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**Preschoolers' Engagement In Physical Activity
And The Ability To Gauge Risks And Challenges
In A Natural Playscape Compared With A Traditional Playground**

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An Action Research Project Presented
in Partial Fulfillment of the Requirements
For the Degree of Master of Education

Abstract

The purpose of this action research project was to determine the relationship between a three-year-old preschooler's physical activity engagement and their ability to navigate risks and challenges in the natural playscape play area compared with the traditional playground. The decline of children's physical activity over the past decade has influenced the research on the attributes of the outdoor space where children can become fully engaged as they navigate the risks and challenges encountered in their environment (Haga, 2021). A mixed-method study was used to determine significant differences in the children's physical activity engagement in a specific play area. Data was also collected on the preschoolers' risky play experiences in each play space. Data analysis revealed a significant difference in physical activity engagement in sliding occurred on the traditional playground. Analysis of risky play engagement revealed significant differences in play with speed, play with impact, and disappearing play when comparing the two playground areas. The research findings from this study may prove beneficial for early childhood educators and managers to consider as they design outdoor play spaces for the students in their care. The outcomes may also provide information for educators and parents to consider as they facilitate outdoor play, actively participate with the children, and give preschoolers the training and scaffolding necessary to navigate risks and challenges during physical activity engagement. The conclusions provide evidence and information for early childhood stakeholders to consider as they determine solutions to reduce inactivity and obesity in young children.

Keywords: early childhood, physical activity, preschool outdoor play environments, risky play, natural playscape

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**Preschoolers' Engagement In Physical Activity
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In A Natural Playscape Compared With A Traditional Playground**

A trend toward reduced amounts of outdoor play in schools and communities has surfaced over the past decade (Sandseter, et al., 2021). The American Academy of Pediatrics along with the Nemours Health and Prevention Services recommend that preschool-age children spend at least 30 minutes in structured or adult-led physical activity and at least 60 minutes in child-led or unstructured physical activity each day (Kinsner, 2019). COVID-19 pandemic regulations have required children to remain socially distant from one another and have mandated changes to the ways educators may use play equipment and plan activities to safely engage preschoolers in physical activity. Such restrictions are another factor contributing to children's physical inactivity (Lafave, et al., 2021). Determining what type of outdoor environment best serves preschool children's needs for engagement in physical activity and how the dynamic of risky play occurs during preschool play experiences will be the focus of this study.

The purpose of this action research is to determine the physical activity engagement levels of preschool-aged children during outdoor free play periods while playing on a traditional playground with fixed play structures compared with their engagement levels of physical activity on a natural playscape playground. The second component of this action research will examine the preschoolers' ability to gauge risks and challenges on the traditional playground with those on the natural playscape playground. These research findings will be beneficial for early childhood educators and managers to consider as they design outdoor play spaces for the preschool children in their care.

There is a growing body of research surrounding the importance of outdoor time and the healthy development of preschool children. Research studies found in peer-reviewed journals focusing on outdoor physical activity and components of risky play on a traditional playground or a natural playscape will be reviewed and discussed throughout this report. Articles included in this study were written from 2012 to 2022. Articles written before 2012, containing foundational and historical information on the attributes of risky play or the development of a natural playscape playground have also been included. A component of the study is the exploration of the shift from traditional playgrounds to natural playscapes and the influences of the chosen outdoor play environment that lead children to take risks and challenges during play. For the focus of this study, a traditional playground is defined as an outdoor play space containing fixed play equipment typically including metal climbing structures, swings, and a concrete area. A natural playscape is characterized by large, open, grassy areas, logs, tree stumps, natural loose parts such as sticks, rocks, or pinecones for collecting and exploration, sand and water play areas, as well as other natural materials to use and examine (Sandester, 2021).

Analysis of both quantitative and qualitative data will reveal not only the amounts of specific engagements in physical activity but also the types of activities chosen by the preschoolers during their outdoor times. The level of variance in physical activity between the playscape playground and the traditional playground activity will reveal where children appear to be most engaged. The types of risks and challenges the preschoolers choose in each playground will be categorized along with anecdotal documentation for an in-depth evaluation as to whether students can gauge appropriate risks for themselves.

The decline of children's physical activity over the past decade has influenced the research on the attributes of the outdoor space where children can become fully engaged as they

navigate the risks and challenges encountered in their environment (Haga, 2021). The literature review will delve into the types of risky play preschool children choose and the possible reasons for their choices. An investigation of the components of a natural playscape will be explored along with an analysis of the dynamics of risky play in association with these components. Finally, adult interactions with preschoolers will be examined to understand the connection to engagement in physical activity.

Review of the Literature

Preschooler's Risky Play Choices and Engagement

Giggles and squeals prevail in an outdoor preschool play area followed by declarations such as, "Higher, faster, longer," or "again!" The association of these declarations to a preschool child's engagement in risky play choices challenges early childhood educators to carefully discern where the equilibrium of exhilarating risky play and safety can be established.

Researchers have explored this quandary from various perspectives including educators, parents, and preschoolers to determine how to balance declarations of, "It tickles my tummy!" (Sandseter, 2010) with "We don't allow children to climb trees." (Sandseter and Sando, 2016).

