

## THESIS

**More than play:  
Promoting moderate-to-vigorous physical activity using  
principles of Outdoor Adventure Education in a Finnish  
Municipal Early Childhood Education and Care Centre**

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**“We do not stop playing because we grow old.  
We grow old because we stop playing.”  
- George Bernard Shaw**

Submitted 22.11.2023.

Bachelor Adventure and Outdoor Education

(210 ECTS)

Humanistinen Ammattikorkeakoulu

# ABSTRACT

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Adventure and Outdoor Education

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Title of thesis: More than Play: Promoting moderate-to-vigorous physical activity using principles of Outdoor Adventure Education in a Finnish Municipal ECEC Centre

Number of pages: 34 and 13 pages of appendices

Supervisor(s) of the thesis: Tero Lämsä

Commissioned by: Raseborg Municipality, Nyland, Finland

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The purpose of this study was to investigate if moderate-to-vigorous physical activity (M-V PA) levels can be increased amongst pre-school children attending a Finnish municipal early childhood education and care centre (ECEC). The role of physical activity as a foundation for healthy lifestyles is well documented. The need to promote more active and less sedentary lifestyles key to reducing the burden of non-communicable diseases. For researching this topic a direct observational physical activity diary using a modified OSRAC-P categories and codes was conducted to collect baseline data. Children (aged 5 to 6 years) were observed during their afternoon outdoor playtime, usually playing while waiting for parent pick-up. Adult-led outdoor activities and games were played with the children for 3 weeks (twice a week) during outdoor afternoon playtime. Principles of Outdoor and Adventure Education were applied using games or activities that favoured moderate-to-vigorous physical movement. Games and activities requiring little to no equipment were prioritised. A post intervention direct observational physical activity diary using OSRAC-P was completed the following week. Quantitative methods were applied to analyse the results. The first week generated 540 observation intervals from 4 to 6 focal children. The final observation diary generated 480 observation intervals from 4 to 6 focal children. The results indicate that physical activity levels increased by 11% for moderate activity and 33 % for vigorous physical activity. Children ranked all the games and activities played during the intervention period, indicating they would play 73 percent of the games again. Future work could see seasonal posters created and a short 3 week introduction program to introduce new games and activities to children. There is a need for future research of a more longitudinal nature to see if school yard games taught at ECEC translate into more active children when they start attending school.

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Keywords: moderate-to-vigorous physical activity ECEC, principles of Outdoor and Adventure education, OSRAC-P, direct observation intervals.

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# 1 INTRODUCTION

This thesis explores whether moderate-to-vigorous physical activity can be increased in children attending a Finnish municipal early education and care centre (ECEC) by using Outdoor and Adventure Education principles during afternoon playtime. A three-week, bi-weekly physical activity program was developed and tested with a target group of 5- to 6-year-old children. Direct observation data was collected pre- and post- intervention to evaluate the physical activity program. Data analysis produced some exciting results in increasing moderate to vigorous physical activity of the target children.

## 1.1 The commissioner

The commissioner of this thesis is Raseborg Municipality (Director of ECEC Centres within Raseborg). Raseborg ECEC interest in how playground/school yard games and activities impact on the children is documented in Raseborg Municipal Early Childhood Education and Care (ECEC) Curriculum Plan (2018, 36). Current ECEC teachers expressed concerns over low stamina and poor coordination function in children attending ECEC. I will summarize the research results, showing the impact of short-term guided outdoor play using Adventure Education principles, on physical activity during afternoon playtime. Using the research results, I will explore recommendations on what can be done to promote the positive aspects of afternoon outdoor playtime and physical activity.

## 1.2 Goals of this thesis

There is no guided or led play during afternoon playtime. This is a period after the 2 pm snack time where children are outside waiting for guardian or parent pick up. I observed operations at the ECEC centre for 6 weeks and noticed that children spent 80% of their afternoon playtime with sedentary or low intensity physical activities. Sitting in sandpits or sitting on swings being the most popular activities. Only 5% of the time was spent playing vigorous activities. I began to wonder, why are there so many sandpit potatoes and swing sloths. Why aren't the children running around playing active games? Is it a case of "if you don't know, you won't know"? Could short-term guided outdoor play using Outdoor and Adventure Education (OAE) principles have an impact on physical activity of children during afternoon playtime? Finding answers to these questions is important by discovering how to activate children, to test and see what works and to learn what could be improved.

The objective of this thesis is to create low threshold outdoor activities using principles of OAE to promote moderate-to-vigorous physical activity (M-V PA). To test these activities with a target group of ECEC children (aged 5-6 years old) to assess any changes in moderate-to-vigorous physical activity. The term of moderate-to-vigorous physical activity (M-VPA) in this thesis follows the same definition used by Kyhälä, Reunamo & Valtonen (2021, 1) that is, “activities during which a child gets hot and breathless”. Finland’s Report Card on Physical Activity (2022, 6) defines “moderate physical activity as physical activity during which the heart rate rises, and breathing becomes faster at least to a certain degree. Vigorous physical activity refers to physical activity during which the heart rate increases, and breathing becomes considerably faster. Moderate-to-vigorous physical activity (M-VPA) is a term that includes both moderate and vigorous activities.”

### **1.3 Creating a low-threshold physical activity program: a bucket of frogs**

Low threshold outdoor activities that promoted moderate-to-vigorous physical activity were created using visual picture prompts. Each game or activity had its own unique picture cue.

