 2016 United States Report Card for Physical Activity for Children and Youth states that only 21.6% of 6 to 19-year-old children meet the 60-minute daily requirements for PA (National Physical Activity Plan Alliance [NPAP Alliance], 2016). Based on data from the 2005-

06 National Health and Nutrition Examination Survey, the NPAP Alliance (2016) reported that boys tend to meet the physical activity requirements more than girls (26% and 16.9%, respectively), and children ages 6 to 11-years-old tend to meet the requirements exponentially more than children ages 12 to 16 or 16 to 19-years-old (42.5%, 7.5%, and 5.1%, respectively). Trost et al. (2002) studied students in first through twelfth grade and found that largest declines in participation for both genders occurred during the middle adolescence period (ages 11 to 14).

In order to better meet requirements, the Institute of Medicine (IOM) (2013) recommends that schools provide students with daily access to 60 minutes of MVPA, with over 30 minutes provided during regular school hours. However, less than half of elementary schools require physical education, and even fewer schools (approximately 8%) require physical education for 11th and 12th grade students. Furthermore, only 62% of students with disabilities participate in these required physical education classes (CDC, 2014).

Given these statistics, the likelihood of children with disabilities meeting the standards is lower than it is for children without disabilities (Kim & Greaney, 2014). Wilson, Haegele, and Zhu (2016) performed a cross sectional analysis of National Health and Nutrition Examination Surveys from 2011 to 2014 and found that boys with mobility limitations were less likely to meet the national physical activity recommendations than boys without mobility limitations. Though a lower percentage of girls with mobility limitations met physical activity recommendations than girls without mobility impairments, this difference was not significant (Wilson et al., 2016).

Law, King, King, and Kertoy (2006) surveyed youth with physical disabilities (N = 427) about their daily recreational and leisure activities. Researchers concluded that males were more likely to participate in higher-intensity physical activities than females (p = .001), and children 12 years and older were less likely to participate in recreational activities overall (p < .001).

Furthermore, children from single-parent households exhibited lower participation in physical activities (p = .001) and high-intensity activities (p = .007) when compared to children living in two-parent households (Law et al., 2006).

Overall, it seems reasonable that lower levels of physical activity are directly related to the fact that children with behavioral or physical disabilities often engage in less vigorous activity (Kim & Greaney, 2014) and experience more restrictions to physical activity (Murphy & Carbone, 2008) than children without health conditions. Due to the numerous physical and psychosocial benefits of being physically active, it is important that adaptive sport programs continue to measure and analyze the degree to which they provide opportunities to meet recommended physical activity levels (Shapiro & Martin, 2010b).

Physical Activity Self-Efficacy

Another determinant of participation is physical activity self-efficacy. *Physical activity self-efficacy* is "a youth's belief in his/her capability to participate in physical activity and to choose physical activity despite existing barriers" (Voskuil & Robbins, 2015, p. 2002). Physical activity self-efficacy and participation are reciprocally related in that physical activity self-efficacy is both a determinant and consequence of participation (McAuly & Blissmer, 2000). Several studies confirm significant direct and indirect relationships between the two factors (Dwyer et al, 2013; Grover et al., 2016; Hamilton, Warner, & Schwarzer, 2016; Motl et al., 2002) therefore, cultivating physical activity self-efficacy in children may be important for overall health and consistency of participation.

Dwyer et al. (2013) examined self-efficacy as a means of overcoming barriers for high school students (N = 484). Outcome measures included physical activity measured using MET hours/week and self-efficacy predictor factors of internal barriers, harassment barriers, physical

environment barriers, social environment barriers, and responsibility barriers. Researchers used a regression analysis that suggested all five self-efficacy barriers were significantly related to physical activity levels and explained 44% of physical activity levels (range of β = .09 for responsibility barriers to β = .25 for internal barriers, R^2 =.44, p < .001).

Motl et al. (2002) analyzed the physical activity participation and intention determinants for adolescent girls (N = 1,797). Researchers measured self-efficacy using an eight item scale, paired with other scales measuring attitude, behavioral control, and subjective norm. They found that self-efficacy was significantly related to intention (R^2 = .743, p. < .0001), expectation (R^2 = .514, p. < .0001), and participation in moderate (R^2 = .240, p. < .0001) and vigorous physical activity (R^2 = .201, p. < .0001).

Hamilton et al. (2016) also studied the correlations between self-efficacy and intention and participation in vigorous physical activity. Unlike Motl et al. (2002), Hamilton et al. concluded that self-efficacy only related directly to intention of physical activity (β = 1.17, 95% CI: 0.97, 1.36), not actual participation. However, in turn, intention of physical activity correlated with increased physical activity (β = 13.37, 95% CI: 0.32, 26.42), resulting in an indirect relationship with self-efficacy.

Though research is sparse, a direct relationship between physical activity self-efficacy and participation has been found in children with disabilities, specifically those with multiple sclerosis. Grover et al. (2016) measured physical activity self-efficacy for youth using a sample of healthy children (n = 27), youth with multiple sclerosis (n = 27), and youth with monophasic acquired demyelinating syndromes (n = 41). They found a positive correlation between the self-efficacy scores and vigorous physical activity (r = 0.441, p = .021) for the multiple sclerosis group only. Researchers concluded that self-efficacy was especially important for youth with

multiple sclerosis to overcome barriers to physical activity in comparison to youth without this chronic disease.

Theoretical background. Physical activity self-efficacy originates from personal self-efficacy, a concept proposed by Albert Bandura. Albert Bandura (1977) defined *self-efficacy* as "belief in one's capabilities to organize and execute courses of action required to produce given attainments" (p. 3). Self-efficacy is differentiated from *outcome expectancy* in that an individual may believe an action will produce a certain result (i.e., outcome expectancy), but at the same time highly doubt their capabilities to successfully complete that action (i.e., *efficacy expectancy*). These doubts influence the individual's performance and desire to pursue the particular action.

According to Bandura, self-efficacy develops around information gathered from the following categories:

1. *Performance accomplishments* in which participants experience repeated success can increase efficacy expectations and decrease fear and overall effect of occasional failure.
2. *Vicarious experiences* in which participants witness others succeed can motivate individuals and increase belief in their own ability. Specifically, youth self-efficacy increases the most when youth observe peers that are competent and successful, but also characteristically similar and relatable (Murray & Tenenbaum, 2010).
3. *Verbal persuasion* such as motivational words from a coach or parent can also influence self-efficacy. Within this category, the child's interpretation of parental support and encouragement has the most significant effect on his or her development of self-efficacy (Gecas, 1989).

4. *Physiological states* such as emotional states of fear and anxiety can result in avoidance behavior, ultimately affecting belief in ability. Health can also change self-efficacy levels. Specifically, youth with chronic conditions may experience lower physical activity self-efficacy (Moola et al., 2008).

Social Cognitive Theory. Bandura's concept of self-efficacy and the corresponding multifaceted influences on psychosocial functioning are the basic constructs in Social Cognitive Theory (SCT). SCT, developed by Bandura, is a model of reciprocal causality in which "internal personal factors in the form of cognitive, affective and biological events; behavioral patterns and environmental events all operate as interacting determinants that influence one another bidirectionaly" (Bandura, 1999, p. 23). In other words, behavior is reciprocally related to both environmental factors and personal cognitive processes (Stajkovic & Luthans, 2003). Specific determinants include:

1. Symbolizing: People use symbols and visual experiences to learn and give meaning to personal experiences.
2. Forethought: People plan and anticipate their future, thus guiding current actions taken.
3. Vicarious learning: People learn by observing the actions and consequences of others.
4. Self-regulation: People set their own self-standards, which influence personal behavior.
5. Self-reflection beliefs: People use personal experiences to reflect on and analyze their capabilities (e.g. self-efficacy) (Stajkovic & Luthans, 2003).

See Figure 1 for an illustration of SCT determinants.