In a study conducted by McFarland and Laird (2017), 26 early childhood educators and 121 parents in the United States and Australia were given an online survey about opportunities provided for children to engage in risky outdoor play. Questions also sought to reveal reasons that kept participants from allowing children to be involved in these opportunities. Findings indicated that 75% of educators viewed risk-taking experiences as important while 81% of parents noted the importance of risk-taking experiences. The themes of risky play opportunities identified in the results by both educators and parents included supporting large motor skills, supporting free exploration of the environment, and supporting the assessment of risk. To this end, it is evident both groups value the provision of risky play experiences for their preschoolers. However, the researchers indicated the parents surveyed expressed more nervousness about safety than the responses provided by the educators.

An online survey was also used by Little and Sweller (2015), to determine the potential connections between outdoor play and the features of the environment, or affordances, that encourage engagement in physical activity and risk-taking. This survey differed from one

conducted by McFarland and Laird (2017) as it questioned early childhood owners, directors, and teachers from 245 centers in Australia. Results indicated that 92.2% of the respondents agreed the outdoor environment of their center provided preschoolers with opportunities for moderate-vigorous physical activity, while 70.6% believed the outdoor environment encouraged risk-taking. The researchers noted those risk-taking opportunities varied in frequency amongst the centers. Tree climbing was not permitted in 47.2% of the centers while 14.9 % allowed tree climbing most of the time and 12.8% always allowed tree climbing. 45% of the respondents identified early childhood regulations as constraining the types of learning experiences and risk-taking opportunities offered in the outdoor play spaces of their centers. Challenging regulations included height restrictions, appropriate fall zones, supervision, proper child/staff ratios, and lack of equipment to support greater risk-taking and physical activity engagement. Results of this study reveal the desire of early childhood educators to challenge and engage their students in physical activity and risky play. Therefore, it appears to be possible in an outdoor play environment void of stringent regulations, early educators would support more risky-play experiences.

Sandseter and Sando (2016) surveyed Norwegian early childhood managers to determine how a focus on safety affects preschoolers' play in early childhood settings. The questionnaire gathered details about children's injuries, injury prevention, health and safety routines, safety training offered to staff, and how the focus on safety in society influences play and activities in the early childhood setting. Managers from 335 early childhood centers responded to the survey. Nearly half of the managers indicated restrictions in play and activities due to safety concerns. The main reason for restrictions was identified as fear of injuries. Similar to the survey findings of McFarland and Laird (2017) and Little and Sweller (2014), Sandseter and Sando (2016) also

found pressure from local authorities, playground inspectors, the media, and parents as the main reasons for restricting physically active play. It appears McFarland and Laird (2017) and Little and Sweller (2014) would agree with the Norwegian managers that over the past ten years play environments have become less stimulating and challenging for the children in their care.

Up to this point, only research findings based on survey results generated by early childhood professionals and parent respondents have been reviewed. The research of Sandseter (2010) goes straight to the source by interviewing 23 preschool-aged children to determine their motivational and emotional perceptions of engaging in risky play. Results of interviews indicated children's ultimate goal in risky play is to maintain the balance between exhilaration and excitement with fear and anxiety in their play situations. The children identified risky play experiences involving great heights, play with high speed, and rough and tumble play as incidents where they could achieve a balance of emotions. Children described their experiences as both fun and scary at the same time. The children explained strategies they used to reduce fears such as slowing down, climbing down or closing their eyes and not looking, or planning how to safely find a way out. This researcher concluded, "The ambiguous state of experiencing both exhilaration and fear is at the core value and the main aim of risky play." (Sandseter, 2010).

The recurring theme of safety concerns by adults as children engage in risky play can be challenged by children's perceptions of their own risky play experiences. Perhaps caregiving adults should observe and trust the children in their care to have a hand in regulating their safety in risky play. Sandseter is cited and associated in all the studies examined in this section and is viewed by other researchers as an authority on risky play in early childhood. The research findings reviewed here offer varying perspectives as well as characteristics of risky play

experiences and outdoor environments for educators to contemplate as they evaluate their preschool play areas and practices.

Components of Natural Playscape Environments

Natural playscape environments continue to be identified by many different names including organic outdoor learning environments, nature-based outdoor classrooms, outdoor nature exposures, nature-based play spaces, and outdoor preschools. While the names may vary, there appear to be common threads in the characteristics of these spaces that draw preschool children to explore and discover the components of the natural playscape. Researchers have been carefully studying these environments to see if there are features to encourage ever-increasing sedentary behaviors in preschool children to diminish as the children become engaged with nature.

Observing three and four-year-old children's responses to natural features introduced in the redevelopment of a childcare center garden was the focus of the research done by Nedovic and Morrissey (2013). The components added to the garden included a teepee, mulch, greenery, flowers, and loose organic materials. After the implementation of these components, the researchers interviewed the children and their teachers. The children responded through drawings, photos, and discussions noting their favorite elements to be the plants with water and mud as their second-best elements. The children's teachers noted the children were engaged in more imaginative play, greater physical activity, more focused play, and positive social interactions. This research indicates components of the natural playscape environment not only foster a preschool child's physical development but also encourage growth in the areas of social, emotional, and cognitive development.