Outdoor afternoon activities were planned for a three-week period, with bi-weekly activities. Week 1 focused on high paced physical activity games. Week 2 utilized ball skills as well as high paced activities. Week 3 created balance opportunities and high paced activities. Activities were selected based on physical activity intensity as well as for providing opportunities for children to lead activities. All activities had a focus on teamwork rather than competing to be the best. Children were given the opportunity to explain game or activity rules to the group if the activity was familiar. After playing the game, new rules were suggested and implemented by the children if they agreed on them.

Excitement and anticipation were created by using plastic frogs as a delivery method. Plastic frogs had a small, laminated picture cue attached. Frogs were drawn from the bucket by a child and the activity began. The bucket of frogs delivery method allowed the children to enjoy taking turns drawing a frog from the bucket to discover a game or activity.

Agency and participatory pedagogy were promoted by using a wild card which was included in every session. A child, when drawing the wild card frog, selected and led a game or activity of their choice. Providing opportunities for developing motor and cognitive skills, building stamina, personal growth, emotional-regulation, empathy and communication with peers and

adults were key principles for selecting the activities that were included in the 3-week program. Having fun and playing outdoors as a group, listening to game rules, following rules, and modifying rules, voluntary participation in activities, encouraged joy of movement together and having fun as a group.

UNICEF and the LEGO Foundation (2019, 8) through their research state that agency is “enabling children to take on an active role and ownership in their experiences, as well as recognizing and trusting children to be capable, autonomous, and agents of their own playful learning journeys”. This highlights the importance of having a certain amount of agency in play. Activities were scaffolded to become more complex once the initial activity was learned. For example, balance activities were first conducted on the ground before being raised off the ground. This allowed for children to be successful and to carry this success to a more challenging task.

All games and activities picture cues were placed on laminated posters and together with the children it was decided where the best outdoor placement for the posters would be. These posters would serve as a reminder of the games and activities the children had played during the three-week intervention period. It was also hoped that these visual picture cues would inspire the children the play these games themselves without adult intervention.



Image 1: Bucket of plastic frogs with activity cue cards.



Image 2: Activity posters in situ.

(Outside toy storage shed door)

## 2 BACKGROUND

There are many theories used in Outdoor Adventure Education (OAE) that are used in early childhood education. A brief overview of these parallel theories emphasize hands-on learning, experiential exploration, and holistic development. These contribute to creating meaningful and effective educational experiences for children.

Prouty, Panicucci & Collinson (2017, 63-76) describe Experiential Learning in Outdoor Adventure Education as “using outdoor challenges and activities to promote skill development and personal growth. Increased self-confidence, self-regulation, self-efficacy, problem-solving skills occur at an individual level. In the group context, outcomes like social cohesion, communication skills and learning to function as a team are typical”. In an early childhood setting it is used to encourage hands-on exploration to facilitate cognitive, social, and emotional development.

Outdoor and Adventure Education principles foster physical, mental, and emotional growth through outdoor challenges. “Holistic Development recognizes the importance of fostering child development with an emphasis on cognitive, social, emotional, and physical development through play-based activities”. (National Core Curriculum, 2022, 5, 11)

Both Outdoor Adventure Education and early childhood education align with constructivists learning theories emphasize that individuals actively construct knowledge by interacting with their environment. In ECEC, opportunities are provided for children to build understanding through hands-on experiences rather than passive instruction. It is considered a right of the child. (National Core Curriculum, 2022, 19)

Promoting the development of social and emotional skills are key in both OAE and ECEC. As mentioned previously, adventure activities require teamwork, communication and problem-solving. In early childhood education “emotional regulation, empathy and effective communication are encouraged through interaction with peers and adults”. (Raseborg Municipal ECEC Plan 2018, 12).

Outdoor experiences are recognized to have a positive impact on both adult and children’s physical and mental well-being. The benefits of connecting with the natural world are well documented. Play-based learning approaches used in early childhood education align with the



hands-on and experiential nature of Outdoor Adventure Education, active engagement, and exploration to enhance learning outcomes.

## 2.1 Principles of ECEC in Finland

*“Play is the key working method in ECEC” Finnish National Core Curriculum, 39*

Early Childhood Education and Care (ECEC) in Finland is administrated in accordance with government legislation. It is classified as part of the education and training system and falls under the of the Ministry of Education and Culture. ECEC has undergone major reform in recent years, the latest update in March 2022. A mandatory National Core Curriculum for ECEC now informs more goal-oriented content. The reformed Act on ECEC stipulates the rights of a child to ECEC.

The National Core Curriculum for ECEC is issued by the Finnish National Agency for Education and is used to guide pedagogical plans at the operational level. Finnish children under 7 years old have the right to early childhood education. From the age of 6 pre-school is compulsory and cost free for parents and guardians. (Finnish National Core Curriculum ECEC Regulation OPH-700-2022, 6)

Raseborg Municipal Early Childhood Education and Care Curriculum (2018, 11) states that “learning is a holistic process and happens everywhere. Children learn by playing, moving, exploring, performing tasks, expressing themselves through speech and creative activities. The child’s previous experiences, interests and knowledge become the starting point for learning and children are seen as active agents in this process. Play is central for learning in young children. It provides joy and motivation while learning new skills and acquiring knowledge.”

These are in line with the National Core Curriculum (2022, 37) Framework for Pedagogic Activities in ECEC. The National Core Curriculum states that “working methods that are functional and promote the creativity and participation of children, provide natural ways of learning, include children’s supervised and free play, exploration, physical activity as well as experience of and expression through art.”

