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# Factors That Increase Physical Activity in Youth Who Are Visually Impaired

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A REVIEW OF LITERATURE ON FACTORS THAT INCREASE PHYSICAL ACTIVITY IN  
YOUTH WHO ARE BLIND OR VISUALLY IMPAIRED

A Synthesis Proposal

Presented to the

Department of Kinesiology, Sport Studies and Physical Education

State University of New York

The College at Brockport

Brockport, New York

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In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Education

(Adapted Physical Education)

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by

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YOUTH WHO ARE BLIND OR VISUALLY IMPAIRED

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### **Abstract**

The purpose of this synthesis was to review the literature on factors that increase physical activity for youth who are visually impaired. The selected studies for this synthesis describe barriers and facilitators that influence physical activity levels in youth ages 7-19. As Kozub and Hyun-Kyoung Oh, (2004) noted, individuals with visual impairment have reported lower levels of physical activity in relation to their same age sighted peers. It is important to understand where this population loses its ground in being regularly and adequately physically active. Research indicates several factors that have been shown to increase physical activity in young people with visual impairments that include the use of external motivators as well as through parental influence.

## Chapter 1 - Introduction

Physical activity levels for visually impaired youth and adolescent children often are sub-par when compared to the daily recommendations for minimal and especially optimal daily levels of physical activity. This can be attributed to many different known barriers that this population faces every day such as their environment, social setting and dynamic, opportunities available to them, education and many more influential factors that play a key role in aggravating this issue (Lieberman, Houston-Wilson, & Kozub, 2002).

In addition to these barriers, these adolescents may have internal barriers, such as lack of motivation (Robinson, 2004). This lack of motivation in adolescents who are blind or visually impaired has caused concern and discussion about how being blind or visually impaired contributes to an unhealthy body mass index (BMI), low fitness scores and lack of regular physical activity (Kozub, 2006). Research results have indicated that students with visual impairments get less physical activity than their same age peers overall in daily living activities, physical education and sport participation (Schedlin, Lieberman, Houston-Wilson, & Cruz, 2012).

Like any individual in our world, low physical activity and low fitness set the stage for a sedentary adult lifestyle and increase risk factors for heart disease, diabetes and other health impairments (Longmuir & Bar-Or, 2000). It is important that individuals that are visually impaired increase their physical activity to decrease these risks. In addition, it is important to understand the barriers to being physically active that individuals that are visually impaired or blind face, including barriers at home, in schools, their perceived competence and internal factors that play a role in their self-perception of being physically active.

Although there are many barriers that youth and adolescents that are blind or visually impaired face, research results suggest, that if they can be self-determined, as well as willing to improve their independence, they can participate in physical activity regardless of barriers they may face (Lieberman, Houston-Wilson, & Kozub, 2002). In order to help these individuals be successful in overcoming such barriers, it is important to provide them with tools and strategies to motivate them either intrinsically, or extrinsically so that they may reap the many benefits of a healthy, active and more productive lifestyle.

Researchers have investigated several factors related to low motivation levels and possible solutions to increasing motivation in youths and adolescents who are blind or visually impaired (Robinson, 2004). Research results have suggested that a perceived lack of competence to be physically active, low self-perceptions, being excluded in physical education classes and receiving little support at home to be physically active contribute to the overall lack of physical activity that is engaged in by individuals that are visually impaired or blind. In light of this, the purpose of this synthesis was to review factors that that increase physical activity in adolescents who are blind or visually impaired.

### **Statement of the Problem**

There are many barriers that adolescents who are visually impaired or blind face that prevent them from achieving adequate levels of physical activity on a daily basis. This population often needs more initiatives and supports to become increasingly physically active. This synthesis will review various means for getting adolescents who are visually impaired or blind to achieve higher levels of physical activity.

## Purpose of the Review of Literature

The purpose of this synthesis is to review the literature on factors that increase physical activity in adolescents who are blind or visually impaired.

### Operational Definitions:

Visual Impairment and Blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness (IDEA, 2003).

**Class B1:** No light perception in either eye up to light perception, but inability to recognize the shape of a hand at any distance or in any direction (USABA, 1976).

**Class B2:** From ability to recognize the shape of a hand up to visual acuity of 20/600 and/or a visual field of less than 5 degrees in the best eye with the best practical eye correction(USABA, 1976).

**Class B3:** From visual acuity above 20/600 and up to visual acuity of 20/200 and/or a visual field of less than 20 degrees and more than 5 degrees in the best eye with the best practical eye correction(USABA, 1976).

**Class B4:** From visual acuity above 20/200 and up to visual acuity of 20/70 and a visual field larger than 20 degrees in the best eye with the best practical eye correction(USABA, 1976).

**Intrinsic Motivation-** Intrinsic motivation is defined as performing an action or behavior because you are internally driven. The inspiration for acting on intrinsic motivation can be found in the action itself (Williams, 2017).

**Extrinsic Motivation-** Extrinsic motivation refers to behavior that is driven by external rewards such as money, fame, grades and praise. This type of motivation arises from outside the individual, as opposed to intrinsic motivation, which originates inside of the individual. An



external motivator initiates an action or desire to do something they wouldn't normally do without it (Cherry, 2016).

**Self-Determination-** Self determination involves the right to possess control, power and decision-making ability in one's life. An individual who is self-determined has access to choices and is able to act on their own ambitions without restriction or hesitations (Lieberman, Houston-Wilson, 2009)

**Self-Competence-** Refers to perceptions of ability in broad academic areas, such as how good of a student one is in general. *Self-competence* may also refer to perceived ability in subject areas as a whole (Williams, 2017).