Dennis, Wells, and Bishop (2014) conducted semi-structured telephone interviews with teachers and administrators of outdoor classrooms in eleven sites throughout the United States. The respondents indicated having an outdoor classroom in a natural setting was preferred over an indoor classroom or traditional playground. Many examples of children connecting and finding joy in natural and living things were given especially as related to the changing of seasons. Those responding indicated nature provided more play props and open-ended opportunities for play supporting longer engagement, more cooperation, and a wider variety of play behaviors. Like the research of Nedovic and Morrissey (2013), Dennis, Wells, and Bishop (2014) also observed how components of the natural playscape environment reinforced the preschoolers' intended learning and developmental outcomes.

The Reggio-Emilia approach to learning emphasizes the importance of children's leadership in the outdoor environment where teachers consciously create "teachable moments" in conjunction with the preschoolers' explorations in nature. Omidvar, et al. (2019) examined the children's nature exposure both indoors and outdoors as two Canadian classrooms spent at least three hours each day exploring a variety of natural settings. Children were engaged in unstructured nature play, the study of natural creatures, gardening, and collecting and displaying items found in their environments such as flowers, sticks, acorns, or stones. The nature experiences helped the children build their appreciation for nature as the teachers designed nature experiences to develop the children's leadership abilities, improve both communication and social skills, and to assist the children in seeing themselves as researchers (Omidvar, et al., 2019). These two groups brought nature into the classrooms so the children could explore plants, and animals, and use natural items such as shells, sticks, and rocks in their play. This

demonstrates preschool children may be able to use components of the playscape to enhance indoor play as well.

Installing natural elements into the outdoor play space resulted in more complex and diverse play experiences for children in Vancouver, Canada. Determining which natural elements to add and how to introduce them led to the development of a criterion for designing outdoor natural play spaces appropriate for preschool-age children. The criterion not only looked at the physical features of the play area but also how those features affected the children's play experiences and linked to their development. For example, designing pathways and different-sized spaces within the play area helped foster the preschoolers' physical, cognitive, and emotional development (Herrington and Brussoni, 2015). Exploration and discovery were promoted by adding sand, mud, water, and loose parts. Adding mystery and risk-taking to the area was achieved by providing looped paths, grassy slopes to roll down, stepping stones, logs, and flat open space to encourage climbing or playing ball. Similar to the findings of Nedovic and Morrissey (2013), Dennis, Wells, and Bishop (2014), and Omidvar, et al. (2019), a link between the natural elements and children's development was evident.

Zamani (2017) gathered preschool children's opinions about their outdoor play using photographs as part of an interview process to understand the children's preferences. Outdoor areas were labeled as behavior settings and were identified as natural areas comprised of mostly organic materials, mixed areas containing both organic materials and manufactured items, and manufactured settings with mostly fixed synthetic features. Children's responses to the interview questions showed their preference was for a mixed setting. The children liked the seasonal changes in the natural settings as well as the challenges and opportunities to explore. The mixed settings encouraged different cognitive play behaviors such as imaginative play and the

inspiration for self-initiated games. The children desired diverse play opportunities beyond just physical activity in the manufactured setting and engaged in hiding and dramatic play, which were afforded by a play structure.

Components such as organic loose parts and natural physical features of a playscape environment appear to be the catalyst for not only enhancing play activity but also building important developmental skills in preschoolers. The children's love for plants and gardening along with adult observations of cognitive, social, and emotional development occurring in conjunction with the children's physical development appear to be benefits of preschool play on a natural playscape (Nedovic and Morrissey, 2013; Dennis, Wells, and Bishop, 2014; Omidvar, et al., 2019; Zamani, 2017).

Dynamics of Risky Play in a PlayScape Environment

The natural playscape environment may prove to be a fascinating area for children to explore nature while being able to safely navigate a series of risky play moves. Early childhood educators have been challenged to allow their students enough time and access to natural environments so they may safely take risks and engage in risky play activities. Along with this challenge is the need for teaching young children to discern between risks and hazards encountered during their play.

While risky play can occur in any play area, a nature play area appears to provide a higher degree of risk in young children's play (Sandseter, 2009). Researchers of risky play refer to the features in the play environment that invite and cause children to act and behave in ways with the components of the area as affordances. The experiences with the affordances in the playscape area are different for each child due to his or her size, strength, skills, and temperament (Sandseter, 2009). Researchers found the nature playscape provided more

affordances for risky play such as taller trees, cliffs, rocky walls, big rocks, and steep hills for climbing and jumping (Sandseter, 2009; Coe, 2017). In all, there were 55 risky play situations on the playscape while 51 situations were observed on the traditional playground. While the number of risky situations in each play area was similar, Sandseter (2009) noted the risks taken on the natural playscape contained a higher level of risk because the affordances of the environment were more challenging and risky.

A recent study conducted by Sandseter, et al. (2021) indicated a positive association between risky play and nature, fixed equipment, and wheeled toys. The amount of risky play was estimated to be 14% higher when the children were in nature. Using fixed equipment was associated with 38% higher incidences of risky play while the use of wheeled toys increased risky play by 6%. Children who were one year older engaged in 3% more risky play. Even though the researchers concluded children were more engaged in risky play in a natural environment, none of the findings were specifically associated with greater risks in the natural environment.