Educational plans are developed for children on three levels. First at the national level using the core curriculum to specify the key objectives and content for ECEC, the local service provider (municipal or private ECEC centres) follow the national core curriculum tailored to the

local ECEC centre and then the individual needs of the child are used to create an individual plan. (National Core Curriculum 2022, 6)

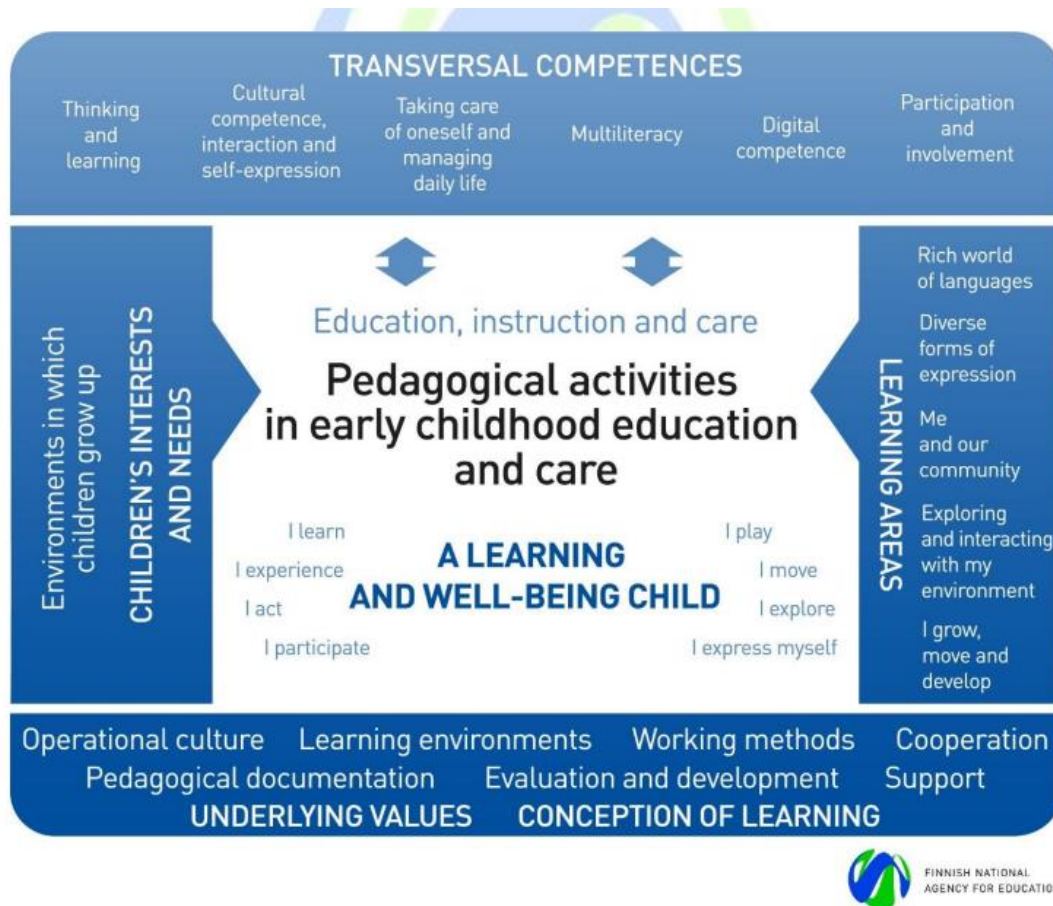


Figure 1: The Framework for Pedagogical Activity in ECEC (National Core Curriculum ECEC 2022, 35)

There are 5 main learning areas that describe the key objectives and contents of pedagogical activities in early childhood education and care. These are:

- the diverse world of languages,
- various forms of expression,
- our community and I,
- I explore and act in my environment,
- I grow, move, and develop.

(National Core Curriculum 2022, 39; Raseborg Municipal ECEC Plan 2018, 31)

For this thesis I will focus on the learning area of I GROW, MOVE AND DEVELOP. This learning area objectives, specified in the National Core Curriculum (2022, 47) related to physical activity, food education, health, and safety. “Children are encouraged to spend time outdoors and engage in physical activity in all the four seasons. Supervised exercise and opportunities for independent physical activity, both indoors and outdoors, are provided daily. Physical activity varying in duration, intensity, and pace, allow the children to develop knowledge of their own bodies as well as core movement skills (balance, locomotor) and manipulative skills.” Physical activity in a group develops children's social skills. Learning interaction and self-regulation skills, practising listening skills, following rules, explaining rules to peers, and playing safely with peers and as a group.

Food education is intended to promote positive attitudes towards food and eating. “Learning to eat independently and obtain sufficient nutrition”. Learning to eat with good table manners and not getting distracted while eating as a group. Health and safety relate to taking care of health and personal hygiene. “Understanding the importance of exercise, rest, and good interpersonal relationships to health and well-being are discussed with children. Traffic safety is also included in safety.” (National Core Curriculum 2022, 48)

The National Core Curriculum (2022, 38) also states that “personnel have the duty to secure the preconditions for playing in line with the principles of inclusion, supervise play, and ensure that each child gets an opportunity to participate in playing together as allowed by their skills and capabilities. Personnel must support the development of the children’s play with a systematic and goal-oriented approach by either guiding it from outside or participating in it.” The impact of adult participation in goal-oriented outdoor children’s play is also explored in this thesis.