**Self-Perception-** Immediate or intuitive recognition or appreciation, as of moral, psychological, or aesthetic qualities; insight; intuition; discernment (Williams, 2017).

### **Assumptions**

For the purpose of this synthesis the following assumptions were made:

1. Literature review on methods for increasing physical activity levels for students who are blind or visually impaired was exhaustive and comprehensive.
2. Research participants are representative of adolescents who are blind or visually impaired.

### **Delimitations**

This synthesis was delimited to:

1. Adolescents that participated physical education classes, day camps, or other outdoor / indoor settings during leisure time.
2. Adolescents, both boys and girls, who were between the ages of 7 and 19 years old.

### **Limitations**

This synthesis was limited to:

1. Research studies on means for increasing levels of physical activity levels in adolescents who are blind or visually impaired.
2. Research research on barriers that may hinder participation in physical activity so that they could be understood and alleviated.
3. Research studies conducted in the United States and Great Britain between the years 2002 and 2017.

## Chapter 2 - Methods

The purpose of this chapter is to review the methods used to investigate factors that increase physical activity levels in youths who are blind or visually impaired. The College at Brockport Drake Memorial Library online database was the primary website used for this search of literature. The studies chosen for this synthesis were found using the EBSCO Host database. Within EBSCO Host, several databases were used including: Academic Search Complete, SPORTDiscus, Medline with Full Text, Education Source, Health Source-Consumer Edition, ERIC and Health Source: Nursing/Academic Edition. The article search was broad yet specific enough to draw many relevant articles to be considered for this topic.

To begin the data search, keywords and phrases were identified in order to reveal worthy research studies. The keywords identified were visual impairment, physical activity, increase, influence, motivation and peer tutors. The phrases identified were barriers, physical activity levels, recreation, physical education, parent influence, motivation and peer tutors. The keywords used to search for relevant articles were used in various combinations, always using no more or less than three words per search to accumulate as many articles related to the topic as possible. The search was conducted until an abundance of articles were compiled.

The search began with selecting several databases that had even a slight relation to this topic, limiting the results to full text articles. First, visual impairment was searched throughout the databases and yielded 33,358 results. The next search used visual impairment and physical activity to somewhat focus the scope of the investigation to find 962 results. In order to then narrow this number down and locate specific articles three keywords were then used for each subsequent search. The next search used visual impairment, physical activity and increase accumulated only 94 articles. Following this search, visual impairment, peer tutors and physical

activity were used to find only three articles. Visual impairment, physical activity and motivation accounted for 21 articles. When visual impairment, physical activity and influence were searched there were 87 articles revealed. After sorting through all of the searches using only three keywords, only fifteen articles were selected as worthy and supplemental to this topic. After a final review of those fifteen, eleven were selected for this review of literature. The other five were used throughout the introduction of this synthesis.

For an article to have been included in the base of eleven articles for the review of literature it was essential to meet the following criteria. The selected articles needed to be research studies published in a peer reviewed journal. The full-text version and references were needed to provide a substantial source of information for the articles that were selected. All ten articles had to discuss a form of increased physical activity in youths who are visually impaired or blind. This could be in almost any environment and also focus on any means for increased physical activity.

These articles must have been as relevant as 2001 - present and had to have a sample of subjects who were visually impaired or blind age 7-19. This filter encapsulates current research of our grade-school age youths. The articles were produced in the United States, Brazil and Australia by public or private educational institutions and their researchers.

A total of eleven articles have been carefully selected and have met the requirements of the scope for this review of literature. These articles were published via Adapted Physical Activity Quarterly, Heldref Publications, Journal of Visual Impairment and Blindness, Research and Practice in Visual Impairment and Blindness and Disability and Rehabilitation. These journals and publications of studies conducted since 2001 have focused on the visually impaired and blind youth populations and their engagement in physical activity.

The critical mass included a total of 747 participants and of those, 373 were male and 374 were female. The ages range from 8 to 23 years old.

### **Chapter 3 - The Literature Review**

The purpose of this chapter is to review the literature on factors that increase physical activity in youth who are blind or visually impaired. Specifically, the following topics will be addressed: barriers that prevent students from participating in physical activity; the role motivation plays in engaging this population in physical activity; strategies for motivating youths to engage in physical activity and the effects of parental influence on physical activity engagement.

#### **Barriers to Physical Activity**

##### *Motivation*

It is known that youths with blindness or visual impairment often are engaged in less physical activity than that of their sighted peers. This often comes as a result of several factors, but one in particular is motivation. Kozub, (2006) explains motivation serves as a means for engaging or not engaging in physical activities. He examined the free-time motivational scores of two groups. One group was within a healthy BMI standard and the other group was outside the healthy BMI standards. The participants for this study included 31 children with Visual Impairment ages 12-21 who were involved in educational and afterschool programs at a Midwestern school for the blind. All participants were categorized and assessed for their fitness levels using the Brockport Physical Fitness Test and the Free Time Motivation Scale for Adolescents. During PE students completed the FTMS-A to retrieve the data. The instruments were used Monday through Thursday of the same week and then moderate to vigorous physical activity recordings were collected. As a result of this study it was concluded that the Criterion Level group for a healthy body index displayed more introjected motivation, external motivation, amotivation, identified motivation and also more minutes total per day of physical activity at or

above the moderate to vigorous level. The implications of this study translate into how a population of children who are Visually Impaired without any barriers perceive and perform in a physical education setting in order to reinforce physical activity for those outside of the criterion level of a healthy BMI. Children who are active may reveal a certain trend in how to become physically active and also how to maintain that level of activity. Reasons for the child being outside the healthy zone could also be explored, but it is apparent that if the child is not in the healthy zone, they are least likely to achieve a health enhancing lifestyle through physical activity and sport. This supports other suggestive research, that due to lack of activity, youths are not achieving a healthy fitness zone, which in turn discourages their intrinsic motivation to become regularly physically active because they are not as “ready,” to enjoy or pursue more engagement in physical activities.

