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Marcia Hamilton

University of St. Augustine for Health Sciences, mhamilton@usa.edu

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The Influence of the Environment on Play Participation in Children with Disabilities

Marcia A. Hamilton

University of Medicine and Dentistry of New Jersey

Faculty Advisor: Virginia Cowen, Ph.D.

Assistant Professor, School of Health Related Professions

University of Medicine and Dentistry of New Jersey

Preceptor: Victoria Schindler, Ph.D., FAOTA

Richard Stockton College of NJ

Abstract

Children with disabilities face challenges with accessing opportunities to play and physical activity (Owen, 2010). Statistical evidence supports the concern for the growing issue of secondary health problems related to lack of physical activity (Cooper, 1999; Council on Disabilities, 2008; Heath, 1997; National Institute for Health and Clinical Excellence, 2008; Spencer-Cavalier and Watkinson, 2010, US Department of Education, 2005). This is of further concern because of a rising incidence of disability in children (US Department of Education, 2005). This research was conducted to help provide an understanding of how children with disabilities can access play. Eleven children with moderate to severe disabilities ranging in age from 5-8 participated in this study. The children all attend a county school specializing in educating children with special needs. Data was collected during field observations on four separate dates over a two-month period, while the children were given access to the playground during recess. Play participation behaviors were observed and measured for type, frequency and duration. The types of play participation behaviors include Body Play Movement (BPM), Object Play (OP), Social/Interactive Play (SIP) and Imaginative/Creative Play, (ICP). The children were able to increase the amount of play participation time over the four observation periods in all four types of play behaviors. These findings indicate that a conducive environment will offer children with disabilities the opportunity to play. This can potentially translate into health and social benefits.

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The Influence of the Environment on Play Participation in Children with Disabilities

Children with disabilities face challenges with accessing opportunities to play (Owen, 2010). This is a problem because through the course of development, play and physical activity provide the foundation for physical capacity and fitness, and opportunity for cognitive and psychosocial development. Children's play is considered to be one of the most important human occupations, which sets forth the stage for the ongoing development of skills. Each minute of opportunity to play is a moment open to exploration, skill learning and mastery. Play requires use and practice of all types of functional domains needed for daily life. These domains include perceptual abilities such as praxis and sensory motor processing skills, emotional regulation, as well as cognitive and communication skills (The American Occupational Therapy Association, 2008). The acquisition of skill in one area promotes or bolsters acquisition of skill in another area. Furthermore opportunity for play enables the child with one or more disabilities to engage with peers and experience participation through play. This sets forth a platform for development of a sense of oneself and capacity to negotiate the surrounding environment.

The ability to play has health and social benefits for all children including those with disabilities. Productive play can help promote gains in many skill areas needed for daily life. Play can also provide opportunities for physical activity supporting development of strength, coordination and cardiorespiratory capacity. When children have a difficult time accessing play because of disability they are at risk for obesity, decreased physical stamina, lack of skill progression and social isolation (King, et al, 2003, Rimmer, Rowland and Yamacki, 2007). Disability may have a profound effect on various aspects of play skill development. The reasons why children with disabilities have difficulty accessing play are multifaceted (Council on

Children with Disabilities, 2008; Heath, 1997; US Department of Education, 2005). There are biopsychosocial barriers to play for children with disabilities. Children with disabilities may not be able to access play because of physical problems such as mobility impairment or decreased endurance and stamina. Difficulty with ability to play may also be related to psychosocial or cognitive challenges. On a community level there are environmental barriers to accessing play, such as a lack of facilities that can accommodate the needs of children with physical or cognitive disabilities (National Institute for Health and Clinical Excellence, 2008). Children with disabilities may also experience attitudinal prejudice, such as those who overestimate risk of injury through participation in play (King et al, 2008). Measuring play is difficult because it is unique and spontaneous with each child. This is further confounded by the unique aspects of disability, which makes assessment of play skills more difficult, such as lack of expressive language.

Measuring the effect of play and play participation is needed based on an increasing body of evidence establishing the importance of play participation in children with disabilities. There is a growing amount of information about the long-term health risks, which are secondary to developmental problems and physical disabilities in children (Rimmer, 1998; Rimmer, Rowland & Yamacki, 2007; Spencer-Cavalier & Watkinson, 2010). Physical activity is one aspect of play participation that can be challenging for children with disabilities. Secondary health problems related to lack of physical activity are common in children with disabilities. Research on increasing opportunities for play participation through environmental access and understanding how children with disabilities play is presently limited. Evidence based research on the benefit exposure to a wheelchair accessible/therapeutic playground has on play participation in children with disabilities is also limited.