## 2.2 Theoretical principles of Outdoor Adventure Education in ECEC

Outdoor adventure Education (OAE) is a very broad field, and it is worth exploring the theoretical principles and how applicable they are to early childhood education. Panicucci & Prouty (2017, 33-48) discuss the supporting theoretical cornerstones of Adventure Education. These supporting theories can be divided into four core themes: **experiential learning theories** focused on learning by doing (Dewey 1938), Constructivists learning (Piaget 1970), Experiential Learning Cycle (Kolb 1984), Intrinsic motivation/self-determination theory (Deci & Ryan, 1985); **optimal arousal theories**, (Yerkes-Dodson law 1908), Optimal arousal-Stretch Zone

Experience (Prouty et al, 2007), Transformative learning (Mezirow 1991); **place-based outdoor learning**, benefits of nature direct and indirect effects of nature on well-being, Biophilia hypothesis (Wilson 1984), Nature-deficit disorder (Louv 2005), and **Psycho-social theories**, social learning theory (Bandura 1971), social constructivism (Vygotsky 1978), group formation theory (Tuckman 1965).

According to Ewert and Sibthorp (2014, 37) Outdoor Adventure Education (OAE) key principles include experience that is analysed and things that are learnt are transferred to other parts of the participants life. It is personalised and learning outcomes are interpreted by the learner. Rather than being a cup to be filled with knowledge, educator and participants are both actively involved in the learning process. Learners are active and the educator guides the process of learning. Learners are physically, emotionally, cognitively, and intellectually engaged in the process.

OAE can be summarised as being holistic, experiential learning based, activities are goal-oriented with the educational intention to contribute to the growth and development of individual as well as the group they function in.

Traditional views of adventure education have interpreted it as involving risk and danger. According to Brown and Beames (2016, 90-92), this view “limits the pedagogical potential of adventure”. They suggest that adventurous learning should begin in the everyday life of the learner. Challenges and learning outcomes that equip learners for real-life challenges rather than artificially constructed physical risk taking. Priest and Gass (2018, 198-201) claim “the concept of adventure is individual specific and because each person has their own level of competence, adventures are experienced differently”. They even go on to say that an adventure is a state of mind.

What is Experiential Learning as a core for adventure education and ECEC?

Experiential Learning is not only a cycle, but it can also be viewed as a spiral or spring, and that with every cycle the depth of understanding and skill is deepened. Experiences are gained and built upon. Learning is reviewed, reformulated with what is already known, tested, and reviewed in a cycle that is not a flat circle but as a three-dimensional spiral.

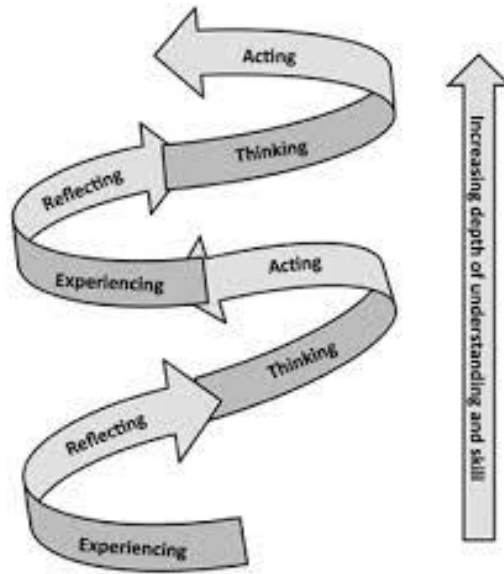


Figure 2: Experiential Learning Cycle Spiral (Kolb 2019)

David Kolb’s most well-known contribution to Experiential Learning is the Kolb Experiential Learning Cycle. The Experiential Learning Cycle (see Figure 3, Kolb 2011). First comes a concrete experience that forms the basis for the next phase. The next phase is observation and reflection. Memorable moments are reflected on by asking specific questions or sharing topics for discussion. These are gathered into a new ‘theory’ based on their experience. The new theory is then tested, this experimenting phase creates new ways of action. These new experiences are reflected upon, and the cycle continues.

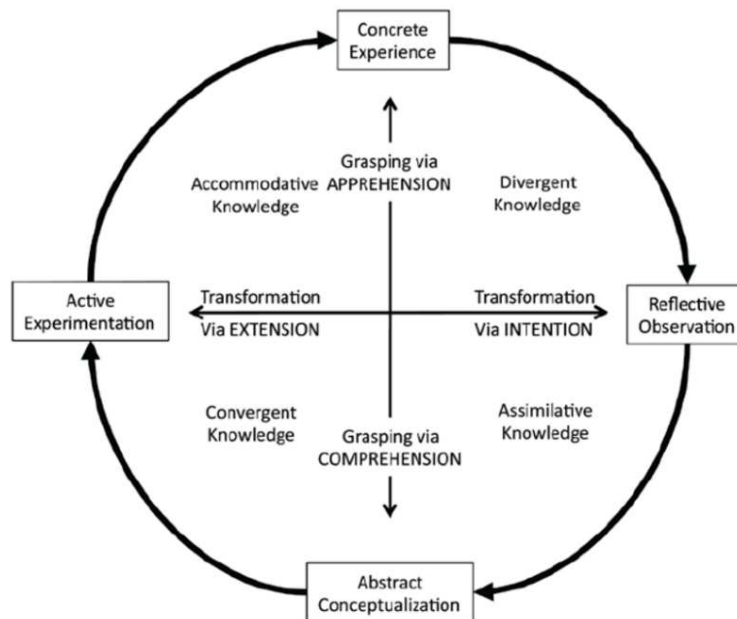


Figure 3: Experiential Learning Cycle (Kolb 2011)

Both Alice Kolb and David Kolb believe that the Experiential Learning Cycle is an adaptable template for the creation of educational programs that actively engage learners in the learning process. (Kolb 2018, 8-14)

Children are naturally curious and learn through their experiences. They are by nature very hands-on and learn with their whole body through authentic experiences. This curiosity and desire to learn new things, revise and repeat what they have learnt, means that experiential learning is a natural learning mode of children. (National Core Curriculum 2022, 19). Allen and Kelly (2015) in chapter 4 on child development and early learning, noted that preschoolers are intuitive and experiential, learning by doing rather than figuring things out “in the head.” This makes shared activities with educators and peers valuable opportunities for cognitive growth.