The question of balance between risk and hazard comes into consideration as children attempt to discern and navigate features in their playscape environment. Sandseter (2009) identifies the freedom with which children can move and engage in the play area as a mobility license. Coe (2017) discovered teachers want their students to explore and experiment in the play area, but there is also a need to provide safety prompts to manage risks and reduce hazards. Teachers were found to model techniques, give subtle reminders, and provide scaffolding as necessary. Coe identifies four methods for managing risks and reducing hazards in the natural playscape including teacher attentiveness, self-monitoring, peer monitoring, and safety checks. These methods gave support to children's engagement in risk-taking and supported their risky

play experiences. In contrast, Sandseter's (2009) observations from video footage revealed teachers were observing and constraining risky play but no evidence showed students being given techniques to manage their risky play.

There appears to be a correlation between higher levels of risky play amongst preschoolers when engaged in a natural playscape environment. Studies point to taller trees, cliffs, rocky walls, big rocks, and long steep hills for climbing and jumping as the affordances in the play environment giving more opportunities to engage in risky play (Sandseter, 2009; Coe, 2017). Greater engagement in risky play suggests the need for teachers to give direct instruction on discerning risks from hazards. This new awareness contrasts with teachers simply observing children in the playscape and stepping in only when they appear to be in a dangerous situation.

Connections Between Adult Interaction and Preschool Physical Activity Engagement

Teachers often enjoy conducting outdoor activities with young children but the activities do not necessarily result in increased physical activity engagement of the children in their care. Ebbeck, et al. (2019) examined the views of early childhood teachers in Singapore on the value of outdoor play and their teaching practices with young children. Teachers surveyed strongly supported the physical and social-emotional value of outdoor play, however, only 46% provided daily outdoor play activities. The lack of human resources to sufficiently supervise outdoor play was identified as a major problem. As part of the follow-up discussion with survey respondents, the researchers found teachers attempted to brainstorm solutions to increase outdoor time and physical engagement.

The design of the outdoor play area may also have an impact on preschool physical activity levels and adult interaction. A study conducted by Berg (2015) comparing physical activity levels of four early childhood centers in Canada revealed the play area of one center

offering large open grassy areas for play, a sand area, and various balls found children to be engaged in vigorous physical activity nearly double the time of the other centers. The teacher on this playground was able to provide more attention and guidance to the children. The results of this study demonstrate by showing children the importance of physical activity; caregivers are providing a positive role model and setting children up for a lifetime of healthy activity choices.

Preschool children were prompted to increase their physical activity levels during their outdoor time by both teachers and researchers during a study conducted by Kahan, Nicaise, and Reuben (2016). The prompts given by the researchers were successfully transmitted 74.8% of the time to increase a child's physical activity in the outdoor play area. Teacher prompts were increased during the observation period by 47.8%, however, at the end of the intervention, the rate decreased by 74.5%. Because the teachers knew which children were participating in the study, they consciously prompted those children. The researchers found prompting may reduce sedentary activity but additional means are needed to increase the children's moderate to vigorous physical activity engagement. If teachers continue to prompt their students and provide enjoyable activities, the children may eventually increase their physical activity engagement without prompting.

While prompting may produce increases in preschoolers' physical activity levels, having an active teacher during a structured PE class also increased physical activity levels. Children with an active PE teacher took 1,712 steps during the class while those in the class with a less active teacher took 951 steps (Cheung, 2020). The children were engaged in higher levels of physical activity when their teacher used energetic movements in an exercise routine with music because they imitated the actions of their teacher. Teachers' behavior along with the choice of

activity and the environment in which it is conducted appear to have a positive impact on preschool physical activity levels.

Like the findings of Cheung (2020), Coleman and Dymont (2013) also discovered educators of young children believe supervision involves interacting with children in their play during outdoor physical activity. Both managers and educators were interviewed in a study conducted by Coleman and Dymont (2013). All managers set the expectation for educators to be actively supervising preschoolers during outdoor play. While some educators interviewed considered their role as a monitor of the children's safety to prevent them from engaging in risky climbing play in the natural areas of the playground, all believed interaction with the children during the outdoor time was part of their role. Educators believed their involvement was essential in helping the children develop movement skills in connection with physical and cognitive development. Unlike the study of Cheung (2020), however, the educators interviewed by Coleman and Dymont (2013) expressed the importance of allowing children to choose their activities and be given time in unstructured free play. The educators in this study also cited more training and professional development opportunities as beneficial in providing them with techniques for games and activities to use during outdoor physical activity times.

Conclusion

Research on preschool outdoor physical activity from around the world reveals educators are concerned about the safety of the children in their care to the extent it often limits what they allow children to do in the play area (McFarland and Laird, 2017; Little and Sweller, 2015; Sandseter and Sando, 2016; Cheung, 2020; Coleman and Dymont, 2013). While the adults are concerned about safety, the children appear to be able to manage the risks and challenges in the outdoor play environment with appropriate support from their teachers (Sandseter, 2010;

Nedovic and Morrissey, 2013; Omidvar, et al., 2019; Herrington and Brussoni, 2015; Zamani, 2017; Coe, 2017). Educators surveyed frequently pointed to the lack of staff on the playground as a limiting factor in the activities they permitted the children to engage in while outside (Little and Sweller 2015; Ebbeck, et al., 2019; Coleman and Dymont, 2013). The outdoor physical activity dynamics risk-taking and natural elements in the play area appear to be beneficial not only for a preschooler's physical development but also for their social, emotional, and cognitive development when supported by early childhood educators.