There are reported to be 5.5 million children and adolescents with disabilities living within the United States (US Department of Education, 2005). The long term impact of the increasing disability rates in children give rise to concern for the future with spiraling increases in the number of secondary health conditions associated with lack of physical activity. From a societal standpoint the limited ability to participate in play and physical activity affects overall health and healthcare costs of this subgroup population (Perrin, Bloom, & Gortmaker, 2007). Statistical evidence supports the concern for the increasing issue of secondary health problems related to lack of physical activity (Cooper, 1999; Council on Disabilities, 2008; Heath, 1997; Maher, Williams, Olds, & Lane, 2007; National Institute for Health and Clinical Excellence, 2008; US Department of Education, 2005). Sedentary recreational activities are noted to be of increased prevalence in children with disabilities, making these children at greater risk for obesity, which in itself increases risk of chronic conditions such as diabetes, hypertension, hyperlipidemia, and decreased cardio/vascular and respiratory status. Additionally secondary conditions stemming from the primary disability make play participation more difficult, such as joint pain, muscle stiffness and limitations in aerobic capacity (Johnson, 2009; Okimoto, Bundy & Hanzlick, 1999; Rimmer, Rowland & Yamacki, 2007). Social isolation is of increased prevalence in children with one or more disabilities. King, et al, 2003, Spencer-Cavalier & Watkins, 2010 and Manjemer, et al. 2008 provide insight into perceptions and attitudes of children with disabilities regarding gaining access to play, having friends and feeling like a legitimate participant in play and levels of enjoyment when included in play. Inaccessibility of facilities compounds the issue of social isolation. Because play is self-directed, engagement in it provides opportunity for development in many important areas. It can potentially promote health, fitness and social interaction, which can positively contribute to overall development and well-

being.

There is research that supports the influence of the playground environment on the safety and activity levels of the children. The effect of brightly colored markings on a playground on activity levels of children during recess was measured using telemetry and accelerometry. The results demonstrated that with the addition of brightly colored markings to the playground the activity levels of the children increased (Stratton and Mullen, 2005). In another research study a significant increase in moderate physical activity was found over time when measured using heart rate monitors on children while on the playground with improved markings and refurbished facilities (Ridgers, Stratton, Fairclough, & Twisk, 2007).

There is also a reported increased incidence of injury in children with disabilities on school playgrounds (Sit, McManus, McKenzie & Lian, 2007). A longitudinal study involving 6,769 students provides information about safety of playground facilities and an increased prevalence of injury among children with disabilities. Children with multiple disabilities had a 70% chance of a play-related injury compared to the children with developmental disabilities. Of these injuries reported through school accident reports, more than one fourth of the injuries occurred on school playgrounds or athletic fields (Ramirez, 2004).

Recognizing the need to increase opportunity for play participation in children with disabilities, the Project Fun Playground, a wheelchair accessible playground was constructed at a large county school, serving children ages 3-21, with moderate to severe disabilities. The Project Fun Playground was designed to be therapeutic by providing a multi-sensory environment for play. A music station includes drums, bells, chimes and horns. Gear and construction panels afford opportunity for eye hand coordination, visual attention and motor planning. Two large Plexiglas art easels serve as a medium for creativity as well as self-expression and fine motor and

visual motor development. A wheel-through arcade provides able bodied and physically challenged children with a structure to develop strength, endurance, mobility, balance and perceptual skills. Swings provide opportunity for children to experience movement and receive vestibular input. The flooring was designed to meet top industry standards for safety. Anecdotal observations of the children on the playground suggested that the new playground environment had a positive effect on the interest, engagement and activity of the children.

This research study was developed to increase the understanding of play participation of children with disabilities on a wheelchair accessible playground. The purpose of the project was to measure the effect of the environment on the ability of children with disabilities to engage in different categories of play participation. This was accomplished through direct observations of children with disabilities given access to a specially built playground.