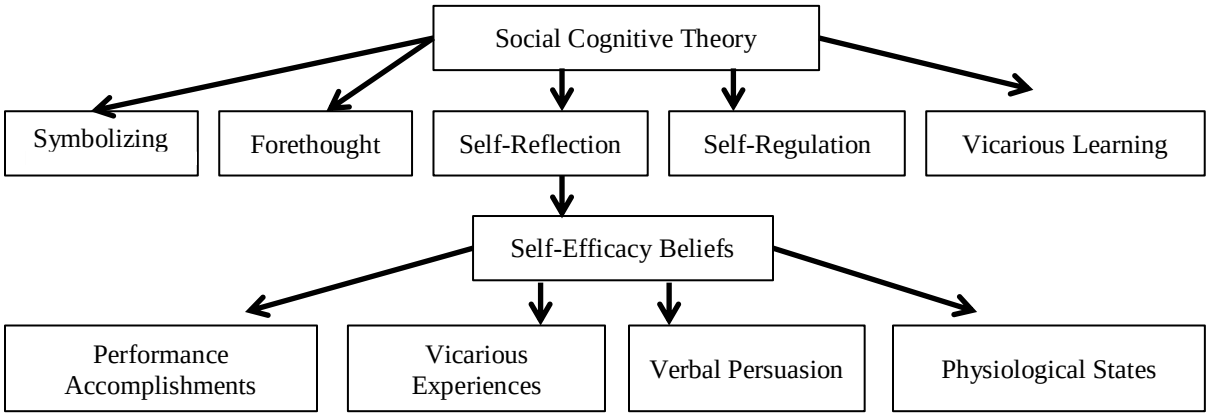


Figure 1. Relationships of Social Cognitive Theory Determinants

Self-efficacy vs. self-competence. Self-efficacy is commonly, but incorrectly, confused with self-competence. This study focuses solely on self-efficacy; therefore, being able to distinguish self-efficacy from self-competence is crucial in research analysis and purpose. The *self-efficacy* construct appears in Social Cognitive Theory, while the *self-competence* construct correlates with Self-Determination Theory (Rodgers, Markland, Selzer, Murray & Wilson, 2014). The Self-Determination Theory states that when people satisfy the basic needs of autonomy, relatedness, and competency, they develop a higher level of intrinsic motivation (Deci & Ryan, 1982). *Perceived competence* refers to one's belief in their capabilities to master certain tasks, particularly tasks that are personally important or challenging. In contrast, self-efficacy refers to the belief in one's capabilities to perform specific tasks in the future despite differing circumstances (Rodgers et al., 2014). For example, an individual may be able to currently play basketball well at home (self-competence); however, fear of public failure or humiliation may cause the individual to believe they would not be successful on a basketball team (self-efficacy).

Rodgers et al. (2014) investigated these definitional differences within an exercise context. Participants, community-dwelling adults (N = 357), completed two questionnaires: the

Psychological Need Satisfaction in Exercise (PNSE) was used to measure *perceived competence*, and the Multidimensional Self-efficacy for Exercise Scale (MSES) was used to measure task, coping, and scheduling *self-efficacy*. The three forms of self-efficacy had a significant, moderate correlation (r = .33) with perceived competence. However, although correlated, there was good discriminate validity differentiating the two concepts, as evidenced by the average variance extracted (AVE) for the self-efficacy scales (task = .78; coping = .75; scheduling = .86) greatly exceeding the squared bivariate correlations of the three self-efficacy scales with perceived self-competence (task = .34; coping = .38; scheduling = .31) (Rodgers et al., 2014).

Multidimensional influences on physical activity self-efficacy. Voskuil and Robbins (2015) performed a concept analysis of youth physical activity self-efficacy. They reviewed 276 articles, with four articles focusing on youth with chronic conditions. Through their research, Voskuil and Robbins found that youth physical activity self-efficacy was a personally developed concept that focuses on the youth's belief in his or her capability to perform physical activity despite barriers, competing activities, and positive alternatives. They also concluded that self-efficacy was dynamic and multi-dimensional, with age and gender as contributing factors.

Grecas (1989) explained that self-efficacy levels develop and increase from childhood to early adulthood. They peak when an individual is in middle age and then start to decline around 60 years of age. Foundational sources also stated that boys tend to have higher self-efficacy than girls (Bandura, 1977; Grecas, 1989). Other researchers have confirmed these relational findings for gender and physical activity self-efficacy (Harmon et al., 2014; Spence et al., 2010). Spence et al. (2010) studied adolescent students (n = 2,222 boys, n = 2,557 girls) and found that boys had a significantly higher level of physical activity self-efficacy (F (1, 4425) = 64.28, p < .0001). They also determined that the relationship between physical activity self-efficacy levels and

participation was higher for females, meaning that self-efficacy may be more important for physical activity participation in females than males (Spence et al., 2010).

Harmon et al. (2014) studied the relationship between Social Cognitive Theory and physical activity behavior. Participants included fourth and fifth grade students (N = 393). Physical activity outcome measures included social support, self-efficacy, enjoyment, environmental variables, fulfillment of moderate to vigorous physical activity (MVPA) requirements, and individual demographics. Researchers found that boys were more likely to meet MVPA requirements (OR = 2.08, 95% CI = 1.32–3.29), and that physical activity self-efficacy exhibited a significant positive relationship with meeting MVPA ($\beta = .21$, $p \leq .001$), strenuous physical activity ($\beta = .22$, $p \leq .001$), and moderate physical activity ($\beta = .13$, $p \leq .001$) requirements.

In addition to gender and age factors, youth with chronic conditions and physical disabilities may experience lower physical activity self-efficacy (Moola et al., 2008). Moola et al. interviewed adolescents with congenital heart disease (CHD) and found that participants indicated a low physical activity self-efficacy. Participants contributed their low physical activity self-efficacy to judgment from peers and seeing others succeed in activities that they were unable to perform. Though physical activity self-efficacy was low overall, support from family, friends, and other significant figures encouraged self-efficacy for some participants.

The U.S. Department of Health and Human Services stated that a higher frequency, intensity, and/or duration of PA will increase positive health outcomes (USDHHS, 2008). The majority of health benefits occur when a person engages in 150 minutes of physical activity per week, with benefits increasing with the duration and frequency of participation. Furthermore, for children to gain optimal health benefits they must participate in at least moderate-intensity

physical activities (Janssen & LeBlanc, 2010). Therefore, as previously stated, the recommended physical activity duration is 60 minutes of MVPA per day (USDHHS, 2008). Research also confirms the need to increase frequency, duration, and intensity for exercise adherence. Telama et al. (2005) conducted a 21-year study monitoring the physical activity patterns from childhood to adulthood (*N* = 1,563). Researchers found that if children (ages 9 to 12) engage in physical activity for six years continuously, they increase the odds of continued participation in adulthood for females (OR = 7.2, 95% CI: 2.6 - 20.3) and males (OR = 12.6, 95% CI: 5.8 - 27.8). With the increased odds of health benefits and exercise adherence into adulthood, it is hypothesized that increases in frequency, intensity, and duration will also correlate with high physical activity self-efficacy. Therefore, these factors are individually examined in this study in the context of adaptive sport.

Adaptive sport and physical activity self-efficacy. Research shows that adaptive sports programs can improve certain factors of psychosocial and physical well-being, such as social acceptance, independence, self-esteem, flexibility, and strength (Murphy & Carbone, 2008; Shapiro & Martin, 2010a). However, little research is available regarding the influence of adaptive sport on physical activity self-efficacy. Individuals with high levels of physical activity self-efficacy may also exhibit high levels of intention (Hamilton, Warner, & Schwarzer, 2016), expectation, and execution of moderate to vigorous exercise (Motl et al., 2002). It is important for adaptive sports programs to be aware of the physical activity self-efficacy levels of their participants and the factors that affect physical activity self-efficacy. This knowledge can help guide program development as needed to assure participants' optimal health benefits and future adherence.