Creating a safe, positive learning environment through Rohnke’s (1989) ‘challenge by choice’ is common practice in outdoor and adventure education. Priest & Gass (2018, 200) observed that by having the freedom to make real choices is important for empowerment, and personal growth. When learners are able to choose their level of involvement, flow experiences can be created. Flow is also experienced when skill and challenge are appropriately balanced, the task not too easy and not too difficult.

Csikszentmihalyi (2008, 3-4) describes flow is an “optimal psychological state that occurs when a learner’s task or activity is appropriately challenging to their skill level”. Feeling totally absorbed in what you are doing and being so focused that you lose track of time indicate the flow state. The key to flow state is to ensure the challenge level is suitable for the skill level. A task seen as too easy may create boredom and a task seen as too difficult may cause anxiety or worry.

Lev Vygotsky (1978), a constructivist theorist in cognitive psychology, states “that learning needs to be practical and authentic in the child’s environment and based on their daily lives”. He found that during social interaction, young children’s cognitive development improved. His Zone of Proximal Development (ZPD) theory postulates that in cognitive development, children progress past their ‘zone’ with support and social interaction from more mature thinkers. (Saracho 2021, 20-22)

The constructivists’ view of learning for young children is that they need to be actively involved in the learning process and initiate most of their educational activities. Jerome Bruner (1960)

believed that children's natural curiosity and yearning for learning was lost if a task was too difficult for them. He noted that "tasks should be challenging but should not be overwhelming". Scaffolding is building upon the child's current skill, to challenge but not to overwhelm. (Sara-cho 2021, 20-22)

Sequencing or the order in which activities are presented is another important part of adventure-based curriculum. (Bisson C. 1998, 3-4) Activities are sequenced in a logical order, progressing from simple to more challenging activities. Sequencing embraces the concept of scaffolding, where skills and knowledge are built upon existing skills and knowledge.

Transfer is another key principle of OAE. The transfer of learning from one activity to another part of their life. Priest and Gass (2018, 283-284) state that transfer is "the process of integrating elements of one learning environment to another learning environment". I think the sustainability of transfer needs to be explored further, examining if the results of the intervention diminish over time.

The benefits of being outdoors has been recognised in learning and child development. Fresh air improves brain and body function. Being outdoors impacts social and emotional well-being positively. I witnessed children's sense of joy and wonder as a squirrel was spotted in nearby trees or a flock of birds flew overhead or just enjoying the sensation of wind in their faces, these moments are available outdoors. Bento & Dias (2017, 157) describe the "outdoors as an open and constantly changing environment where children can experience freedom, gross and boisterous movements". Contact with natural elements, sunshine and fresh air contributes to a better immune system and stronger bone density.

### **2.3 Why is physical activity important in child development in ECEC?**

Motor learning and physical activity are core to early childhood pedagogy. Motor learning and movement promotes holistic growth and learning while laying the foundations for a physically active and healthy lifestyle. Kyhälä, Reunamo & Valtonen (2021, 1-2) noted that physical activity patterns and fitness start to develop in the early years and that the stability of these patterns is moderate or high along the life course. Learning to move and moving to learn promote activities that support children's motor development as well as socio-emotional and cognitive thinking skills.

Karvonen, Ukkonen-Mikkola, Fenyvesi, Salonen, Erkkilä, Laine, Hellden-Paavola & Taittonen (2022, 80) discuss motor development, motor learning and motor skills develop during early childhood. They state that motor development is partially determined by genetics, but environment and opportunities offered for physical activity impact the level of proficiency reached. Importantly, motor learning occurs through experience and practice which leads to permanent changes in motor behaviour. Finland's Report Card on Physical Activity (2022, 42) echoed Kyhälä's findings that motor competence is higher in children who are more physically active. Low motor competence in pre-school will impact children's current and future physical activity levels as they mature.

Finland's Report Card on Physical Activity (2022, 20) recommend that pre-school aged children should get the most physical activity from active play and outdoor activity. The World Health Organizations' guidelines on physical activity for children under 5 years of age should spend at least an average of 180 minutes of various types of physical activities at any intensity, of which 60 minutes is moderate-to-vigorous, mostly aerobic, physical activity per 24-hour period. (WHO Guidelines on physical activity, sedentary behaviour, and sleep for children under 5 years of age.) They recommend that children over 5 should average 60 minutes per day moderate-to-vigorous intensity, mostly aerobic physical activity. These activities also should include muscle and bone strengthening activities at least 3 days per week, with attention to flexibility and that recreational screen time should be limited.

The European Union physical activity recommendations follow the WHO guidelines. Finnish ECEC physical activity recommendations from 2016 state that a child needs at least 3 hours of physical activity of varying intensity every day, two of those hours' light physical activity and brisk outdoor activities and one hour of moderate-to-vigorous physical activity. Children should not be sedentary for more than one hour and children should practice basic motor skills every day in different ways during all the seasons of the year. (Ministry of Education and Culture 2016)

Outdoor play is important and provides children with opportunities for more freedom of movement and to be more physically active. Boisterous physical activity is permitted outdoors whereas it is not permitted indoors. Keniger, Gaston, Irvine & Fuller (2013, 928) noted that "outdoor play improves concentration and attention span while promoting positive feelings of joy and excitement".