Methods

Participants

The school in which this study was conducted is a three-year-old preschool through eighth-grade Christian school building in a small rural community in central Iowa. The socioeconomic level of the families served by the school ranges from upper-middle-class to nearly 20% at or below the poverty level. There are approximately 610 students in three-year-old preschool through eighth grade consisting of 93.9% Caucasians, 2.9% Asian Americans, 1.8% African Americans, and 1.3% Latinos.

The outdoor playground settings used for the action research include a natural playscape playground and a traditional playground with a fixed slide and several pieces of climbing equipment. The natural playscape area includes a fallen tree, grassy hill, several tree stumps, a natural wood balance beam, two cement culverts, three trees, a sand area, raised bed garden, child-sized picnic tables, and storage shed containing play accessories that can be requested for use by the children to enhance their play.

The participants in this study were children in the three-year-old preschool program known as Three School. The sample selection for this mixed methods action research was a convenience sample consisting of the students who attend class on Tuesday and Thursday afternoons. The three-year-old students' actions, behaviors, and perceptions as related to engagement in physical activity and ability to gauge appropriate risks and challenges for themselves contributed valuable information for answering the research questions.

There were six children in the Three School class (four males and two females) ranging in age from three years and two months to four years and two months. The researcher was the lead teacher for the class. There were four Caucasian children, one Latino child, and one African

American child in this class. One child came from a home where Spanish is the primary language spoken. One child had developmental delays.

Data Collection

The questions explored through this action research are related to the outdoor play space and three-year-old preschoolers.

- How does the children's level of engagement in physical activity compare in a natural playscape with that on a traditional playground?
- How does the children's ability to gauge appropriate risks and challenges for themselves during their play compare in the natural playscape with that on the traditional playground?

The independent variable is the outdoor space used by the children, either the natural playscape or the traditional playground. It is the independent variable because the researcher can decide which area the class will be using and can gather data as the children play in that specific space.

Dependent variables are the children's level of engagement in physical activity and the children's ability to gauge appropriate risks and challenges for themselves. As a result of where the play occurs-either on the natural playscape or the traditional playground-the researcher was able to observe changes in the children's engagement in physical activity or their ability to gauge appropriate risks and challenges for themselves.

The researcher collected data from videos taken while the students were engaged in outdoor large motor activities on both the natural playscape playground and later in the traditional playground area. The outdoor times were 30-40 minutes in length. The researcher set up the video equipment in a place so the entire playground area could be shown on the video. Because

each outdoor play experience was being recorded, the researcher, who was also the children's teacher, was able to facilitate play experiences as usual by offering support as the children asked for help, providing requested items to enhance play, and engaging in conversation and play activity with the children.

The researcher collected data from each video segment by using tally marks to note engagement in physical activity and the types of risky play the children exhibited during their outdoor time. The data collection sheet included a section to make anecdotal notes related to observed physical activity performed by each student in the class. In this area, the researcher was able to add details or qualifying information to add clarification to the tally marks. By viewing the video of each outdoor session, the researcher was able to observe all students closely and repeatedly to add reliability and validity to the data collected.

Data was collected from the video recording of each 30-40 minute outdoor playtime from October 12, 2021, to November 19, 2021. The researcher viewed each video to collect tally marks for each child's engagement in physical activity and the number of risks and challenges navigated in the play space being used. Anecdotal notes were added to give greater details to the tallies on the spreadsheet. Video footage was stored in Google Photos with accessibility only to the researcher and the school's technology director. Data collected from the video footage was securely stored on the researcher's computer with password protection and was not accessible without the researcher's permission.

Qualitative data from the anecdotal notes taken while viewing the video of each outdoor play session was used to add details and clarification to the tally marks of physical activity engagement and risky play incidents. Observations in each outdoor play space included details about behaviors, perspectives, relationships, and strategies. The quantitative data collected and

entered onto a spreadsheet was organized and then graphed to compare children's ability to gauge appropriate risks and challenges for themselves during their play in the natural playscape with the play on the traditional playground. Two-tailed t-test samples were used to compare students' ability to gauge appropriate risks and challenges for themselves in each of the two play spaces. Finally, the statistical and practical significance of this action research study was determined.

An application for exemption for this action research project was approved and permission to conduct the study was granted by the Northwestern College Institutional Review Board. This research involved normal educational practices by conducting a comparison of outdoor environments and how the children respond to each one. The researcher recognizes the importance of maintaining the confidentiality of data collected, getting informed consent from the students' parents, respecting the research site, ensuring the safety of the participants, and accurately interpreting and presenting the data collected.