Adaptive sport is defined as "sport modified or created to meet the unique needs of individuals" (Winnick & Porretta, 2016, p.6). Research demonstrates the correlation between adaptive sport participation and higher physical activity self-efficacy levels (Greenwood, Dzewaltowski, & French, 1990; Grover et al., 2016; Wickman, Nordlund, & Holm, 2016; Wickman et al., 2016). Internationally, the first organization for adaptive sport started in 1888 as the Sports Club for the Deaf in Berlin, Germany (Blauwet & Willick, 2012). However, adaptive sports did not become widely prevalent until after World War II when they were used to rehabilitate injured veterans. In 1944, sports began to change from being strictly rehabilitative to also being recreational and competitive in nature. The first Paralympic summer games occurred in 1960, followed by the first Paralympic winter games in 1976 (International Paralympic Committee (IPC), n.d.). In the United States, Disabled Sports USA is a prominent organization that provides opportunities for individuals with disabilities to participate in sport and recreation. Disabled Sports USA currently offers over 100 community programs and serves over 600,000 people each year (Disabled Sports USA, n.d.).

Although somewhat dated, Greenwood et al. (1990) studied the psychological well-being, self-efficacy, and physical performance between professional wheelchair tennis athletes (n = 87) and non-athlete wheelchair-users with similar demographics (n = 40). Participants completed a tennis self-efficacy scale, a wheelchair mobility self-efficacy scale, and the Profile of Mood States (POMS) to measure psychological well-being. Researchers found that wheelchair tennis players had significantly higher levels of positive moods, tennis self-efficacy, and wheelchair self-efficacy than non-athletes ($F(8,118) = 39.53$, $p < .001$). Participants with higher levels of tennis self-efficacy also demonstrated higher levels of wheelchair mobility self-efficacy ($r = .73$).

Researchers concluded that increased self-efficacy levels might be due to athlete's increased number of opportunities to have positive performance experiences.

Wickman et al. (2016) also studied the effect of adapted physical activities on self-efficacy levels. Participants included children ages 8 to 14 ($N = 45$) with physical impairments, neuropsychiatric diagnoses, speech or language disabilities, or muscular diseases. Individuals participated in 25 training sessions that provided instruction and practice in different adaptive sports. Self-efficacy significantly increased after completing the intervention ($p < .001$), along with the youths' perceptions of body attractiveness ($p < .01$), global self-esteem ($p < .01$), and physical self-worth ($p < .05$).

Similarly, Grover et al. (2016) studied physical activity determinants for healthy children ($n = 37$) and children with multiple sclerosis ($n = 27$) and monophasic acquired demyelinating syndromes (mono-ADS) ($n = 41$). Researchers measured self-efficacy using the eight item Physical Activity Self-Efficacy Scale (PASES). Researchers found a significant correlation between vigorous physical activity and self-efficacy ($r = .441$, $p = .021$) and between vigorous physical activity and exercise goal setting ($r = .564$, $p = .002$) for children with multiple sclerosis. However, the correlation was not significant for healthy children or children with mono-ADS. Researchers concluded that a focus on raising self-efficacy and exercise goal setting in children with multiple sclerosis might promote physical activity.

Lowther, Lane, and Lane (2002) studied physical activity self-efficacy levels for Amputee Soccer World Cup athletes ($N = 15$). Self-efficacy levels were measured one hour before six different games. Although levels did not change significantly from the first to last game, higher levels of physical activity self-efficacy were significantly correlated with game performance ($r = .57$, $p < .01$). Researchers noted that physical activity self-efficacy tends to

increase when there is a better understanding of task demands. As participants were professional athletes, physical activity self-efficacy levels may be lower for more inexperienced players who have less understanding of the sport.

Other studies have examined the relationship between adaptive sport and its' ability to promote self-competence in athletes (Lundberg, Bennett, & Smith, 2011a; Lundberg, Taniguchi, McCormick, & Tibbs, 2011b). Though self-efficacy and self-competence have subtle theoretical and definitional differences, there are still several conceptual overlaps. Lundberg et al. (2011a) studied the effect of adaptive sports and recreation on personal identity negotiation. Researchers conducted interviews and qualitative analysis for athletes over age 13 with a disability (N = 17). Researchers concluded that adaptive sports helped participants challenge negative perceptions of disability, gain social support, feel a sense of freedom, experience success, accomplish goals, and feel more self-competent and comparable to individuals without disabilities. Similarly, Lundberg et al. (2011b) examined the change in participants' sport-related competence after a three-week-long adaptive sports program for veterans with acquired disabilities (N = 18). Pre- and post-tests revealed significant improvement in sport related competence [t (17) = 3.869, p = .001].

Although limited, current research comparing adaptive sport participation and physical activity self-efficacy reveals positive associations and potential influences between the two factors. However, there is still much to learn about the many potential factors embedded within sport, and in particular adaptive sport, that might impact self-efficacy in children. Further research is needed to confirm these findings for physical activity self-efficacy in children with physical disabilities.

SECTION III: EXTENDED DISCUSSION

Explanation of Findings

Physical activity guidelines. Research suggests that on average only 21.6% of 6 to 19-year-old children meet the 60-minute daily requirements for physical activity (National Physical Activity Plan Alliance (NPAP Alliance, 2016). This percentage is typically lower for children with disabilities (Kim & Greaney, 2014). However, in this study, 77.8% met the recommendations for the day prior to taking the questionnaire and 33.3% met the recommendations for the whole week prior to taking the questionnaire. Due to a low sample size, generalizations of these outcomes cannot be made. However, a higher percentage than the national average may be a result of only surveying athletes. It is also possible that the cross-sectional and self-reported data in this study may not accurately represent the physical activity patterns of participants (Caspersen, Pereira & Curran, 2000; Corder, Ekelund, Steele, Wareham, & Brage, 2008). With a larger sample size and more longitudinal data, the percentage may either align closer to the national average or be lower than the average due to more barriers to physical activity for people with disabilities.

Research also suggests that boys tend to meet physical activity requirements and participate in extracurricular sports more often than girls (NPAP Alliance, 2016; Telford et al., 2016). However, in this study girls engaged in more physical activity than boys. This result is encouraging as many girls typically face gender stereotypes, which may discourage them from participating in physical activity or sport. Despite a small variance in biological physical ability, psychosocial aspects of sport strongly affect female participation and success (Chalabaev, Sarrazin, Fontayne, Boiche & Clement-Guillotin, 2013). Males normally dominate the sport world with higher media coverage and expectancy of better sport abilities. Boys also receive

more encouragement from parents to participate in sport with their performance being deemed more important than the performance of girls. These gender stereotypes may lessen with positive role models or the increased mindset that sport performance is not biological, but instead dependent on amount of training and effort (Chalabaev et al., 2013).

A Toronto-based study further investigated reasons why adolescent girls stopped participating in physical activity (Dwyer, Allison, Goldenberg, & Fein, 2006). Some reasons the girls (n = 73) reported for engaging in less physical activity were lack of time, lack of facilities, body-centered concerns, and influence of others. As girls aged, they gained more household, school, and job responsibilities. Physical activity was not a priority among their demanding schedule. Others did not have friends or family that wanted to join them in physical activity; therefore, this influenced them to engage in other social activities instead. Some girls could not afford to join workout facilities or find transportation to a gym, also limiting their access. Lastly, stereotypes deterred girls from participation. They did not want to appear unfeminine or unattractive for engaging too much in sport (Dwyer et al., 2006). It is important to override these gender and performance stereotypes and barriers to physical activity due to the benefits of physical activity for children (Janssen & LeBlanc, 2010; USDHHS, 2008). Fortunately, it appears the four females in this study have successfully engaged in physical activity despite barriers. This may be due to positive role models, positive influence of peers, and access to workout facilities within the participating adaptive sports program.

Aside from gender, research also indicates that younger children tend to meet physical activity requirements more than older children (NPAP Alliance, 2016). Dissimilarly, in this study, older athletes engaged in more physical activity than younger athletes. Though there was not a decline in participation with age, the lowest physical activity reported in this sample was

evident among participants ages 12 to 14. This age range closely aligns with the middle adolescence period when higher declines typically occur (Telama & Yang, 2000; Trost et al., 2002). Studies indicated that this decline is associated with puberty and desocialization from sport, or the process of finding activities that are most meaningful and enjoyable to the adolescent (Telama & Yang, 2000). A longitudinal study by Telama & Yang (2000) found that the largest decline in physical activity and organized sport for both girls and boys started at age 12. The decline was higher for boys than girls at this age. In fact, in their study, after the age of 15 adolescent girls participated in more physical activity than adolescent boys. The steeper decline of physical activity for boys in this age range may also contribute to the higher physical activity participation of girls in the study.