Methods

To provide objective data on play, field observations were conducted on four separate occasions. Children were observed for 20-minute observation periods during their recess, on the Project Fun Playground, during December 2011 and January 2012. This data categorizes the amount of time a child participated in a specific type of play, on four separate observation periods during recess. All children (subjects) involved in this study attended Atlantic County Special Services School District, where the Project Fun Playground is located. Parents/guardians for eleven students consented to allow their children to be observed and their play behaviors documented. Each subject in the study had a diagnosis of a developmental and/or physical disability including autism, cerebral palsy and various genetic syndromes, such as Down syndrome. Three were female and eight male. Subjects are of ethnically diverse backgrounds including Hispanic, Black and Middle Eastern. Children whose parents/guardians did not sign

the consent form for their child to participate in the study used the playground during recess. However their play participation was not recorded.

To evaluate play participation an assessment tool was developed based on the work of Kuhaneck, Spitzer and Miller (2010). Types of play participation were grouped into four categories for observation. These included Body Movement Play (BMP), Object Play (OP), Social Interaction Play, (SIP) and Imaginative/Creative Play (ICP). BMP is defined to include activities such as hanging, jumping and swinging. OP is demonstrated through using the playground equipment in a purposeful way, such as banging a drum or turning gears. SIP is defined as engaging with other students or staff by talking or making sounds or cooperatively using playground equipment. ICP is considered to be more complex cognitively and involves make-believe activities such as pretending or using playground equipment in an imaginative or unusual way, such as using a wheel to steer an imaginary ship. This measurement tool serves to record observations collected. The measurement tool was used to record the number of minutes the child engaged in one of the categories of play. Demographic data (age, gender and type of disability) was recorded for each subject, and is summarized and reported (See Table 1).

This research project was reviewed and approved by the University of Medicine and Dentistry of New Jersey Institutional Review Board and the Atlantic County Special Services School District Board of Education.

Results

Observed minutes of play were collected for the eleven subjects over four time periods (See Table 2, Appendix A). A repeated measures analysis of variance (ANOVA) was calculated using Statistical Package for Social Sciences (SPSS) software version 17.0. The mean number of minutes that the children engaged in different types of play over a 20-minute period was

compared over the four observation periods. A comparison was made among the four separate categories of play: BMP, OP, SIP and ICP for each of four observations (see Figure 1.) Overall the subjects spent the most time participating in BMP with swinging being the most preferred activity of the playground. With the alpha level set at .05, statistical significance was achieved when comparing the average number of minutes of play participation in SIP from the baseline (T1, M=7.6, SD 6.6) and the fourth observation (T4, M=12.9, SD 6.9) over the course of the data collection periods, with $p = .049$, $n=11$. SIP was seen during other categories of play participation. For example, subjects were observed engaging in social interaction while banging on the drum or coloring on the easel, which was recorded as minutes of play participation in both OP and SIP. Another example of this was observed with subjects engaging in social interaction, eye contact, vocalizations and gestures during swinging which is classified under BMP. ICP was the least common type of play observed.

Discussion

This study found that an environment accessible to children with developmental and physical disabilities was associated with positive play behaviors and some increase in play participation over time. A playground designed with objects and activities that provide visual auditory, tactile, proprioceptive and vestibular sensory input can promote play for children with disabilities. Subjects participating in this study had diverse challenges through various disabilities; however the variety of stations or activities on the Project Fun Playground provided different opportunities for meaningful play participation. ICP considered to require higher order operational thought indicative of more complex cognitive thought processes, was the type of play least observed among the subjects. One possible explanation is that all of the subjects had some degree of cognitive impairment. ICP would be difficult in any environment.

A playground environment that is safe, stimulating and accessible to children with disabilities can be beneficial in providing opportunity to play. This is important because children with disabilities are recognized as having difficulty accessing play and the lack of access to play participation increases the risk of secondary health problems over the lifespan. Typical school playgrounds may have slides, see saws, merry-go rounds, monkey bars and chin up bars. However for a child with a disability this type of equipment may be impossible or unsafe to access. There are limited studies about how children with disabilities access playground equipment. The data in this research project is limited and the scope of the information lessened because of the small sample size, however there are multifaceted areas of impact, which can be further understood through this research. Measurement of specific categories of play participation provided information about how children spend their time when given access to a playground that offered different types of sensory activities. Productive play can help promote gains in many skill areas needed for daily life. Interestingly SIP was found to have a statistically significant increase in mean number of minutes of play participation, which further supports the understanding of the need for play in addressing issues of social isolation. Overall the findings suggest that improvements in a playground environment can have a favorable impact on play participation for children with disabilities.