## 2.4 Current research examining physical activity of children in ECEC

Finland's Report Card on Physical Activity 2022 is compiled by five Finnish research institutes and a working group with specialists from research, policy or practices related to physical activity among children and adolescents. Finland's Report Card on physical activity is part of the international Active Healthy Kids Global Alliance. A summary of the physical activity of children and adolescents in 60 countries was published in October 2022. Key findings echo global trends in "the ability of children and adolescents to be active at an intense level for longer periods of time has decreased over the past 30 years". (2022, 28)

Finland's Report Card on Physical Activity (2022, 8, 26) gave ECEC a grade B- for physical activity and noted that preschool-aged children 2–6-year-olds use digital devices for an average of 1.6 hours per day on weekdays and 2.2 hours per day on weekend days. There are no differences between boys and girls. The use of digital devices increases with age. Time spent sitting or being physically passive for long periods of time are linked to poorer health. Partially replacing excessive sedentary time with moderate-to-vigorous physical activity promotes health.

Kyhälä, Reunamo & Valtonen (2021, 22) noted that moderate to vigorous physical activity can be equally encouraged across genders with teacher-led rule play. Age appropriate, physically active, rule play is valuable in enhancing moderate to vigorous physical activity. Their findings suggest that time spent non-goal-directed activities, "hanging out" could be used to promote physical activity with the use of an activity dice or activity cards that tell children what to do. They also suggest that educators need more knowledge of moderate-to-vigorous physical activity (M-VPA) as well as skills in implementing M-VPA activities across the curriculum. They discuss the need to reassess highly active, "not allowed" activities in the playground. I observed that when to intervene in rough and tumble active physical activity and when to let it go in favour of more active children is completely dependent on the adult present in the playground.

Finland has national promotion programmes for physical activity and physical exercise. On The Move promotes a physically active lifestyle for different age groups and demographics. These include Families on the Move, Joy in Motion, Schools on the Move. JOYPAM study found that parents' roles by setting an example, encourage and facilitate their children's physical activity,

along with grandparents, siblings, and local community. As age increases, how friends spend their time, affects the physical activity of young people. (Finland's Report Card 2022, 40)

Monica Frilander from Säynätsalo daycare and school was interviewed in Finland's Report Card on Physical Activity (2022, 41-42) she commented that 4–6-year-olds accumulate lighter physical activity according to the daily recommendations but more opportunities for moderate-to-vigorous physical activity are needed at home and in early childhood education. I observed during my internship, that taking children to spend time in a forest does not automatically increase physical activity, not counting transitional physical activity (walking to and from the forest). I watched children standing around in the forest like trees in the forest, they were very still. I agree with Frilander that children often want adults to be involved in play. Frilander stated that this promoted more active play and even encouraged children who might not otherwise be active, to take part.

## **2.5 Impact of physical activity in ECEC on future physical activity of children**

Early childhood education and care (ECEC) centres are key to support physical activity of children. They are the ideal setting for promoting physical activity, they have access to numbers of children and have equipment that encourages a child to run and climb. Lum, Wolfenden, Jones, Grady, Christian, Reilly & Yoong (2022, 2) note that “physical activity in early childhood can help establish physical activity behaviours that track into adulthood. Learned physical activity in early childhood helps reduce the risk of chronic disease”. According to Kyhälä, Reunamo & Valtonen (2021, 1-2), physical activity is important for young children because physical activity patterns and fitness develop in the early years and the stability of these patterns is moderate or high along the life course.

Encouraging moderate-to-vigorous physical activity in early childhood helps combat noncommunicable diseases of which inactivity is a leading risk factor. According to Lum et al(2022, 2) 7 percent of the global burden of cardiovascular disease can be linked to physical inactivity. Equipping children with joy for physical activity is setting them for success.

Finland's Report Card on Physical Activity (2022, 5) points out that the challenge of insufficient physical activity cannot be solved only by promoting participation in organised sports and physical activity. “Physical activity is needed as an everyday activity”. It is important that

children and adolescents who participated in organised physical activity also have a variety of other physical activity and sufficient daily activity.

Physical activity is critical to optimal growth and development of young children. Coe (2020, 16) goes on to state that “physical activity during early childhood has been linked to positive health, improved motor skill development, and continued physical activity later in life”.

In summary, physical activity in ECEC setting impacts the future physical activity of children. Early childhood is crucial for establishing lifelong habits. Regular physical activity is more likely to be then viewed as a normal part of their daily routine. Developing fundamental motor skills in early childhood are built upon in later life. Physically active children are less likely to have weight issues that impact their long-term health. Physical activity has been shown to improve cognitive function, attention, and mood in children. Physical activities that involve group play foster social skills and a sense of belonging to a group. Developing enjoyment in physical activity at a young age can lead to lifelong enjoyment of fitness and being physically active. Children who find physical activities fun are more likely to continue them into adolescence and adulthood.

## **3 RESEARCH METHODS**

### **3.1 Methodology**

The goal of this thesis is to collect and analyze data pre- and post- intervention. Quantitative methods were applied to analyse the impact of adult-led outdoor afternoon activities had on the target group. A comparison of the observation intervals was conducted using descriptive statistics. Tables and graphs show the differences between pre- and post- intervention observation intervals. Informal interviews with staff on playground duty gather qualitative data. Questions were standardized for both staff members.