Physical self-efficacy levels. Physical activity self-efficacy is both a determinant and consequence of physical activity participation (McAuly & Blissmer, 2000). Several studies confirm significant positive relationships between the two factors (Dwyer et al, 2013; Grover et al., 2016). One specific study (Grover et al., 2016) focused on physical activity self-efficacy for youth with multiple sclerosis and monophasic acquired demyelinating syndromes. Grover et al. found a significant correlation between vigorous physical activity participation and PASES scores for youth with multiple sclerosis only ($r = 0.441$, $p = .021$). However, the relationship between moderate physical activity participation and PASES scores was not significant.
In this study, PASES scores were slightly higher for those that met the physical activity recommendations. Furthermore, the scores for the three participants that met the weekly recommendations were higher than the scores for those that only exercised the suggested amount for one day during the week. Though significance cannot be determined due to the small sample

size, these results appear to follow the trends reported in research on adolescents (Dwyer et al, 2013) and youth with disabilities (Grover et al., 2016).

Overall, PASES scores for all participants regardless of physical activity levels were a lot higher than past research with children without disabilities (Bartholomew et al., 2006) and children with disabilities (Grover et al., 2016). Mean PASES scores in these studies did not exceed 2.00; however, the mean score for participants in this study was 4.29 (SD = 0.66, n = 9). This score may be higher because all participants in this study were athletes and engaged in higher amounts of vigorous activity than participants in previous research.

Intensity, frequency, and duration of sport. Positive health outcomes may increase with greater sport intensity, as well as increased youths' frequency and duration of sport involvement (USDHHS, 2008; Jannsen & LeBlanc, 2010; Telama et al., 2005). After analyzing past research, Jannsen and LeBlanc (2010) found that low intensity physical activity did not consistently correlate with health benefits, although moderate and vigorous intensity physical activity did. Further evidence showed that vigorous intensity physical activity may provide additional health benefits in comparison to moderate physical activity alone (Jannsen & LeBlanc, 2010). Since the participants in this study engaged mostly in high intensity sports (wheelchair basketball and swimming), it is possible that they may have more positive health outcomes than peers that engage in low to moderate intensity sports (i.e. sailing or bowling). However, this could not be determined in the current study. In future research, it would be important to include participants from sports with different intensity levels in order to test this hypothesis.

Telama et al. (2005) highlighted the importance of continuous physical activity involvement for youth. Youth that were continuously active were significantly more likely to be active in adulthood. Specifically, adolescents aged 15 and 18 who were active for three years in a

row were approximately 12 times more likely to be active as adults (CI = 5.1 – 27.6) (Telama et al., 2005). In this study, the duration and frequency of participation were similar across all participants. All practices were approximately 2 hours long and frequency of participation ranged from 18 to 25 times in a year-long-period (January 1, 2017 to December 31, 2017). In further research, it is recommended to include participants with a greater variation in their duration and frequency of sports involvement. Furthermore, a longitudinal study could better provide insights into the effect this has on physical activity in adulthood.

The PASES was intended to look at items as a whole, not individually. However, investigation of these singular items provided further insight into barriers for athletes' participation and frequency levels related to their involvement in adaptive sports programs. In this study, several participants (boys and girls) reported having trouble participating in physical activity when they were busy (PASES item 7, mean = 3.89; SD = 1.27). It is possible that schoolwork and other home or work commitments limited their ability to engage in physical activity, particularly given that most of the sample was in high school. On the other hand, the item with the highest mean was "I think I have the skills I need to be physically active" (*M* = 4.89; SD = 0.33). This indicates that they felt equipped with the skills they need to be active and reflects well on the adaptive sports program. Through the program, the participants also have access to a facility that helps them be physically active.

Age, gender, and self-efficacy. Fundamental research indicates that self-efficacy is developmental for the general population, and therefore, increases with age (Bandura, 1977). In this sample, the PASES scores for individuals ages 17 to 19 were higher than the PASES scores for youth ages 12 to 16. Though significance cannot be determined, these results for participants

with disabilities in this study appear to follow the trend reported in prior research for a general population (Bandura, 1977).

Research also indicates that females tend to report less physical activity self-efficacy than males (Spence et al, 2010; Harmon et al., 2014). In this study, female and male PASES scores were very close; however, the girls did have slightly higher PASES scores than the boys. Another study found that among students in grades seven through ten (N = 4,779), level of self-efficacy was a greater determinant of physical activity in girls than boys (β = -.11 [0 = male], p < .001) (Spence et al., 2014). Therefore, self-efficacy levels may be a more important focus for female athletes than male athletes. The sample from this study only included adaptive sports athletes, thus, the higher self-efficacy scores reported may be a factor in their increased physical activity and sport participation as an athlete. The research used to compare these results (Harmon et al., 2014; Spence et al, 2010) also focuses solely on children without disabilities; therefore, any differentiation may be a result of the dissimilarities in population.

Limitations

Many limitations occurred throughout this research process. First, the participating adaptive sports program experienced staff loss during the planned data collection period. Prior to this loss, it was decided that the program staff would distribute the questionnaire and collect data. Eliminating the primary investigator from this process was predicted to increase participant confidentiality and response rate due to familiarity with staff. However, ability to commit time to data collection lowered significantly when staff numbers decreased.

The staff limitations are one reason why the sample size of this study included only nine participants. According to Bartlett, Kotrlik, and Higgins (2001), adequate sample size can be estimated using several different methods (e.g. multiple-step research approach, pilot study

results, data from similar studies, or mathematical estimation). For a population of 100, the authors predict that a sample size of 46 for continuous data (margin of error = .03) and 74 for categorical data (margin of error = .05) may avoid usual statistical errors (Bartlett et al., 2001). Another study using the PASES to measure physical activity self-efficacy with a similar population (youth with multiple sclerosis) utilized a sample size of 68 with a control sample of 37 (Grover et al., 2016). Although this study used the same assessment, in contrast, research participants varied in disability resulting in even more need for a higher sample size. Nine responses were not an adequate amount to make any inferences or conclusions without avoiding statistical error. Furthermore, these nine responses may not be representative of the participating adaptive sports program. According to program records, the gender distribution is similar, but it is possible that other variables may differ.

The response rate for this research questionnaire was 11.4%. There are several possible contributing factors to this low response rate (Fan & Yan, 2010). First, an online format was provided for convenience of participants; however, online questionnaires typically have an approximately 11% lower response rate than other methods (Fan & Yan, 2010). However, according to the participating adaptive sports program, parents tended to not be present at youth sports practices. Since the questionnaire recommended parents and children answer most of the questions together, completing the paper questionnaire at practices was difficult. The topic of the research also may have influenced the response rate. It is possible that the topic of physical activity self-efficacy did not seem pertinent or pressing to the given population. Further education on the topic and its relevancy may increase interest in the future. Length of questionnaire is also known to affect response rates. The research questionnaire for this study took approximately 5 to 20 minutes to complete for each participant, with the majority

completing in less than 10 minutes. However, it also required assent forms and 27 questions were included which may have appeared time-consuming and subsequently a deterrent to completion. The website used for data collection indicated that many participants started the questionnaire but did not complete it. This trend may have occurred due to an appearance of length and not the actual time commitment needed. Perhaps a greater description at the beginning of the survey identifying the time requirement expected would have been beneficial.

Having participants self-report questions was another limitation of this study. Specifically, questions pertaining to meeting physical activity recommendations were self-reported. Children may have more difficulty accurately remembering amount of physical activity due to higher activity variability and differences in cognitive development compared to adults. It is additionally difficult for adults to recall physical activity of a child (Corde et al., 2008). Therefore, even with parental assistance, recall may not be precise. To avoid self-report limitations for the amount of specific physical activity within the adaptive sports program, this study used past records of participation frequency and duration. One potential solution to increase the accuracy of reporting variables without past records is the use of activity diaries; these may help with recall but add additional burden to the participant. Using physiological and objective measures of physical activity, such as heart rate or accelerometry, is another option to increase accuracy (Corder et al., 2008). However, these methods cost more and may be time consuming.