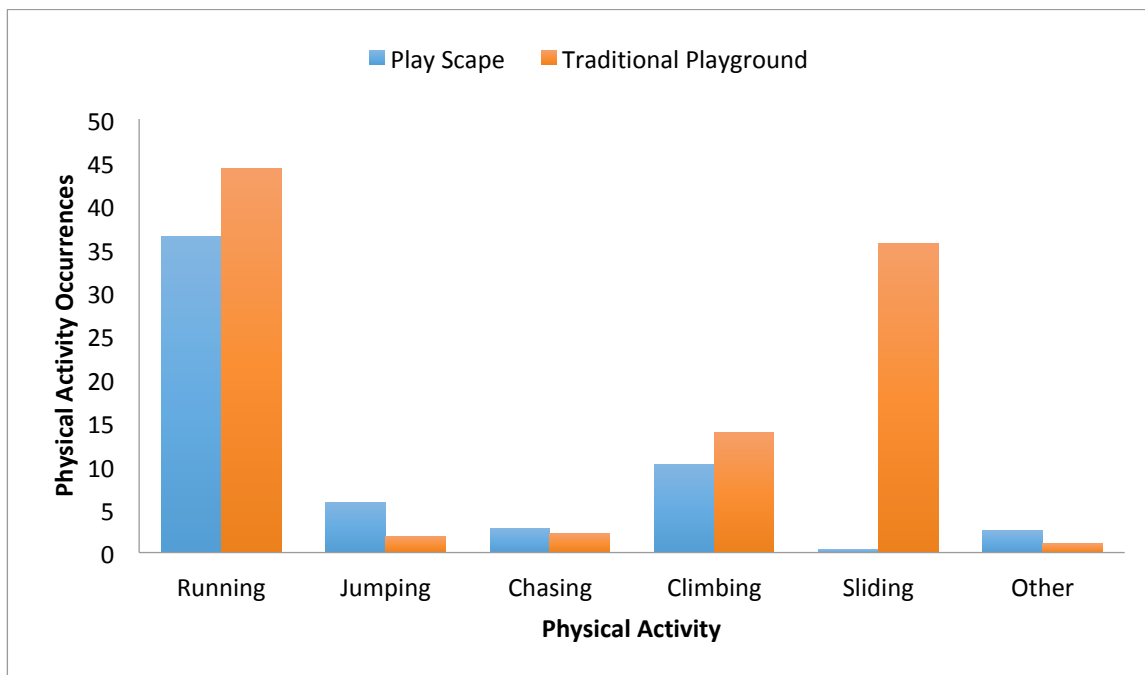
Findings

Data Analysis

To compare physical activity engagement on the natural playscape playground with that on the traditional playground, quantitative data was collected using tally marks from video footage of the outdoor playtimes in both settings. The researcher recorded each child's physical activity engagement in the categories of running, jumping, chasing, climbing, sliding, and other on an excel spreadsheet. Figure 1 compares the engagement in each category of physical activity in both playground settings.

Figure 1

Comparison of Physical Activity Engagement



Dependent samples t-tests were conducted to determine whether there were significant differences in the categories of physical activity engagement while the preschoolers were playing

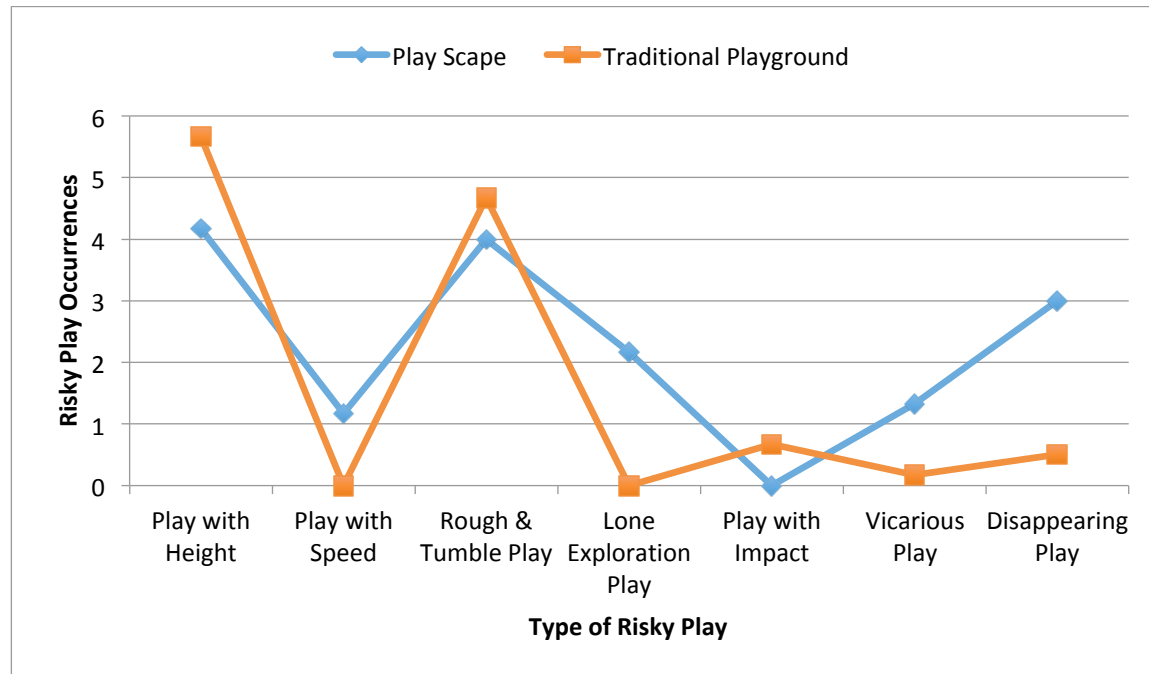
on the natural playscape playground compared to their play on the traditional playground. In the category of running on the playscape ($M=36.50$, $SD=18.45$) compared with running on the traditional playground ($M=44.33$, $SD=17.07$) a two-tailed t-test revealed an insignificant difference between the two areas, $t(5) = -0.98$, $p > .05$. The category for jumping on the playscape ($M=5.83$, $SD=3.71$) compared with jumping on the traditional playground ($M=1.83$, $SD= 1.72$) revealed an insignificant difference between the two areas, $t(5)=2.24$, $p > .05$. The category of chasing on the playscape ($M=2.83$, $SD=2.48$) compared with chasing on the traditional playground ($M=2.17$, $SD=1.72$) revealed an insignificant difference between the two areas, $t(5)=0.53$, $p > .05$. The climbing category on the playscape ($M=10.17$, $SD=5.46$) compared with climbing on the traditional playground ($M=13.83$, $SD=7.49$) showed an insignificant difference between the two areas $t(5)= -0.90$, $p > .05$. The category of sliding on the playscape ($M= .33$, $SD= 0.52$) compared with sliding on the traditional playground ($M=35.67$, $SD=20.56$) showed the most significant difference $t(5)= -4.27$, $p < .05$. The category of other for physical activity engagement on the playscape ($M=2.20$, $SD=1.52$) compared with the traditional playground ($M=1.00$, $SD=0.63$) was an area of insignificant difference $t(5)=1.96$, $p > .05$. In summary, the physical activity area revealing a significant difference was sliding, while the areas of running, jumping, chasing, climbing, and other did not reveal significant differences when comparing the two playground areas.