Similarly Sindik, Furjan-Mandić, & Schiefler, (2011) analyzed motivating factors that affected students in three different countries to be physically active. Variables included sport action with a friend, popularity, fitness and health, social status, sports events and relaxation through sports. The motive for this study was to determine which factors had the greatest influence in sport participation. Participants included 390 students in college from Germany, Croatia and Slovenia. The researchers listed all of the thirty different motivating factors to join or participate in sports and sport teams. Of those factors, six categories were made to group the motivational factors. The method for retrieving the data was questionnaires which were sent to the participants for them to fill out and return. Six themes emerged. The most prevalent reason to be engaged in physical activity was popularity, followed by sport action with friends, fitness and health, social status, relaxation through sports and appeal of sport events. This study reveals current sport motivational factors mainly for people without disabilities. The six themes are

common reasons for involvement in sports. This can also be said for young people who are visually impaired. Another study agrees with this notion about youth who are visually impaired and their willingness to be involved in sports and physical activity. Jessup, Cornell and Bundy (2010) conducted a study to explore the benefits of leisure activities. The study took a close look at supportive relationships, desirable identity, experiences of power and control and also maintaining or gaining social justice. Eight young people ages 17-22 with visual impairments ranging from B1(5) - B2(3) were interviewed because they were engaged in at least one physical activity per week. Participants were interviewed using semi-structured open-ended questions. Questions asked sought to know what activities kept them totally engaged, what they got from those particular activities and why they might do them instead of others? Depending on the answer, interviewers would use the lead question as an inductive approach to finding more information about their answers to gather more salient details. All questions were analyzed as a descriptive form of information and then as an interpretive answer. Researchers looked at interpretation of the results through four different lenses. They examined the information from first to understand who is telling the story and what they are feeling and secondly to peer into the benefits of leisure and how the participants engaged with and were affected by certain leisure activities. The other two filters for analysis were focusing on contextualizing the first two readings together within societal perceptions of disability and the fourth to interpret the data as a reflexive reading on how the researcher may or may not have influenced the process of the interview and analysis. Researchers found that the participants in this study valued several benefits: social connections, being accepted, relief from stress, support in adversity, fitness and health, learning and experiencing new things, being challenged, having fun, contributing to others and resisting social prejudice. Of these themes, four categories emerged; tensions of



resilience, relationships, identity, power and control and social justice. These young people were motivated externally and internally to be physically active. By engaging in physical activity, it was determined that youth with visual impairments experienced an overwhelming feeling of satisfaction, enjoyment and achievement through being regularly physically active. This is consistent with Sindik, et al. (2011) who found individuals enjoyed participating in physical activities for similar reasons of health and wellness, enjoyment, self satisfaction and for social benefits that also come about from regular participation. Jessup et al. (2010) determined that young people with visual impairment are just as inclined to seek physical activities that they can enjoy just as their same age sighted peers do. The goal setting, health and fitness, independence and respect within society is something that youth with visual impairment embrace whether they have found it or not.

In addition to studies previously mentioned regarding motivation and willingness to participate in physical activity, Jaarsma, Dekker, Dijkstra and Geertzen (2014) researched barriers to and facilitators of sports participation in young people with visual impairments. This study interviewed 648 individuals with a mean age of 18 years old about their experiences and perceptions of physical activity. A 30-item questionnaire was employed to retrieve information regarding facilitators and barriers to physical activity. Participants were categorized into active participants and inactive participants to seek variance in perspectives and experiences with physical activity and to compare the two groups. Participants were labeled as active participants if they were engaged in at least thirty minutes of physical activity per week that was exhaustive, skill demanding, required endurance and competitive in nature for at least two or more times per week. Researchers compared groups using a Mann-Whitney U-test and analyze the differences of barriers and facilitators that the participants experienced. In addition, a chi-square test was

implemented to also determine differences between the two groups. In order to analyze the paired proportions between the initiation of maintenance of sports participation a McNemar test was employed to further investigate differences between groups and their responses. Finally, the variables were associated with sports participation were determined through the use of a logistic regression to include all responses from the groups in their respective themes. In order to determine statistical significance an alpha level of .05 was established. As a result, the researchers found 63% of participants to be in the active category. There were no differences in activity levels based on level of visual impairment. It is noted that active participants were found to have higher education than that of the inactive participants (73%-59%). Walking, fitness and recreational cycling were of the top three most frequently mentioned activities by active participants. It should be noted that the results of this study found that the more active group had more first hand experience with being regularly active, as they had come into contact with various forms of physical activity, assistive devices, social environments and physical environments. Barriers to physical activity for the active group were claimed to be dependent on others, transportation and lack of possibilities in the neighborhood as environmental barriers. On the other hand the inactive group viewed barriers as more personal; lack of exercise with peers and costs associated with being active. Other environmental barriers the active group claimed to experience more than the inactive group was the lack of qualified and professional supervision. There were several barriers mentioned, however the facilitators to physical activity also offered some interesting insight to the situation. Both groups found that they initiated and maintained their regular sports and physical activity participation for health, fun and social contacts. This was the most similar comparison between the two groups as no more than a 2% difference separated their outcomes in response. Behind the facilitators were several other factors that