Another limitation concerning this study's research methods is the use of energy expenditure studies as they often exclude adults and youth with disabilities. While a few published studies calculate MET values for individuals with disabilities, these studies were specific to adults with spinal cord injury (Collins et al., 2010) and paraplegia (Lee, Zhu, Hedrick,

& Fernhall, 2010). Youth participants in this study reported a wide range of physical disabilities not yet measured. Furthermore, Collins et al. and Lee et al. did not report MET values for the sports and activities observed in this study. Therefore, this study utilized the able-bodied MET values instead based on reports from Ainsworth et al. (2011), Ridley et al. (2008), and Butte et al. (2018), prioritizing directly-measured *youth* MET values when available. While certainly recognized as a significant limitation due to the lack of existing MET values specific to youth with physical disabilities, the intent of using MET values as a variable in this study was to look at the value of a continuum of physical intensities rather than the *actual* energy expended.

Directions for Future Research

The previously mentioned limitations restricted this research from forming meaningful statistical deductions. As this research remains important for the participating adaptive sports program, staff plans to continue collecting research with the university to increase probability of meaningful and generalizable results. Moving forward, a longitudinal study of participants may present insight into any change in variables and the relationships among adaptive sports participation factors, self-efficacy and physical activity levels. Adjusting the questionnaire to apply to similar organizations outside of the participating adaptive sports program may also increase the generalizability of the study to all youth adaptive sports programs.

Using a control of comparison group would also provide further insight to results. Children with chronic conditions and disabilities are less likely to meet physical activity recommendations or have high physical activity self-efficacy in comparison to children without disabilities (Kim & Greaney, 2014; Moola et al., 2008). Control samples including athletes without disabilities, non-athletes with disabilities, and non-athletes without disabilities would provide some clarity into the causality and implications of these relationships. Having these

control samples would also allow for a comparison and evaluation of the effect of adaptive sports on participants. Furthermore, these samples should be representative of a wide range of frequency, duration, and physical activity intensity levels in order to more clearly understand the relationship between adaptive sport participation and physical activity self-efficacy in the future.

Implications for Practice

Practitioners working in the adaptive sports sector need to be concerned with increased physical activity self-efficacy for their participants. The health benefits that result from physical activity are important for youth with physical disabilities (Murphy & Carbone, 2008; Shapiro & Martin, 2010a). At the same time, children with physical disabilities have more restrictions to physical activity, making it difficult for them to meet suggested physical activity recommendations (Murphy & Carbone, 2008). As technology becomes more prevalent in schools, so does sedentary activity (Kohl & Cook, 2013). Short classroom physical activity breaks and physical activity programs in addition to physical education can increase the chances of students meeting the 60-minute physical activity recommendation (Kohl & Cook, 2013). However, extracurricular activities like participation in adaptive sports programs can also provide additional opportunities for physical activity. With the increase in sedentary activity, it is especially important within the recreational therapy practice to focus on making these programs accessible to youth.

Physical activity participation may increase with greater levels of physical activity self-efficacy, since the two factors are reciprocally related (McAuly & Blissmer, 2000). As self-efficacy increases, children with physical disabilities feel they are better equipped to overcome barriers and participate in future physical activity. For this reason, physical activity self-efficacy needs to be further researched in order to determine ways to increase such feelings among

participants. When considering the health of youth, physical activity participation and physical activity self-efficacy should also be a primary focus within the recreational therapy practice.

Conclusion

Though this study did not have a large enough sample size to explore significant findings and relationships, the data collected were still compared to physical activity trends found in the research. First, the percentage of children in this sample who met physical activity recommendations (33.3%) was slightly higher than the national average of 21.6 % (NPAP Alliance, 2016). This may have been a result of surveying only athletes, having too small of a sample size, or looking at too limited of a time period. In this study, girls and older athletes met recommendations more often than boys and younger athletes. Though these findings also contradicted past research (NPAP Alliance, 2016), the younger athletes fell into the middle adolescence category where the largest drops in physical activity typically occur (Trost et al. 2002).

Results from this study also mirrored several physical activity self-efficacy trends. Physical activity self-efficacy scores were higher for youth who met physical activity recommendations than those who did not meet the recommendations, similar to the study by McAuly and Blissmer (2000). Older athletes also showed higher self-efficacy scores, aligning to research based on the self-efficacy theory (Bandura, 1977). However, females exhibited higher self-efficacy scores than males. These results were not similar to past research (Spence et al, 2010; Harmon et al., 2014); however, self-efficacy is a determinant of physical activity, especially for girls. Since, these girls engaged in higher amounts of physical activity, it made sense that they had higher self-efficacy. Despite some alignment with past research trends, additional research is recommended to further investigate results and establish significance.

REFERENCES

Ainsworth, B. E., Haskell, W. L., Herrmann, S. D., Meckes, N., Bassett Jr, D. R., Tudor-Locke, C., ... & Leon, A. S. (2011). 2011 Compendium of Physical Activities: A second update of codes and MET values. *Medicine and Science in Sports and Exercise*, *43*(8), 1575-1581.

Bandini, L., Danielson, M., Esposito, L. E., Foley, J. T., Fox, M. H., Frey, G. C., . . . Humphries, K. (2015). Obesity in children with developmental and/or physical disabilities. *Disability and Health Journal*, *8*(3), 309-316.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215.

Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, *2*(1), 21-41.

Bartholomew, J. B., Loukas, A., Jowers, E. M., & Allua, S. (2006). Validation of the Physical Activity Self-efficacy Scale: Testing measurement invariance between Hispanic and Caucasian children. *Journal of Physical Activity and Health*, *3*(1), 70-78.

Bartlett, J.E. & W. Kotrlik, J., & C. Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal.* 19 (1), 43-50.

Blauwet, C., & Willick, S. E. (2012). The Paralympic movement: Using sports to promote health, disability rights, and social integration for athletes with disabilities. *American Academy* of *Physical Medicine & Rehabilitation*, *4*(11), 851-856.

Butte, N. F., Watson, K. B., Ridley, K., Zakeri, I. F., Mcmurray, R. G., Pfeiffer, K. A., ... & Berhane, Z. (2018). A youth compendium of physical activities: activity codes and metabolic intensities. *Medicine and Science in Sports and Exercise*, *50*(2), 246.

Caspersen, C. J., Pereira, M. A., & Curran, K. M. (2000). Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Medicine & Science in Sports & Exercise*, *32*(9), 1601-1609.

Center for Disease Control and Prevention (CDC) (2010). *National Youth Physical Activity and Nutrition Survey.* Retrieved from ftp://ftp.cdc.gov/pub/data/yrbs/nypans/2010nypans_questionnaire.pdf.

Centers for Disease Control and Prevention (CDC) (2014). *School Health Policies and Practices Study.* Retrieved from https://www.cdc.gov/healthyyouth/data/shpps/pdf/shpps-508-final_101315.pdf.

Center for Disease Control and Prevention (CDC) (2015). *Glossary of Terms*. Retrieved from https://www.cdc.gov/physicalactivity/basics/glossary/index.htm.

Chalabaev, A., Sarrazin, P., Fontayne, P., Boiché, J., & Clément-Guillotin, C. (2013). The influence of sex stereotypes and gender roles on participation and performance in sport and exercise: Review and future directions. *Psychology of Sport and Exercise*, *14*(2), 136-144.

Chung, A. E., Skinner, A. C., Steiner, M. J., & Perrin, E. M. (2012). Physical activity and BMI in a nationally representative sample of children and adolescents. *Clinical Pediatrics*, *51*(2), 122-129.

Clevenger, K. A., Aubrey, A. J., Moore, R. W., Peyer, K. L., Suton, D., Trost, S. G., & Pfeiffer, K. A. (2016). Energy cost of children's structured and unstructured games. *Journal of Physical Activity and Health*, *13*(6 Suppl. 1), S44-S47.