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APPENDIX A

Table 1: *Demographics of Research Participants:*

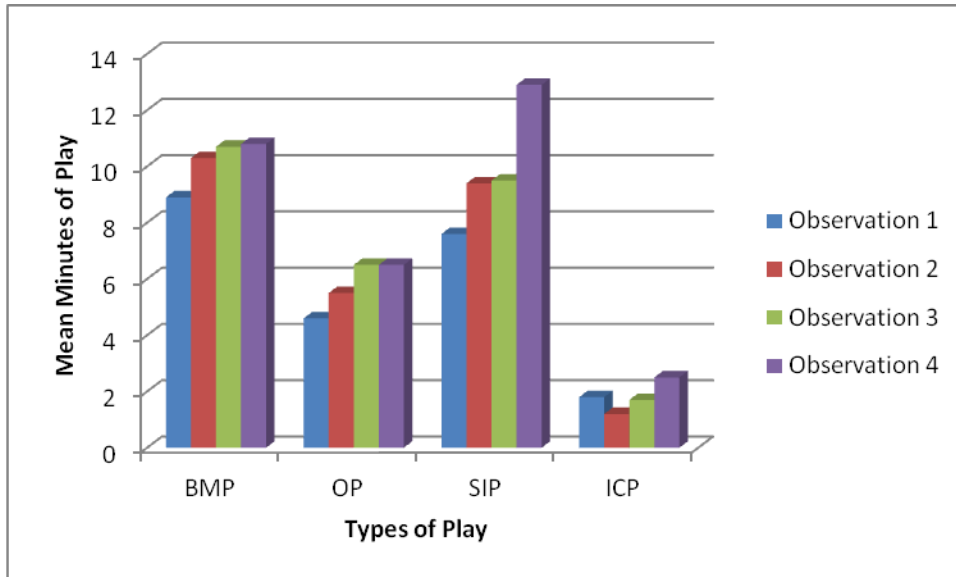
		Mean						
Males	Females	Age	Dev. Dis. inc. Autism, Down Syndrome, Genetic Syndrome, CP			Mobility Impairment	Comm. Imp.	Cog. Imp.
8	3	6.09	11			4	11	11

Table 2: *Means and Standard Deviations Associated with each Observation and Category of Play Participation:*

	Obs.1 M(SD)	Obs.2 M(SD)	Obs.3 M(SD)	Obs.4 M(SD)
Body Movement Play	8.9 (6.2)	10.2 (6.8)	10.7(5.3)	10.8(5.2)
Object Play	4.6 (4.3)	5.45 (3.90)	6.5 (4.0)	6.5 (3.9)
Social/ Integrative Play	7.6 (6.6)	9.4 (6.6)	9.5 (6.5)	12.9 (6.5)*
Imaginative / Creative Play	1.2 (1.95)	1.3 (2.5)	1.7 (1.84)	4.9 (6.5)

* $p < .049$, with alpha = .05

APPENDIX B

Figure 1: Comparison of the Mean Number of Minutes Children are Participating in Play:

APPENDIX C

Data Collection Sheet:

**Project Fun:
Patterns of Play Participation
Observed Sheet**

Student _____ Date _____ Week _____

Please record the amount of time each play behavior is observed. Please note any maladaptive behavior such as kicking or hitting on the bottom of the form.

Body Play Movement	Object Play	Social Play	Integrative Creative Play

Comments: _____

APPENDIX D

Informed Consent:



Atlantic County Special Services School District

CONSENT/ASSENT TO TAKE PART IN A RESEARCH STUDY:

TITLE OF STUDY: Project Fun: Addressing the Need for Access to Play Participation in Children with Developmental Disabilities and Use of a Wheelchair Accessible/Therapeutic Playground.

Who am I and why are you being contacted?

I am Marcia Hamilton, OTR/L and I am an Occupational Therapist at Atlantic County Special Services School District, (ACSSSSD) and a graduate student at the University of Medicine & Dentistry of New Jersey in the Department of MSHS/Integrated Health and Wellness Programs. I have developed this study to help provide an understanding of children's ability to play, when they have access to a therapeutic playground. The therapeutic playground is called Project Fun, which is a brightly colored, multi-sensory, wheelchair accessible playground, which is part of the Group IV playground on the school grounds of ACSSSD. The observations will occur on four separate occasions during your child's normally scheduled recess. The observations will be made by volunteer educational staff from ACSSSD. The types of play the investigator(s) will observe are:

Body Movement: This includes activities such as hanging, jumping and swinging.