enhanced these claims. It was noted that family support had a great impact on the consistent initiation and maintenance of physical activity, as well as medical advice from rehabilitation professionals and a personal factor of weight control was another determinant of facilitating constant and adequate physical activity levels. Factors that predicted sports participation for inactive participants were education, disability, costs, lack of peers and use of computer software. Active participants experienced a lack of qualified supervision as a barrier more than inactive participants. More external factors than personal factors were mentioned by the active group as opposed to the inactive group who also had lower emphasis on education, sophisticated understanding of technology and also believed more barriers were personal in nature such as disability, or lack of social contact with peers. It can be said that all participants agreed that family and social support had a lot to do with engagement in physical activity, as well as enjoying the health, pleasure and social contacts that come from being physically active. This goes on to demonstrate that individuals with visual impairment do in fact understand the benefits of physical activity and would like to partake in adequate physical activity despite their perceptions and or barriers preventing them from doing so, whether external or internal.

### **Facilitators to Physical Activity**

#### *External Motivators*

In another study, Lieberman, Stuart, Hand and Robinson (2006) studied the effects of a talking pedometer on daily walking and physical activity goals. In the study 22 children with Visual Impairment or who were deaf-blind, attached a talking pedometer to their person for seven days prior to a sports camp for children with Visual Impairment. Parents recorded the number of steps each child took per day and were instructed not to encourage any extra physical activity or attention to the pedometer to reflect a genuine reading of the child's normal physical

activity levels. The average number of steps taken prior to camp was 9,000 steps and during camp the average rose to 15,000 steps. Children were making goals and were motivated to beat their previous amount of steps when they wore the pedometers at Camp. Children were also educated on the benefits of walking and how they can set goals for themselves through walking and the talking pedometers. Aside from the quantitative data of steps traveled, there were also interviews related to the experience with the pedometers. Four main themes emerged from the interviews about achievement of goals, health and fitness, independence and transportation. By notifying the individual of their progress independently, children are afforded the opportunity to be more physically active by setting their own goals based on electronic feedback. These children may or may not be using the pedometers during sports or physical activity, but the bottom line here is that the child is receiving more physical activity by wanting to move and walk instead of being stationary or sedentary at home or inside. Children who are Visually Impaired want to be empowered to be independent and build on their past accomplishments. This information can help other children to use talking pedometers to increase their physical activity in school, at home and wherever they may travel to inside and outside of sports and recreational activities. This research has highlighted the fact that, if youths who are blind or visually impaired know how far they are traveling and can set goals to motivate them to increase their activity time, they will be automatically more active and this activity may lead to finding other activities as a result of their increased travel to new places. Technology in this instance has been shown to benefit youths who are blind or visually impaired to be more active because it can be used to increase their ambition to be active. Another way that this population of youths has found an enjoyable way of being active with the use of technology and an external motivator is through

exergames. Foley, Gasperetti, Yang and Lieberman (2011) looked into enjoyment levels of youths with visual impairments while playing different exergames.

A study conducted at a one week sports camp for children who are visually impaired recruited twelve participants ages 9 – 16 years old that were randomly assigned one of three exergames to play on three separate nights for ten minutes each night. After participants played the games at night, their counselor interviewed them using the Physical Activity Enjoyment Scale (PACES), in an interview questionnaire after the participants were done playing one of three of the exergames. The PACES had 18 questions with a 1-8 likert scale with one being the lowest enjoyment and eight being the highest enjoyment for responses. The questions were made to measure the levels of enjoyment the exergames offered them. Data were analyzed by SPSS for Windows v.16. All responses were totalled into a spreadsheet to be converted into the PACES program. The highest score a game could receive was 144 and the lowest was 18. A Friedman's ANOVA was used to investigate differences between groups. The alpha was pre-set at .05. As a result of playing DDR on the Playstation 2, Eye Toy on the Kinetic / Playstation 2 and Wii Boxing on Nintendo Wii, the results showed how significant differences were in terms of enjoyment levels after participants played all three games. Wii Boxing had the highest mean score and least range of variability. Dance Dance Revolution was the second most enjoyed and Eye Toy was two values behind in overall mean scores for enjoyment. Based out of a possible 144, no game produced a mean score of less than 127 which suggests that exergames are in fact very much enjoyable and will encourage youth who are visually impaired to engage in these kinds of physical activities. It was not known why exactly they were enjoyed so much, but this information can now be used to extend physical activities indoors or with the use of technology

in an independent setting. These results suggest that an external motivator such as technology can translate into increased physical activity levels.