### **3.2 Data collection**

#### **3.2.1 Direct Observation using OSRAC-P data collection**

Using a modified Observational System for Recording Physical Activity in Children-Preschool (OSRAC-P) direct observation intervals were collected. Seven observation categories were used and the observation codes for these categories followed as those set out in the OSRAC-P Training Manual for Observers. The OSRAC-P Training Manual for Observers is located in appendix 1. Observation intervals were collected both pre- and post- intervention.

The seven categories observed included physical activity level, type of activity, location of activity, context of activity, initiator of activity, group composition and prompt for physical activity. Physical activity was recorded using 5 levels of activity increasing with intensity from 1 to 5. (1 stationary, 2 stationary/limbs, 3 slow/easy, 4 moderate and 5 fast). Types of activity had 17 codes, location was coded as indoor, outdoor or transition, context of activity had 13 codes, initiator was coded as adult, child or cannot tell. Group composition was coded as solitary, one on one adult, one on one peer, group with adult or group peer. Prompt for physical activity used 5 codes. No prompt, teacher prompt to increase activity, teacher prompt to decrease activity, peer prompt to increase activity and peer prompt to decrease activity.

Direct observation using OSRAC-P categories and codes to collect data. (Brown, Pfeiffer, McIver, Dowda, Almeida & Pate 2006). Observations used the OSRAC-P protocol of 30 second observation intervals. A focal child is observed for 5 seconds, and their observation recorded within 25 seconds. Two observation intervals per minute per focal child.

### **3.3 Data Analysis**

#### **3.3.1 Using interval observations and gathering teacher perspectives**

Direct interval observations are a data collection technique where a behaviour is researched by using systematic observations and counting when a behaviour or event is observed. Descriptive statistical methods are used in analysing interval data, frequency distribution: showing the frequency with which each event or behaviour occurs.

To analyse data from the direct observation, I compared the frequency of an event or behaviour occurring. The percentage of how many observation intervals for the group were calculated and I compared the pre- and post-intervention observation interval percentages.

An informal interview of 2 staff using semi-structured questions is used to gather teacher perspectives and observations. The interviews were short in nature and notes made regarding their observations of physical activity. Teaching staff shared their observations of the intervention, how the intervention impacted outdoor playtime, how the picture prompt poster functioned and any other observations they noted during outdoor playtime. The interview questions and answers are in appendix 2.

## 4 RESEARCH RESULTS

### 4.1 Results

During week 1 there were 2 observation periods that generated 540 observation intervals for baseline data collection observing 4 to 5 focal children. There were 60 observation intervals generated per focal child. Post intervention observations (week 5) generated a total of 480 observation intervals from the first observation period. Only 120 of the observation intervals were from the second observation period in week 5.

<b>OSRAC-P OBSERVATION RESULTS</b>	<b>PRE-INTERVENTION</b>	<b>% OF OBSERV</b>	<b>POST-INTERVENTION</b>	<b>% OF OBSERV</b>
<b>A PHYSICAL ACTIVITY</b>		<b>n=540</b>		<b>n=480</b>
STATIONARY	39	7.2	32	6.67
LIMBS	118	21.85	52	10.83
SLOW/EASY	284	52.59	92	19.16
MODERATE	81	15	126	26.25
FAST	18	3.33	178	37.08
CAN'T TELL				
TOTAL	540	100%	480	100%

Table 1: Physical Activity Results

<b>OSRAC-P OBSERVATION RESULTS</b>	<b>PRE-INTERVENTION</b>	<b>% OF OBSERV</b>	<b>POST-INTERVENTION</b>	<b>% OF OBSERV</b>
<b>B TYPE of ACTIVITY</b>		<b>n=540</b>		<b>n=480</b>
CLIMB	22	4.07	42	8.75
JUMP/SKIP	18	3.33	30	6.25
LIE DOWN	8	1.48		
ROUGH&TUMBLE	4	0.74		
RIDE	20	3.7	18	3.75
RUN	56	10.37	238	49.58
SIT/SQUAT	118	21.85	6	1.25
STAND	30	5.56	78	16.25
SWING	238	44.07	48	10
WALK	26	4.81	20	4.17
CAN'T TELL				
TOTAL	540	100%	480	100%

Table 2: Type of Activity Results

<b>OSRAC-P OBSERVATION RESULTS</b>	PRE-INTER-VENTION	% OF OBSERV	POST-INTER-VENTION	% OF OBSERV
<b>E CONTEXT of ACTIVITY</b>				
FIXED slide swings	266	49.26	94	19.58
GAME formal			190	39.58
OPEN SPACE	170	31.48	178	37.08
SANDBOX	78	14.44		
SOCIO PROPS cars, buckets	6	1.11		
WHEEL riding or push toys	20	3.7	18	3.75
CAN'T TELL				
TOTAL	540	100%	480	100%

Table 3: Context of Activity Results

<b>OSRAC-P OBSERVATION RESULTS</b>	PRE-INTER-VENTION	% OF OBSERV	POST-INTER-VENTION	% OF OBSERV
<b>G GROUP COMPOSITION</b>		n=540		n=480
SOLITARY	50	9.26	40	8.33
1-1 ADULT	10	1.85	4	0.83
1-1 PEER	440	81.48	98	20.42
GROUP ADULT				
GROUP PEER	40	7.4	338	70.42
CT				
TOTAL	540	100%	480	100%

Table 4. Group Composition Results

## 4.2 Reliability

The OSRAC-P is a recognised research method and has been widely used in hundreds of studies since its initial inception in 2002. Using OSRAC-P direct interval observation method for data collection is a valid and reliable tool (Brown, Pfeiffer, McIver, Dowda, Almeida & Pate 2006). Following OSRAC-P Observer Training Manual Protocol reduces observer bias as strict coding rules were followed. Direct observation method is subjective and observer bias may be present as there was no observer comparison of observations. Two observers would be able to compare observations for inter-observer agreement confirming observer reliability.