Object Play: This includes using the playground equipment in a purposeful way, such as banging a drum or ringing a bell.

Social Play: Demonstrating social interaction with other students or staff, by making sounds or cooperatively using playground equipment.

Creative Play: This involves imaginative activities such as pretending or using playground equipment in a creative way, such as using a wheel to steer an imaginary ship.

What is this research study about?

This study is being done to gain an understanding of how to help children with disabilities be better able to play. There is a growing amount of evidence to support the need for specialized playgrounds to help children with disabilities to have access to play. Project Fun is a unique playground designed to promote children's ability to play. It was funded through grants from the Wal-Mart Foundation, Christopher and Dana Reeves Foundation, Hammonton Soroptimists, the ACSSSD Education Foundation and an anonymous donor. Additional grant funding is being

sought to expand the environmentally sustainable, safety flooring to a larger area of the playground. Collecting data about how children learn and participate on this playground will help to contribute to an understanding of the importance of play and physical activity for children with disabilities and how to give children the best access to play.

Why has my child been asked to take part in this study?

Your child has been asked to be included in this study because they are a student at ACSSSD between the ages of 3 and 11 and have access to the wheelchair accessible/ therapeutic playground at ACSSSD during recess.

What will happen to my child if I grant permission for him/her to participate in this study?

Your child will be observed 1x/week, for a 20 minute period, while at recess, at Project Fun. A simple observation form will be completed by an approved educator. Your child will not be asked to do anything, as the form is completed solely based on observation.

Will my child get better if she/he is in the study?

There will be no direct benefit to your child through participation in this study. Play itself, is known to offer opportunity for development in physiologic function, such as improved physical capacity including strength, coordination, balance and endurance as well as improved sensory registration, modulation and processing will hopefully be achieved by your child through playing on the playground. Additional opportunity for development of cognitive, psychological and social skills through play will also hopefully be gained by your child. The goal for Project Fun is that through play participation, children will experience fun and positive health outcomes will result.

Can something bad happen to my child if I give permission for him /her to participate in this study?

Sometimes things happen to people in research studies that may hurt them or make them feel bad. These are called risks. The risks of this study are nothing additional than would be experienced through normal play. The Project Fun therapeutic playground is specifically designed to be absolutely as safe as possible. If any problematic behavior occurs such as pushing or hitting it will be immediately dealt with by ACSSSD staff according to school procedure. Documentation of this behavior will be recorded as well. The floor surface of Project Fun is made of a smooth solid recycled tire surface, which minimizes severity of injury with falls. All playground attractions promote improved alertness and focus through basic sensory input, e.g. Drums, bells and chimes for alerting auditory input. When children are alert and focused on their environment there are psychological and behavioral benefits which help to increase safety.

What if I don't give permission for my child to be in this study?

You don't have to give consent for your child to be in this study, if you don't want to. No one will get angry or upset if you don't want your child to be in the study. Just indicate this on the

form or call us. And remember, you can change your mind later if you decide you don't want your child to be in the study anymore. If you refuse to allow your child to participate in the Project Fun study, your child will still be permitted to play on this special playground.

Will I be given anything to take part in this study?

There is no financial compensation for allowing your child to participate in this study.

What if I have questions?

You can ask questions at any time. You can ask now. You can ask later. You can talk to me or someone else at any time during the study. I can be reached on my cell phone at 609.839.9244. An administrator at ACSSSD can be reached at 609.909.9258. If you have any questions regarding the rights of your child as a research subject, you may call the UMDNJ IRB Director at (973) 972-3608.

What are my rights if I decide to take part in this research study?

I understand that I have the right to ask questions about any part of the study at any time. I understand that I should not sign this form unless I have had a chance to ask questions and have been given answers to all of my questions.

I have read this entire form, or it has been read to me, and I believe that I understand what has been talked about. All of my questions about this form and this study have been answered.

I agree to take part in this research study.

Subject Name: _____

Parent/Guardian Signature: _____ Date: _____

Signature of Investigator or Responsible Individual:

To the best of my ability, I have explained and discussed the full contents of the study, including all of the information contained in this consent form. All questions of the research subjects and those of his/her parent(s) or legal guardian have been accurately answered.

Investigator/Person Obtaining Consent: _____

Signature: _____ Date: _____