Another way that youth who are visually impaired can benefit from an external source of motivation is through music. Coleman, (2017) cites findings from various studies about the teaching strategies of manipulation of music to increase the time in which students were engaged in physical activity, but also provided meaningful and purposeful movement for improved coordination, spatial awareness, body awareness and movement patterns. Music has been found to decrease the need for prompts during physical activity, thus increases independence. It was noted that instruments could be utilized in non-traditional ways. Preferred instruments were first pre-taught and then used to work on movement concepts like left and right, crossing midline, reaching over their head and increasing range of motion. Students with limited vision were able to play percussion instruments not only through sound, but also through sight tracking the drum beat. The instructor could control the duration of the activity through the length of the song being played. Other mobility and travel games like “find the shaker” activity where students had to travel throughout an area looking for an egg. A drum beat got faster and louder as students got closer to the egg using basic walking travel skills first and then going into search mode. These practical traveling skills were also practiced in an activity with three drums in a hallway, that allowed the student to gauge the distance to each drum sound, but also in search of the bass sound with the lowest pitch. This challenges the auditory senses for navigation and distance estimates. Music can be used to teach cadence and rhythm while walking in a proper gait, which improves efficiency and comfort while traveling. All of these concepts can be used to make the individual’s functional skills stronger, which could then translate into improved physical activity experiences, thus greater enjoyment. Foundational skills are very important to success and

enjoyment within various physical activities. Haegle (2015) reported how educators can use generalization tactics to promote leisure time physical activity and how it can transition to greater physical activity levels that are enjoyable and functional in nature.

In the report by Haegle (2015) four generalization tactics were found to help improve leisure time physical activity levels in students with visual impairments. The first of these tactics was asking significant others to notice and reinforce physical activity participation, teaching students to recruit reinforcement, teaching sufficient stimulus examples and teaching self-management skills. When family, friends, teachers and other individuals help stimulate more activity participation students are more inclined to be physically active. In turn, with more physical activity time, teaching a skill or concept in more than one setting can prove beneficial to the translation to other environments and applications. Using self-management skills like logging journals containing information about the number of steps with talking pedometers during the day or during an activity and how the activity made the individual feel can also help to further engage the student. They can also log what kind of physical activity they were participating in and who they were participating with. These tactics can be used across the family and school network to increase physical activity levels both in schools and in free time environments when fully utilized by educators, family members and peers. One example of this form of support in the social - educational environment is the effect of trained peer tutors on the physical education of children who are visually impaired. Wiskochil, Lieberman, Houston-Wilson and Peterson (2007) researched whether trained peer tutors improved academic learning time in physical education. In this study four students were selected, two classified as having functional travel vision (B2) and two having no vision (B1). The subjects were in grades 3, 6, 8 and 11. The study sought to compare the amount of academic learning time for the students while in physical

education class before having a trained peer tutor and after having a peer tutor. Peer tutors were selected from the tutees physical education classes. There were two to four tutors trained for each tutee. This was important to make sure that they were consistent, capable and readily available for the duration of the study. Without training, peer tutors worked with a student who was visually impaired for four to five lessons. During this time baseline data were recorded by analyzing videos that were recorded so that researchers could tally and keep track of ALT-PE during the lessons. After an extensive and comprehensive 1.5-2 hour training session was completed by the tutors, the second phase of the study was conducted. Tutors worked in six to eight physical education classes where ALT-PE time was measured again via videotape and identification. The tutors gave feedback, assistance and instruction when necessary during the lessons in accordance with their training. After each lesson an expert debriefed with tutors to answer questions and provide assistance to ensure that they were confident in their role and also to improve on any areas in teaching / working with the tutees. ALT-PE was determined when there were motor appropriate behaviors in action, where the student was performing just what they were asked and within the time asked to do so. Percentages of ALT-PE were compared for pre-intervention and post-intervention phases. Interobserver and intraobserver reliability were determined by using the formula  $\frac{\text{agreements}}{\text{agreements} + \text{disagreements}} \times 100$ . Interobserver agreement was determined through a second observer. An interobserver reliability score of 89% was found as a result. Four participants were observed in four to six classes and then again for six to eight classes after the intervention phase. Aside from looking at the intervention results of training, open and closed skill activities were also examined to determine if peer tutors had any influence on these kinds of skills and activities within the lessons for ALT-PE percentages. The percentages were averaged between the baseline and intervention stages to see if there were any



increases, decreases, or similarities in ALT-PE. One student saw an increase of 38% of ALT-PE following the intervention stage. Another student saw an increase of 10.7% in her mean score. Both of these participants were completely blind. Participants who were visually impaired had improvements of 29.6% and 4.2%, It is also noted that there was an increase ALT-PE in open skill activities (16.6%) and closed skill activities (29.4%). Although there was a definite increase in ALT-PE in the students' classes, they are still lower than that of their sighted peers without tutors. All subjects experienced improvements of ALT-PE from 4.2%-49% which demonstrates that trained peer tutors can and do help increase desired motor behavior within the physical education classes.

### *Parental Influence*

Parental influence in relation to levels of physical activity have a great effect on overcoming barriers, communicating positive perceptions and facilitating adequate physical activity levels. Parental influence on physical activity practice among children and adolescents with visual impairment, mainly the influence of their support and perceived barriers were researched by Gregol, Gobbi and Carraro (2014). The study involved 22 young people with VI 8-14 years old and their parents age 44-48 years old. Data were collected via the Baecke questionnaire and the parental support questionnaire about perceived barriers to physical activity. The participants were divided into two groups ages 8-10 (n=15) and ages 11-14 (n=7). Young people filled out the PAQ-C in reference to the previous 7 days to recall their physical activity encounters or lack thereof. Nine items were selected to examine the amount of moderate to vigorous PA. The final score ranged from 1-5 points, one being the lowest and five being the highest. The parents responded to the Baecke questionnaire which measured physical activity levels work, sport and during leisure time. Both answered a scale of parental support for PA, that took into account how