Collins, E. G., Gater, D., Kiratli, J., Butler, J., Hanson, K., & Langbein, W. E. (2010). Energy cost of physical activities in persons with spinal cord injury. *Medicine and Science in Sports and Exercise*, *42*(4), 691-700.

Côté-Leclerc, F., Boileau Duchesne, G., Bolduc, P., Gélinas-Lafrenière, A., Santerre, C., Desrosiers, J., & Levasseur, M. (2017). How does playing adapted sports affect quality of life of people with mobility limitations?: Results from a mixed-method sequential explanatory study. *Health and Quality of Life Outcomes*, *15*(1), 22.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Disabled Sports USA. (2017). *Our Mission.* Retrieved from http://www.disabledsportsusa.org/about/our-mission/.

Dwyer, J. J., Allison, K. R., Goldenberg, E. R., & Fein, A. J. (2006). Adolescent girl's perceived barriers to participation in physical activity. *Adolescence*, *41*(161), 75.

Dwyer, J. J., Chulak, T., Maitland, S., Allison, K. R., Lysy, D. C., Faulkner, G. E., & Sheeshka, J. (2012). Adolescents' self-efficacy to overcome barriers to Physical Activity Scale. *Research Quarterly for Exercise and Sport*, *83*(4), 513-521.

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*(2), 132-139.

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and

adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 98.

Gecas, V. (1989). The social psychology of self-efficacy. *Annual Review of Sociology*, *15*(1), 291-316.

Greenwood, C. M., Dzewaltowski, D. A., & French, R. (1990). Self-efficacy and psychological well-being of wheelchair tennis participants and wheelchair non-tennis participants. *Adapted Physical Activity Quarterly*, *7*(1), 12-21.

Grover, S. A., Sawicki, C. P., Kinnett-Hopkins, D., Finlayson, M., Schneiderman, J. E., Banwell, B., ... & Yeh, E. A. (2016). Physical activity and its correlates in youth with multiple sclerosis. *The Journal of Pediatrics*, *179*, 197-203.

Hamilton, K., Warner, L. M., & Schwarzer, R. (2016). The role of self-efficacy and friend support on adolescent vigorous physical activity. *Health Education & Behavior*, *44*(1), 175-181.

Harmon, B. E., Nigg, C. R., Long, C., Amato, K., Kutchman, E., Anthamatten, P., ... & Hill, J. O. (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 and Exercise*, *15*(3), 272-279.

Hicks, A. L., Martin, K. A., Ditor, D. S., Latimer, A. E., Craven, C., Bugaresti, J., & McCartney, N. (2003). Long-term exercise training in persons with spinal cord injury: Effects on strength, arm ergometry performance and psychological well-being. *Spinal Cord*, *41*(1), 34-43.

Institute of Medicine (IOM). (2013). *Educating The Student Body: Taking Physical Activity and Physical Education to School.* Retrieved from

http://www.nationalacademies.org/hmd/Reports/2013/Educating-the-Student-Body-Taking-Physical-Activity-and-Physical-Education-to-School.aspx.

International Paralympic Committee (IPC). (n.d.) *Paralympics – History of the Movement.* Retrieved from: https://www.paralympic.org/the-ipc/history-of-the-movement.

Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, *7*(1), 40.

Kim, J., & Greaney, M. L. (2014). Prevalence of physical activity, screen time, and obesity among US children by the service type of special health care needs. *Disability and Health Journal*, *7*(3), 318-324.

Kohl III, H. W., & Cook, H. D. (Eds.). (2013). *Educating the student body: Taking physical activity and physical education to school*. Washington: National Academies Press.

Law, M., King, G., King, S., Kertoy, M., Hurley, P., Rosenbaum, P., ... & Hanna, S. (2006). Patterns of participation in recreational and leisure activities among children with complex physical disabilities. *Developmental Medicine & Child Neurology*, *48*(5), 337-342.

Lee, M., Zhu, W., Hedrick, B., & Fernhall, B. (2010). Estimating MET values using the ratio of HR for persons with paraplegia. *Medicine and Science in Sports and Exercise*, *42*(5), 985-990.

Lowther, J., Lane, A., & Lane, H. (2002). Self-efficacy and psychological skills during the amputee soccer world cup. *Athletic Insight (on-line)*, *4*(2), 23-34.

Lundberg, N., Bennett, J., & Smith, S. (2011a). Outcomes of adaptive sports and recreation participation among veterans returning from combat with acquired disability. *Therapeutic Recreation Journal*, *45*(2), 105.

Lundberg, N. R., Taniguchi, S., McCormick, B. P., & Tibbs, C. (2011b). Identity negotiating: Redefining stigmatized identities through adaptive sports and recreation participation among individuals with a disability. *Journal of Leisure Research*, *43*(2), 205.

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise and Sport Sciences Reviews*, *28*(2), 85-88.

McMurray, R. G., Butte, N. F., Crouter, S. E., Trost, S. G., Pfeiffer, K. A., Bassett, D. R., ... & Fulton, J. E. (2015). Exploring metrics to express energy expenditure of physical activity in youth. *Public Library of Science (PLOS) ONE*, *10*(6).

Mobily, K. E. (2009). Role of exercise and physical activity in therapeutic recreation services. *Therapeutic Recreation Journal*, *43*(2), 9-26.

Moola, F., Faulkner, G. E., Kirsh, J. A., & Kilburn, J. (2008). Physical activity and sport participation in youth with congenital heart disease: Perceptions of children and parents. *Adapted Physical Activity Quarterly*, *25*(1), 49-70.

Motl, R. W., Dishman, R. K., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., & Pate, R. R. (2002). Examining social-cognitive determinants of intention and physical activity among black and white adolescent girls using structural equation modeling. *Health Psychology*, *21*(5), 459.

Murphy, N. A., & Carbone, P. S. (2008). Promoting the participation of children with disabilities in sports, recreation, and physical activities. *Pediatrics*, *121*(5), 1057-1061.

Murray, M., & Tenenbaum, G. (2010). Computerized pedagogical agents as an educational means for developing physical self-efficacy and encouraging activity in youth. *Journal of Educational Computing Research, 42*(3), 267-283.

National Heart, Lung, and Blood Institute (NHLBI). (2008). *Recommendations for Physical Activity.* Retrieved from https://www.nhlbi.nih.gov/health/health-topics/topics/phys/recommend.

National Physical Activity Plan Alliance. (2016). *The 2016 United States Report Card on Physical Activity for Children and Youth.* Retrieved from http://www.physicalactivityplan.org/reportcard/2016FINAL_USReportCard.pdf.

Ridley, K., Ainsworth, B. E., & Olds, T. S. (2008). Development of a compendium of energy expenditures for youth. *International Journal of Behavioral Nutrition and Physical Activity*, *5*(1), 45.

Ridley, K., & Olds, T. (2008). Assigning energy costs to activities in children: A review and synthesis. *Medicine & Science in Sports & Exercise*, *40*(8), 1439-1446.

Rodgers, W. M., Markland, D., Selzler, A. M., Murray, T. C., & Wilson, P. M. (2014). Distinguishing perceived competence and self-efficacy: An example from exercise. *Research Quarterly for Exercise and Sport*, *85*(4), 527-539.

Saunders, R. P., Pate, R. R., Felton, G., Dowda, M., Weinrich, M. C., Ward, D. S., ... & Baranowski, T. (1997). Development of questionnaires to measure psychosocial influences on children's physical activity. *Preventive Medicine*, *26*(2), 241-247.

Shapiro, D., & Martin, J. J. (2010b). Multidimensional physical self-concept of youth athletes with disabilities. *Adapted Physical Activity Quarterly*, *27*(4), 294-307.

Shapiro, D. R., & Martin, J. J. (2010a). Athletic identity, affect, and peer relations in youth athletes with physical disabilities. *Disability and Health Journal*, *3*(2), 79-85.