Quantitative data was collected to make the comparison of the preschoolers' engagement in risky play on the natural playscape playground with the risky play on the traditional playground. Tally marks were gathered from video footage of the outdoor playtimes in both settings. The researcher recorded each child's risky play engagement in categories similar to those identified by Sandseter et al. (2021) including play with height, play with speed, rough and

tumble play, lone exploration play, play with impact, vicarious play, and play where the child would disappear on an excel spreadsheet. Figure 2 compares the engagement in each category of risky play activity in both playground settings.

Figure 2

Comparison of Risky Play Engagement



Dependent samples t-tests were conducted to determine whether there were significant differences in the categories of risky play engagement while the preschoolers were playing on the natural playscape playground compared to their play on the traditional playground. In the category of play with height on the playscape ($M=4.17$, $SD=5.00$) compared with the traditional playground ($M=5.67$, $SD=6.09$), a two-tailed t-test revealed an insignificant difference $t(5) = -2.24$, $p > .05$. The play with speed category on the playscape ($M=1.17$, $SD=0.98$) compared with the traditional playground ($M=0$, $SD=0$), showed a significant difference $t(5) = 2.91$, $p < .05$. Rough and tumble play on the playscape ($M=4.00$, $SD=3.41$) compared with the traditional playground ($M=4.67$, $SD=4.63$) showed an insignificant difference $t(5) = -0.33$, $p > .05$. In the

area of lone exploration play on the playscape ($M=2.17$, $SD=2.99$) compared with the traditional playground ($M=0$, $SD=0$) an insignificant difference was shown $t(5)=1.77$, $p>.05$. Play with impact on the playscape ($M=0$, $SD=0$) compared to the traditional playground ($M=.67$, $SD=.52$) revealed a significant difference $t(5)=-3.16$, $p<.05$. Vicarious play on the playscape ($M=1.33$, $SD=1.21$) compared to the traditional playground ($M=0.17$, $SD=0.41$) showed an insignificant difference $t(5)=2.44$, $p>.05$. The final category of disappearing play on the playscape ($M=2.83$, $SD=2.04$) compared to the traditional playground ($M=0.50$, $SD=0.55$) revealed a significant difference $t(5)=2.65$, $p<.05$. The risky play areas revealing significant differences were playing with speed, play with impact, and disappearing play, while the areas of play with height, rough and tumble play, lone exploration play, and vicarious play did not reveal significant differences when comparing the two playground areas.

Discussion

Summary of Major Findings

In comparing the three-year-old preschoolers' physical activity on the playscape playground with the traditional playground, findings revealed a higher level of engagement in jumping, chasing, and other physical activity on the playscape playground while running, climbing, and sliding was higher on the traditional playground. The fixed equipment on the traditional playground included a slide and several fixed climbing pieces equipment. The video footage from this playground revealed that children were involved in a cyclical pattern of sliding down the slide and then running back to do it again. At times the children would wander over to one of the climbing structures and climb to a comfortable height before taking off for another turn down the slide. This observation was consistent with Sandseter (2010), who identified children's repetitive play as almost obsessive because the excitement they experience is so enjoyable they want to do it again and again. Each play episode lasted less than five minutes and a considerable amount of time was spent queuing to use the equipment, which was consistent with the activity behaviors observed by Herrington and Brussoni (2015). While children were involved in similar activities on the natural playscape playground, the play episodes lasted longer so not as many tally marks were added to the recording sheet. The only area of significant difference was sliding due to the fixed play structure on the traditional playground compared to more natural affordances for sliding on the playscape such as a grassy hill, cement culverts, and a fallen tree which were also used for climbing, running and jumping.

The comparison of the children's navigation of risks and challenges on the two playgrounds revealed higher levels of play with height, rough and tumble play, and play with impact on the traditional playground while play with speed, lone exploration, vicarious, and

disappearing play levels were higher on the playscape. Those with significant differences were playing with impact, play with speed, and disappearing play. Again a relationship with the affordances in each play area was a factor in the observed differences. The playscape's large grassy areas allowed for great running speed and the structures and trees provided ample places for disappearing play while the traditional playground's sliding area challenged students to bump one another as they slid down before others moved off the slide as well as instances of one child attempting to slide down while another was climbing up the slide.