parents support their children participating in PA. Questionnaires focused on perceived barriers including a list of environmental, social and personal factors and within those reasoning's, other indications were analyzed to determine whether they in fact did hamper levels of physical activity by young people with visual impairment. As a result of collecting the data through a t-test, pearson correlation test and chi-square test differences in answers between the child and the parent could be analyzed through age, gender and level of vision. The Pearson Correlations were used to investigate associations between youths' and parents' PA beliefs of importance and perceived support. The chi-squared test was also performed to evaluate differences in perceived barriers to PA between young people and their parents. Young people who were blind showed lower physical activity levels compared to their older peers in the study. There were significant correlations in parents' physical activity and the support offered to children between PAQ-C results and the importance of physical activity. The main perceived barriers were lack of security, motivation, professional training and information about available physical activity programs. Parental support seems likely to have a negative effect on students with visual impairment. Parents and students should have more information and education about the benefits of physical activity and what opportunities are readily available to them. Professional training and support for the parents and child could help bridge the gap over the barriers described here. In another study by Ward, Farnsworth, Babkes-Stellino and Perrett (2011) researchers aimed to investigate perceptions of physical activity through the child's view and to also understand to what extent did and how parental perceptions affected the attraction to physical activity. The study focused on perceptions of physical competence among youth with VI and what the perceived barriers that parents and peers have on attraction to physical activity among children who are visually impaired. Eight young students age 10-18 (5 boys and 3 girls) were

interviewed. The participants were chosen from available students with VI and no other physical or mental impairment who could respond appropriately to questions asked. Four were braille readers and four were read in large print. Individual interviews were conducted over two days at 30-45 minutes each. A deductive analytic reduction was used to for the analyses which focused on themes that were based on the Children's Attraction to Physical Activity. Quantitative data were used from the qualitative responses to make comparisons with the CAPA survey. The themes that arose from the interviews included; motivation, to be physically active or to play a sport, perceptions of physical competence and perceived social influence of parents and peers and sports involvement. The study found that the themes that arose from the interviews were motivation to be physically active, or to play a sport, perceptions of physical competence and perceived social influence of parents or peers. Subthemes included fun and physical exertion. Male participants reported enjoying the experiences of getting sweaty and breathing hard. Female participants also claimed to enjoy the experience of exertion. Boys reported they liked wrestling, track and goalball, while girls liked goalball and cheerleading. The second CAPA result was perceived physical competence, where participants viewed themselves as "good," or worthy in their skill level to be able to attempt and accomplish skills and activities like their sighted peers. The third CAPA revealed that social influences of parents and peers had an effect on their participation. Parental support was limited to asking permission and also little encouragement was provided. Attention to this was not adequate. Peers were just the opposite as they always encouraged their visually impaired peers and were very supportive and encouraging to increase inclusion and engagement of PA. Participants did say they felt awkward asking or being asked to play certain activities because of their impairment. As a result of this study, the participants agreed that they did in fact enjoy physical activity and wanted to be engaged in more

moderate to vigorous activity because of the way it made them feel. They noted that their parents did not value physical activity as much as they should and this had a negative effect on their levels of participation.

In another study, Robinson and Lieberman (2007) conducted an intervention study that aimed to increase physical activity levels at home by recording the duration and kinds of physical activities played at home before attending a one week developmental sports camp and again after a parental resource manual was provided to stimulate opportunities and other resources to increase PA. This study involved eighteen young people ages 9-23 years old (11 boys, 7 girls) who had visual acuity ranging from B1-B3 and two were deafblind. Six weeks prior to attending the camp researchers sent home information packets about the study and asked parents to log their child's physical activity for one week. They had to record what kind of physical activities they played and for how long they played them each day, to make an average number of minutes or hours that they were physically active or participating in sedentary activities for the week. When the family returned the information packet and log, researchers sent the parental resource manual on physical activity. This included walking, swimming, aerobics, team activities like soccer, baseball/softball, basketball and sedentary activities, watching tv, listening to music, reading and computer time. Parents logged all the activities for the pre and post intervention logs. The manual included information regarding adapted physical education programs, sport organizations, books, equipment, journals, mailing lists and e-lists, national service links, regional and state agencies, organizations and projects, switches to adapt appliances and toys, toys and games and websites for individuals with visual impairments. This information was provided to increase knowledge of potential resources and applications to be more physically active at home and in schools. The study found seven participants to have more

physical activity time after their parents having the manual. Boys saw an increase in physical activity by an hour and thirty minutes, while girls saw a decrease in their overall hours of physical activity. The total group decreased physical activity levels by 7 hours and thirty minutes, however 39% of participants saw an increase in physical activity levels after receiving the parental resource manual. The most popular choices were individual lifetime activities like walking, running and swimming. All activities saw an increase in participation except skating, bicycling and jumping rope. Parents found many resources to be helpful and informative to increase meaningful physical activities for their children. Some of these helpful links include: addresses and email addresses of organizations, web sites, locations of adaptive organizations, publications, journals, mailing lists, adapted athletic/sport organizations, e-links, geographically expansive links. Parents also recommended that the following be added to the list: braille and reading tutors, community ideas of activities that positively work (boy scouts), provide a variety of ideas by professionals that parents and teachers can use to have the adaptive physical education program effectively adapt current curriculum, more local organizations and clubs, social skills groups or organizations and list of suggestions from parents. 50% of parents were satisfied with their child's level of physical activity on the pre manual questionnaire. After they received the manual, 67% indicated that they were satisfied to some extent with the level of their child's activity level. Although not all participants in this study increased their levels of activity, it did show improvement in 39% of participants which means to some extent the physical activity manual could very well have helped improve the prevalence of physical activity at home. Parents enjoyed having the resources and information they needed to help make their child more successful in achieving this goal and also provided their input on how it could even be that much better with some additions. This serves as a stepping stone to advocacy and combating barriers to

increase physical activity in youth with visual impairment. If parents are educated and youth are motivated to be active increasing levels of meaningful and purposeful activities can be attained over time. It is suggested that this study might benefit from a longer duration with and without the parental resource manual to see the longevity effects over the long term of approximately a month's time.