Spence, J. C., Blanchard, C. M., Clark, M., Plotnikoff, R. C., Storey, K. E., & McCargar, L. (2010). The role of self-efficacy in explaining gender differences in physical activity among adolescents: A multilevel analysis. *Journal of Physical Activity and Health*, *7*(2), 176-183.

Stajkovic, A. D., & Luthans, F. (2003). Social cognitive theory and self-efficacy: Implications for motivation theory and practice. In R. M. Steers & L. W. Porter (Eds.), *Motivation and Work Behavior* (5th ed.) (pp. 126-140). New York, NY: McGraw-Hill Irwin.

Telama, R. I. S. T. O., & Yang, X. (2000). Decline of physical activity from youth to young adulthood in Finland. *Medicine & Science in Sports & Exercise*, *32*(9), 1617-1622.

Telama, R., Yang, X., Viikari, J., Välimäki, I., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21-year tracking study. *American Journal of Preventive Medicine*, *28*(3), 267-273.

Telford, R. M., Telford, R. D., Olive, L. S., Cochrane, T., & Davey, R. (2016). Why are girls less physically active than boys? Findings from the LOOK longitudinal study. *PloS One*, *11*(3).

Trost, S. G., Drovandi, C. C., & Pfeiffer, K. (2016). Developmental trends in the energy cost of physical activities performed by youth. *Journal of Physical Activity and Health*, *13*(6 Suppl. 1), S35-S40.

Trost, S. G., Pate, R. R., Sallis, J. F., Freedson, P. S., Taylor, W. C., Dowda, M., & Sirard, J. (2002). Age and gender differences in objectively measured physical activity in youth. *Medicine & Science in Sports & Exercise*, *34*(2), 350-355.

United States Department of Health and Human Services (USDHHS). (2008). *2008 Physical Activity Guidelines for Americans.* Retrieved from https://health.gov/paguidelines/pdf/paguide.pdf.

Voskuil, V. R., & Robbins, L. B. (2015). Youth physical activity self-efficacy: A concept analysis. *Journal of Advanced Nursing*, *71*(9), 2002-2019.

Wickman, K., Nordlund, M., & Holm, C. (2016). The relationship between physical activity and self-efficacy in children with disabilities [Special Issue]. *Sport in Society*, 1-14.

Wilson, P. B., Haegele, J. A., & Zhu, X. (2016). Mobility status as a predictor of obesity, physical activity, and screen time use among children aged 5-11 years in the United States. *The Journal of Pediatrics*, *176*, 23-29.

Winnick, J., & Porretta, D. (2016). *Adapted Physical Education and Sport (6th ed.)*. Champaign, IL: Human Kinetics.

Yazicioglu, K., Yavuz, F., Goktepe, A. S., & Tan, A. K. (2012). Influence of adapted sports on quality of life and life satisfaction in sport participants and non-sport participants with physical disabilities. *Disability and Health Journal*, *5*(4), 249-253.

APPPENDICES

Appendix A: IRB Approval Letter

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **www.ecu.edu/ORIC/irb**

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB
To: Kristina Cripe
CC: David Loy

Date: 10/2/2017
Re: UMCIRB 17-000745
Adaptive Sports and Children's Physical Activity Self-Efficacy

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 10/1/2017 to 9/30/2018. The research study is eligible for review under expedited category #7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Child Written Assent (Age 12+)	Consent Forms
Data Collection Excel Sheet	Data Collection Sheet
Parental Permission Form	Consent Forms
Survey	Surveys and Questionnaires
Thesis Proposal	Study Protocol or Grant Application

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

Appendix B: Letter of Support from Participating Adaptive Sports Organization

July 7, 2017

East Carolina University
East 5th Street
Greenville, NC 27858

RE: UMCIRB Letter of Support
Kristina Cripe

Dear Institutional Review Board Chair and Members:

We are writing this letter of support for one of your university's students, Kristina Cripe. It is our intention to support Kristina Cripe in her research project with our agency.

We as an agency have been made aware and understand the research process. As a part of this relationship we have agreed to collect the data using the survey instrument provided by the primary investigator, Kristina Cripe. We will also provide Kristina with existing participation data for her research project. Once all data has been collected and names de-identified to protect participant confidentiality, we will send the information to Kristina for analysis.

Throughout this process we will also answer any questions related to the research that participants may have or forward questions to East Carolina University's IRB staff via the contact information provided on the informed consent letter.

We look forward to working with Kristina and East Carolina University to examine issues that will help evaluate the effectiveness of our program. We hope this research will be beneficial to all parties involved and look forward to working together in the future.

Sincerely,

[redacted]

[redacted] Director of Operations and Evaluation
BlazeSports America

cc: Kristina Cripe; Dr. David Loy

Appendix C: Youth Adaptive Sports Survey

ID CODE of Youth Participant: _____

<u>Directions:</u> Please answer all of the following questions the best you can about your sports participation. All information provided will only be known by [redacted] and East Carolina Researchers. Your name will not be shared with ECU. Your parent(s) can help you complete this information except with question # 7 (Physical Activity Self-Efficacy section). Once you are finished, please return this to Mara Galic.

1. From January 1, 2017 to December 31, 2017, which of the following [redacted] programs did you participate? Place an "X" by all that apply.

___ Swimming ___ Archery

___ Wheelchair Basketball ___ Rock Climbing

___ Table Tennis ___Bowling

___ Track & Field (select all that apply

___ 100 ___ Shot put
___ 200 ___ Javelin
___ 400 ___ Discus
___ 800
___ 1500

___ Water Sports (select all that apply)
___ Swimming
___ Sit Skiing
___ Sailing
___ Kayaking
___ Jet Skiing

PLEASE GO TO NEXT PAGE

2. Did you participate in any sports outside of [redacted] programs January 1, 2017 to December 31, 2017? ___ Yes ___ No

If you answered yes, approximately how many times did you participate in the following sports outside of [redacted] during the year of January 1, 2017 to December 31, 2017?

	Never	*Infrequently* (1-5 times per year)	*Occasionally* (1-3 times per month)	*Frequently* (1-3 times per week)	*Almost Every Day* (3-6 times per week)	*Every Day*
Swimming						
Wheelchair Basketball						
Track & Field						
Table Tennis						
Archery						
Rock Climbing						
Water Sports						
Bowling						
Other Sport (list below) _____						
Other Sport (list below) _____						

PLEASE GO TO THE NEXT PAGE

3. In this section, please write the number of months and/or years you have participated in each sport (including participation both inside and outside of [redacted] If your participation is less than a year, please write "0" in years. If you have never participated, check ☑ never.

	Years	Months	Never
Swimming			
Wheelchair Basketball			
Track & Field			
Table Tennis			
Archery			
Rock Climbing			
Water Sports			
Bowling			
Other Sport (list below) _____			
Other Sport (list below) _____			

4. Now think about your activity level **yesterday**. Were you physically active for a total of **at least 60 minutes**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time). This would include pushing or walking between classes.

_____ Yes ____ No

5. During the **past 7 days**, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)

_____ 1 day

_____ 2 days

_____ 3 days

_____ 4 days

_____ 5 days

_____ 6 days

_____ 7 days

PLEASE GO TO THE NEXT PAGE

6. In an average week when you are **attending school**, how many hours do you spend in physical education (PE) classes?

____ Less than 1 hour

_____ 1 hour

_____ 2 hours

_____ 3 hours

_____ 4 hours

_____ More than 4 hours

PLEASE GO TO THE NEXT PAGE

7. Physical Activity Self-Efficacy Scale

This section must be filled out by the youth participant only. The parent can explain instructions or questions but cannot provide answers to the questions.