Observations of risky play on both playgrounds revealed findings similar to those of Coe (2017) in that not all children were attracted to the same activities and each uniquely approached the activities. Because the researcher, who was also the children's teacher, video recorded each outdoor play session, she was able to provide safety prompts, reminders, and scaffold techniques to make sure the children were able to manage their risks. The researcher's involvement in the children's activity allowed them to build on their fundamental movement skills and was essential in stimulating areas of development (Coleman and Dymont, 2013). Because each playground has diverse affordances that offer significant variances in both physical activity engagement and the ability to navigate risks and challenges, the teacher should consider utilizing both play areas with her students.

Limitations of the Study

The size of the class for this action research was six students. It is possible with a larger group of three-year-olds there would have been more waiting to use the affordances of each playground and less time engaging in physically active play or navigating risky play. This study was limited to engagement in physical activity and risky play with the fixed structures in each area and did not include sand, the garden area, or the use of any loose parts. The research was

done in the fall before the leaves fell from the trees. Therefore, no leaf raking, snow play, or spring gardening were part of the observations and may have altered the number of physical activity engagements and risky play episodes.

Further Study

The findings from this study of the three-year-old preschoolers' physical activity engagement and ability to navigate risks and challenges in the playscape and traditional playground pique the researcher's curiosity to explore preschool outdoor play in greater detail. A similar study could be done with four-year-old preschoolers to compare their responses with those of the three-year-olds. Another possible study could include action research throughout the entire school year to compare the engagement levels in each playground during the different seasons.

Measuring how loose parts influence the children's play on each playground would be another possible method for expanding this study. By adding balls or sand toys as play accessories, the physical activity engagement data collection could be expanded to include kicking, throwing, or digging. Risky play engagement data collected could also be extended if wheeled toys, rocks, or sticks were added as loose parts. Another consideration could be the influence of a fenced playground compared with an open area for play.

Examining the preschooler's ability to focus at group time in the indoor classroom following time spent outdoors would provide early childhood educators with helpful information to consider when planning the flow of the children's day at school. Research could investigate the ability to focus after playing on the playscape as compared to playing on the traditional playground. Findings from such a study could influence the design of outdoor play spaces.

Results could perhaps be useful in the design and structure of the class schedule and daily routines.

Conclusion

The purpose of this action research project was to determine the relationship between a three-year-old preschooler's physical activity engagement as well as the ability to navigate risks and challenges in the natural playscape play area compared with the traditional playground. A mixed-method study was used to determine if there were significant differences in the children's physical activity engagement in a specific play area. Data was also collected on the preschoolers' risky play experiences in each play space.

Data analysis revealed insignificant differences in running, jumping, chasing, climbing, and other physical activity engagement when comparing the playscape with the traditional playground. However, a significant difference in physical activity engagement in sliding occurred on the traditional playground. The children's choice to slide down the slide over and over again was explained by the research of Sandseter (2010), who identified children's repetitive play as almost obsessive because the excitement they experience is so enjoyable they want to do it again and again.

Analysis of risky play engagement revealed insignificant differences in the areas of play with height, rough and tumble play, lone exploration play, and vicarious play. The risky play categories showing significant differences when comparing the two playground areas were play with speed, play with impact, and disappearing play. The researcher cited reasons for the significant differences that could be attributed to the playscape's large grassy areas, which allowed for great running speed. The structures and trees of the playscape provided ample places for disappearing play while the traditional playground's sliding area challenged students to bump one another as they slid down before others moved off the slide as well as instances of one child attempting to slide down while another was climbing up the slide creating play with impact.

The literature review of this study explored preschoolers' risky play experiences and engagement, components of natural playscape environments, the dynamics of risky play in a playscape environment, and the connections between adult interaction and preschool physical activity engagement. Research on preschool outdoor physical activity from around the world revealed educators are concerned about the safety of the children in their care to the extent it often limits what they allow children to do in the play area (McFarland and Laird, 2017; Little and Sweller, 2015; Sandseter and Sando, 2016; Cheung, 2020; Coleman and Dymont, 2013). While the adults are concerned about safety, the children appear to be able to manage the risks and challenges in the outdoor play environment with appropriate support from their teachers (Sandseter, 2010; Nedovic and Morrissey, 2013; Omidvar, et al., 2019; Herrington and Brussoni, 2015; Zamani, 2017; Coe, 2017). The literature reviewed indicated outdoor physical activity including risky play and natural elements in the play area appear to be beneficial not only for preschoolers' physical development but also for their social, emotional, and cognitive development when supported by early childhood educators.

The decline of children's physical activity over the past decade has influenced the research on the attributes of the outdoor space where children can become fully engaged as they navigate the risks and challenges encountered in their environment (Haga, 2021). The research findings from this study may prove beneficial for early childhood educators and managers to consider as they design outdoor play spaces for the students in their care. The outcomes may also provide information for educators and parents to consider as they facilitate outdoor play, actively participate with the children, and give preschoolers the training and scaffolding necessary to navigate risks and challenges during physical activity engagement. The conclusions could

provide evidence and information for early childhood stakeholders to consider as they determine solutions to reduce inactivity and obesity in young children.

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