The following presented a review of literature on increasing levels of physical activity in youth with visual impairment. Youth with a visual impairment have opportunities available to them to be physically active, however are often impacted by several environmental, social and claimed personal factors. Those with VI, do typically want to engage in physical activity and have aspirations to increase their level of participation because of how it makes them feel and the other benefits personally and socially they experience. Seeking opportunities as an individual in advocacy, supportive parents and a facilitating environment conducive to meaningful physical activity can positively impact the amount of physical activity youth with VI can achieve.

## Chapter 4 - Discussion and Conclusions

The purpose of this chapter was to review literature regarding factors that increase physical activity levels in youth with visual impairment. Despite several reported barriers to physical activity, youth with visual impairments have the ability to overcome them and can pursue greater levels of physical activity through various methods.

Physical activity can occur through leisure activities, recreational and competitive activities as well as through daily activities. The main goal of increasing physical activity from a health perspective is to achieve a healthy body mass index and to perform various physical tasks without fatigue. Those who are inside the healthy fitness zone have been shown to produce higher levels of physical activity on average, thus if a student has healthy body weight he or she is more likely to engage in and remain engaged in physical activities. Individuals with visual impairments who are more fit also tend to have higher levels of education than others who are less active. Individuals who have higher education are more likely to initiate and maintain equal to or close to adequate levels of physical activity. They are more willing to try new things and can problem solve better than those who are less physically fit. Youth with visual impairment face barriers related to dependence on others, transportation, lack of peers to be active with, lack of possibilities within their environment, cost of programs and accessible facilities and lack of qualified supervision. On the other hand, facilitators and influences of physical activity and reasons for initiating and maintaining positive and desired engagement are healthy behaviors and outcomes, the fun and enjoyment that derive from being physically active, social contacts, the feeling of contributing to something within a team or group, personal advocacy / social justice, family support, weight control and personal improvement and medical and rehabilitation professionals advice.

Aside from medical professional advice, youth with visual impairment want to be and are physically active for the same reasons as their sighted peers. In order to increase physical activity levels in youth with visual impairment, several approaches can be utilized. Movement that is purposeful and enjoyable will transition to greater levels of physical activity due to higher self competence and efficiency in motion. Positive reinforcement via family members, friends and educators across all social environments establishes a positive atmosphere where encouragement bridges a gap in motivation and confidence. Teaching necessary skills in various contexts will facilitate positive skill transfer for universal application. In conjunction with this, self management techniques and strategies will also contribute to personal responsibility, expression, goal setting via planning, recording and logging activities and their duration, while keeping a journal of experiences from physical activities they participated in. Another form of enhancement of physical activity that increases attraction to meaningful and adequate physical activity is the use of music. Music can be used for the sake of motivation, coordinate movements in relation to body awareness and be used to designate and estimate distance while navigating to different locations near and far within distances warranting auditory reception and feedback. The use of music has the ability to provide greater independence within an activity and space as it can be a guiding tool for certain specific movements in a static or dynamic environment.

There were many other external supports that fostered increased levels of physical activity and many of which attack and combat previously mentioned known barriers to physical activity. One certain useful tool to increase physical activity in youth with visual impairment is the use of talking pedometers to help track total distances covered and estimates on physical activity levels. The pedometers were enjoyable to wear because participants in the study could set goals for level of physical activity or distances traveled per day. This tool is an enhanced to



enjoyment, transport, motivations, challenge and social expression and interaction because it can be used for independent use and communication of activity, or one that adds to social interaction between others who are sighted and or visually impaired that wear a pedometer throughout the day also. Also enjoyable and a worthy piece of technology were exergames. Exergames were described as very enjoyable and exhilarating. They provide an independent setting while in the game and require the individual to be physically active for the entire game so they are engaged in physical activity indoors, where they might not be if they did not have access to the outdoors and other facilities that promote physical activity. As mentioned before transportation was a barrier to participants getting to be physically active, but if the exergame is at the home or dwelling in which he or she lives, they will gain the physical activity that they would have missed out on. Both pedometers and exergames provide meaningful feedback to set goals and produce understanding of what transpires while they are engaged in physical activity.

Other social external supports studied were peer tutors and parental supports. It has been noted that students in physical education classes are less active than their sighted peers. This can be affected by the adequate and inadequate use of peer tutors within a class and whether they are trained or not to work with youth who are visually impaired. When peer tutors have had sufficient training to work alongside a child who is visually impaired in physical education their academic learning time and engagement increases because proper instruction, meaningful supports, pedagogies and implementation of modifications to equipment and rules are offered to enhance the learning experience without restraints. Positive engagement in physical education will help translate to greater levels of physical activity because self competence and self perception can be further improved to translate into everyday life based on their experience. This also combats the barrier of lack of peers, buddies, or qualified supervisions. Peer tutors allow for

safe and adequate participation while offering a social attachment to the experience which youth with visual impairment do seem to enjoy.