Please circle the number which most closely describes how much you agree or disagree with each statement. Remember that physical activity can be any play, game, sport, or exercise that gets you moving and breathing harder. There are no wrong answers. (CIRCLE ONE NUMBER FOR EACH ITEM)

	Disagree a lot	Disagree a little	Neither disagree nor agree	Agree a little	Agree a lot
1. I think that I can be physically active most days after school.	1	2	3	4	5
2. I think that I can ask my parent or other adult to do physically active things with me.	1	2	3	4	5
3. I think that I can be physically active even if I could watch TV or video games instead.	1	2	3	4	5
4. I think that I can be physically active even if it is very hot or cold outside	1	2	3	4	5
5. I think that I can be physically active even if I have to stay at home.	1	2	3	4	5
6. I think I have the skills I need to be physically active.	1	2	3	4	5
7. I think I can be physically active no matter how busy my day is.	1	2	3	4	5
8. I think I can ask my best friend to be physically active with me.	1	2	3	4	5

PLEASE GO TO THE NEXT PAGE

Demographics (Put an "X" on the line that describes you)

8. Gender: ___ Male ___Female

9. Age: _____ years

10. School Grade: _____

11. Race: Check one of the following.

___ Caucasian ___ African American

___ Hispanic or Latino ___ Native Hawaiian or other Pacific Islander

___ Native American

___ Other race (please specify): _____

12. Which condition(s) apply to you? Please check all that apply.

___ Traumatic Brain Injury ___ Spina Bifida

___ Cerebral Palsy ___ Amputation(s)

___ Spinal Cord Injury

___Visual Impairments

___ Dwarfism

___ Other (please specify): _____

13. For everyday activities, do you use a wheelchair or other mobility device for more than half the day?

___ Yes ___ No

14. Which of the following best describes the household you live in?

___ Two-parent household ___ Single-parent household

___ Other (Specify) _____

Thank you for completing this survey. Please return this to [redacted]

APPENDIX D: Participant Assent Form (For Minors 12-17)

East Carolina University

Assent Form

Things You Should Know Before You Agree To Take Part in this Research

IRB Study #_____

Title of Study: Examination of the Relationships Between Youth Adaptive Sports Participation Factors and Physical Self-Efficacy

Person in charge of study: Kristina Cripe

Where they work: East Carolina University Recreation and Leisure Studies Graduate Program

Other people who work on the study: Dr. David Loy, [redacted]

Study contact phone number: 252-328-4640

Study contact E-mail Address: Cripek15@students.ecu.edu

People at East Carolina University study ways to make people's lives better. These studies are called research. This research is trying to find out how the current sports you play help you have high physical self-efficacy. Physical self-efficacy means you are confident in your ability to be fit and active in the future. Your parent(s) needs to give permission for you to be in this research. You do not have to be in this research if you don't want to, even if your parent(s) has already given permission. You may stop being in the study at any time. If you decide to stop, no one will be angry or upset with you.

Why are you doing this research study?

The reason for doing this research is to find out how the current sports you play help you be confident in your ability to be fit and active in the future.

Why am I being asked to be in this research study?

We are asking you to take part in this research because the research will help us find out what [redacted] and other similar programs can do to help participants be more active and confident in their abilities.

How many people will take part in this study?

If you decide to be in this research, you will be one of about 50 people taking part in it.

What will happen during this study?

- Surveys will be given to you by [redacted]
- You may bring the surveys home to complete.
- You will complete the survey to your best ability and return it to [redacted]. Parents can help you complete some parts of the survey.

- [redacted] will also look up the amount of hours you have played sports with [redacted] during the past year.

This study will be given out at [redacted] and will take about 20 minutes to complete.

Who will be told the things we learn about you in this study?

[redacted] will be able to see your name and all the information you give on your survey. [redacted] will send the information only (without your name) to the people at East Carolina University.

What are the good things that might happen?

Sometimes good things happen to people who take part in research. These are called "benefits." The benefits to you of being in this study may be letting [redacted] learn what they need to do or keep doing to help you more as an athlete.

What are the bad things that might happen?

We don't think that there is anything bad that may happen. We just want you to tell us about the sports you participate in and how it makes you feel. If you have any problems, you should report them to [redacted]

Will you get any money or gifts for being in this research study?

You will not receive any money or gifts for being in this research study.

Who should you ask if you have any questions?

If you have questions about the research, you should ask the people listed on the first page of this form. If you have other questions about your rights while you are in this research study you may call people at ECU at 252-744-2914.

If you decide to take part in this research, you should sign your name below. It means that you agree to take part in this research study.

_____ _____

Sign your name here if you want to be in the study Date

_____

Print your name here if you want to be in the study

_____ _____

Signature of Person Obtaining Assent Date

_____

Printed Name of Person Obtaining Assent

INITIALS_____

APPENDIX E: Parental Consent Form

East Carolina University

Parental Permission to Allow Your Child to Take Part in Research

Information to consider before allowing your child to take part in research that has no more than minimal risk.

Title of Research Study: Examination of the Relationships Between Youth Adaptive Sports Participation Factors and Physical Self-Efficacy

Principal Investigator: Kristina Cripe (Person in Charge of this Study)

Institution, Department or Division: East Carolina University, Recreation and Leisure Studies

Address: 1413 Belk Building, Greenville, NC 27858

Telephone #: 252-328-4640; Email: Cripek15@students.ecu.edu

Study Coordinator: Dr. David Loy

Telephone #: 252-328-2718

[redacted] Contact: [redacted]

Telephone [redacted]

Participant Full Name: _____Date of Birth: _____

Please PRINT clearly

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why is my child being invited to take part in this research?

The purpose of this research is to help [redacted] and other similar programs evaluate ways to increase physical self-efficacy in their participants. Physical self-efficacy levels explain the amount of confidence participants have in their ability to be physical active in the future. Your child is being invited to take part in this research because your child is a current [redacted] participant. The decision for your child to take part in this research will also depend upon whether your child wants to participate. By doing this research, we hope to learn how different levels of physical activity and adaptive sports participation help children develop high physical self-efficacy. This information will be helpful in program evaluation for [redacted]

If you and your child agree for him/her to volunteer for this research, your child will be one of about 50 people to do so.

INITIALS_____

Are there reasons my child should not take part in this research?

I understand I should not agree for my child to take part in this study if he/she is unable or uncomfortable to discuss information requested on the survey.

What other choices do I have if my child does not take part in this research?

Your child will not have any other options available for this study.

Where is the research going to take place and how long will it last?

The research will be conducted at [redacted] in [redacted]. Surveys will be distributed by an [redacted] employee and completed by you and your child at home or in the facility. Surveys will be returned to [redacted], and then sent to ECU. All information will be kept confidential. Only [redacted] staff will know your child's name. The total amount of time your child will be asked to volunteer for this study is approximately 20 minutes to complete the one-time only survey.

What will my child be asked to do?

Your child will be asked to do the following:

Complete a short survey with questions about current sport participation, physical activity, self-efficacy, and general demographics. You can help your child on everything except the self-efficacy portion.

What might I experience if I take part in the research?

We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We don't know if your child will benefit from taking part in this study. There may not be any personal benefit to your child but the information gained by doing this research may help others in the future.

Will my child be paid for taking part in this research?

We will not be able to pay you or your child for the time you volunteer while being in this study.

Will it cost me anything for my child to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

ECU and the people and organizations listed below may know that your child took part in this research and may see information about your child that is normally kept private. With your permission, these people may use your child's private information to do this research:

[redacted]

- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your child's welfare during this research and may need to see research records that identify your child. INITIALS_____

How will you keep the information you collect about my child secure? How long will you keep it?

All information provided will be kept confidential. [redacted] will collect the survey and will use the child's name to collect further participation data. [redacted] will send the survey data without name identifiers to ECU. Data will be analyzed and kept for three years.

What if my child decides he/she doesn't want to continue in this research?

Your child can stop at any time after it has already started. There will be no consequences if he/she stops and he/she will not be criticized. Your child will not lose any benefits that he/she would normally receive.

Who should I contact if I have questions?

The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at 252-328-4640 (Mondays - Fridays, 9am-5pm). If you have questions about your child's rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971

I have decided my child can take part in this research. What should I do now?

The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that my child can stop taking part in this study at any time.
- By signing this informed consent form, my child is not giving up any of his/her rights.
- I have been given a copy of this consent document, and it is mine to keep.

_____

Parent's Name (PRINT) **Signature** **Date**

Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person's questions about the research.

_____

Person Obtaining Consent (PRINT) **Signature** **Date**