Finally, parental / family support is another important determinant and facilitator of positive engagement for physical activity levels. Parents have been known to have lower perceptions of the need for physical activity for their child, Despite these levels, the children seem to value the importance and enjoyment of living a healthy and active lifestyle. Parents often hold the key to becoming physically active or not. They can create and facilitate an environment that is conducive, supportive and meaningful for increase physical activity participation. For example, a parental resource manual on physical activity in conjunction with logging physical activities can help families promote and explore new physical activities. Implementation of the parental resource increased knowledge of various physical activities, exercise and sports equipment, activity programs for activities that are competitive, recreational and social, but also beneficial to the health and wellness of the individual. If parents and youth are both educated on the importance of The previous findings that suggest when youth with VI are better educated on access to various opportunities and applications they can quantify their physical activity opportunities, thus achieving a greater their chance of becoming proactive advocates of their own physical activity endeavors. It was noted that young individuals with visual impairment seek to explore new experiences and challenges and this manual guides them into these opportunities. Parents can appreciate the importance of physical activity for their child because of how it presents the need for increased participation and an abundance of choices for programs and activities. This will help to maintain their interest and logging the activities as a family will help to collect data and set goals for consistent, enjoyable and increased participation in desired physical activities.

Within the critical mass of articles, there were no longitudinal studies, nor were there an exuberant number of participants. It should be taken into consideration that physical activity levels are influenced greatly by one's environment, their resources, amount of support, climate and personal limitations as defined by the individual. These studies focused much on qualitative research in interviews and some tied likert-scales to them in order to be more descriptive within the data. The participants had adequate variance in levels of VI from B1, B2 and B3 meaning the studies were broad and open to different results encompassing all visual impairment. The purpose of this review of literature and the paper were to research, list and define any means necessary for increased physical activity within all youth with visual impairment. It was not limited to certain specific activities, nor levels of activity exertion and energy demands, but rather defined within studies that determined what measureable physical activity meant to the researchers and that could be recorded. Several means for increasing physical activity and background knowledge around barriers and facilitators have been outlined within this review, in hopes of building a lead into advocating for the population of youth who are visually impaired.

In collaboration, with many different strategies and opportunities the research has explained, several possible solutions to the problem of lower and inadequate levels of physical activity have been outlined. If all of these positive facilitators are employed within the child's environment and they success with their experiences being active you could expect that physical activity levels would be on the rise. Motivation, external supports, technology and parental influence all play key and vital roles for the engagement levels of youth ages 9-19 with visual impairment in physical activity both for the short term, but also can potentially have a long lasting effect on their participation beyond this age if delivered and received sufficiently. With the knowledge that youth with visual impairment want to be increasingly physically active if

provided the opportunity and the many supports that can facilitate this aspiration, can be a recipe for greater participation in physical activities. Furthermore, once barriers are broken down, or adaptations are made to foster increased participation in physical activity, it is known that youth who are visually impaired typically continue on this path and attain healthier fitness levels. Due to higher fitness levels and increased enjoyment of the physical activities they engage in, it is likely that this behavior will be part of an ongoing commitment to maintain higher levels of participation across a lifetime. The main goal in the real world, will be to enact these strategies and supports to bring adequate and enjoyable physical activities to youth who are visually impaired so that they may continue a life of being healthier, skillful and more self-satisfying.

## Chapter - 5 Recommendations for Future Research

The purpose of this chapter was to discuss recommendations for future research on physical activity levels of youth with visual impairment. Following this review of literature and its' findings, it can be suggested that more is to be known about a few things related to this topic. First, a study about the effect of autonomous physical activities and the willingness to engage in that sort of activity as opposed to one with necessary supervision and or guidance should be studied to determine if participants are more apt to choose them to be independent and physically active. Allowing students to have more control over their choices of physical activity and providing activities that can be done independently and/or with minimal equipment may yield greater outcomes. In addition, a possible rating scale tied to a questionnaire asking students about their perceptions and willingness to participate in various activities independently or with supervision could be employed to describe the feelings of the participants. In summary, it would be interesting to understand to what extent that autonomy might have an effect on longevity of participation in physical activity.

Another question left unanswered that would encompass more understanding to these findings and leads to more information regarding increased levels of physical activities would be to determine how youth with visual impairment have been educated to the point where it has had a positive effect on their higher levels of physical activity participation and just what kinds of knowledge they possess that has led to this result? If this can be understood in more depth, education programs can be quantified to distribute the content found to be impactful across schools and into the hands of parents or guardians to facilitate more physical activity on a regular basis. Individuals who had a higher level of education were assumed to have better problem

solving skills and were thought to have more success in different contexts of physical activity, therefore found more enjoyment.

Within the qualitative research lies a lot of discrepancy of what kind of physical activity participants are reporting. It would be helpful to have a large number of students participate in a survey questionnaire that seeks to understand what activities youth with visual impairment typically engaged in and then determine their rate of exertion levels to the activity by using accelerometers, heart rate monitors, or even pedometers while participating in those activities, to understand what activities warrant the highest levels of physical activity. The activities could be competitive, leisure, or recreational. Because this review of literature has focused on increasing levels of physical activity participation, the next step would be to determine just what activities offer the most benefit for calories burned and cardiovascular endurance to promote a healthy body mass index. It is important to promote a healthy fitness zone, because it has been reported to have a positive impact on the increased levels of engagement in physical activities abroad. This knowledge could be used to promote these kinds of activities to individuals who are visually impaired to reach higher levels of energy expenditure and also heart rates while participating in physical activity.

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