It is my belief that the study is dependable and confirmable as I have maintained a clear audit trail, and the results are based on the gathered data. I have been aware of my own impact on the research subjects and the role the Hawthorne Effect may have on the final observation period.

### 4.3 Critical Points

Did the morning activities have an impact on energy levels of children for the afternoon activities? Tuesday mornings are generally a forest morning where children spent up to 2 hours playing in nearby forests. Thursday mornings are gym mornings where children walk to and from the local primary school for an hour of PE (physical education) at an indoor sports hall or play in the village park.

As the observer of physical activity, the children did not interact with me for the first observation periods. However, after running outdoor games and activities with the children for 3 weeks, during the second observation periods, the children wanted me to play with them. I had bandaged my knee and told them I was unable to play with them because of my sore knee. I also told them that I was observing the Finnish speaking children to see how they played. This satisfied the children, and they ran off to play. My role of leading games and activities during the intervention period may have influenced how the children played in the post-intervention observation period. The children associated me with games and activities, my presence may have been a prompt for them to play the games we had played together. The Hawthorne effect may have influenced the results. The Hawthorne effect occurs when a research subject changes their behaviour because of being observed, rather than as a result of an intervention.

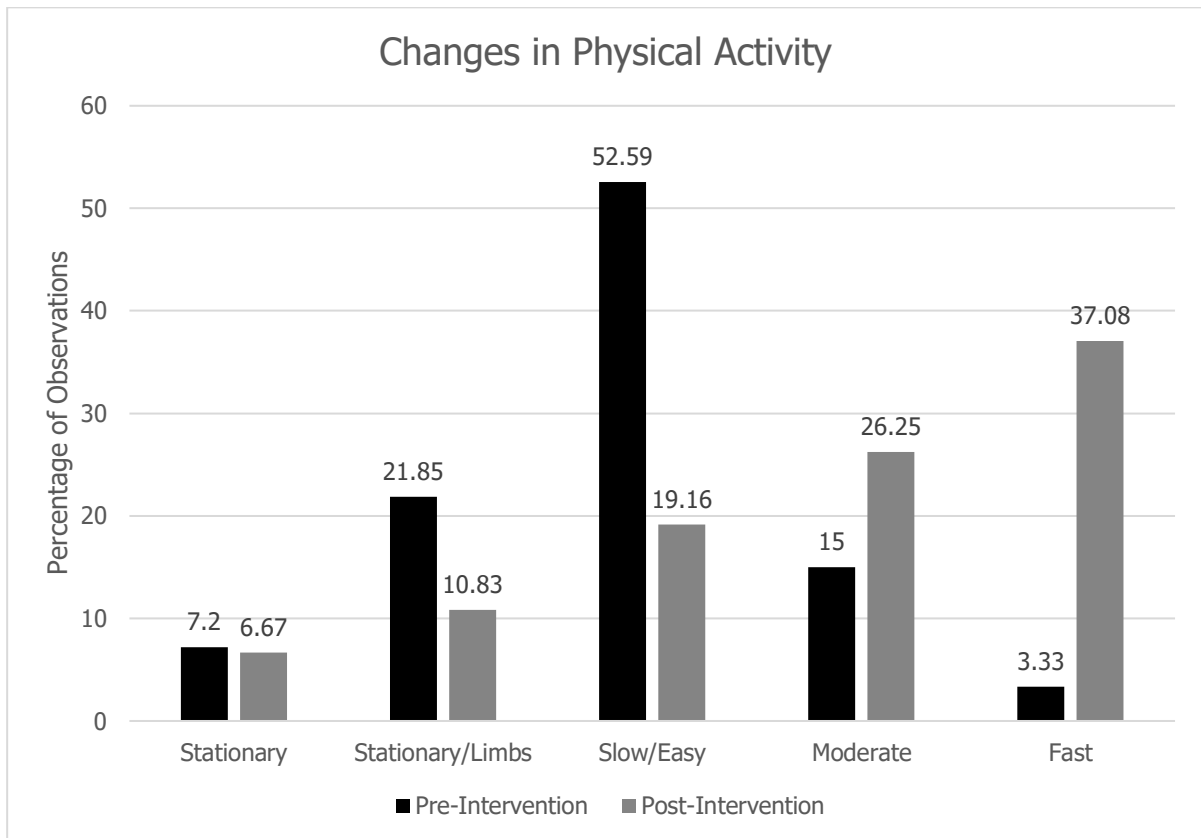
Kassiani Nikolopoulou (2022) noted that it is difficult to determine exactly how participant awareness impacts study results. Her suggestions to help reduce the Hawthorne effect include maintaining a sustained contact with participants because time reduces participant reactivity and improves the quality of data collection. By giving participant red herring tasks to complete that are unrelated to the study, takes their focus off what is being observed. Covert observation, where ethically possible, is another strategy. I did consider observing from a second-floor window but the whole playground was not visible and verbal interactions between the children would be missed. Other studies filmed the physical activity and observed from the screen, however they also experienced problems with children not being always visible.

There were a higher number of observation intervals in the first observation period than the second observation period. Research subjects were collected from ECEC centre early on Thursday of the final observation period reducing the total number of observation intervals. To compare the pre- and post- intervention observation intervals, they were converted into percentage of observation intervals.



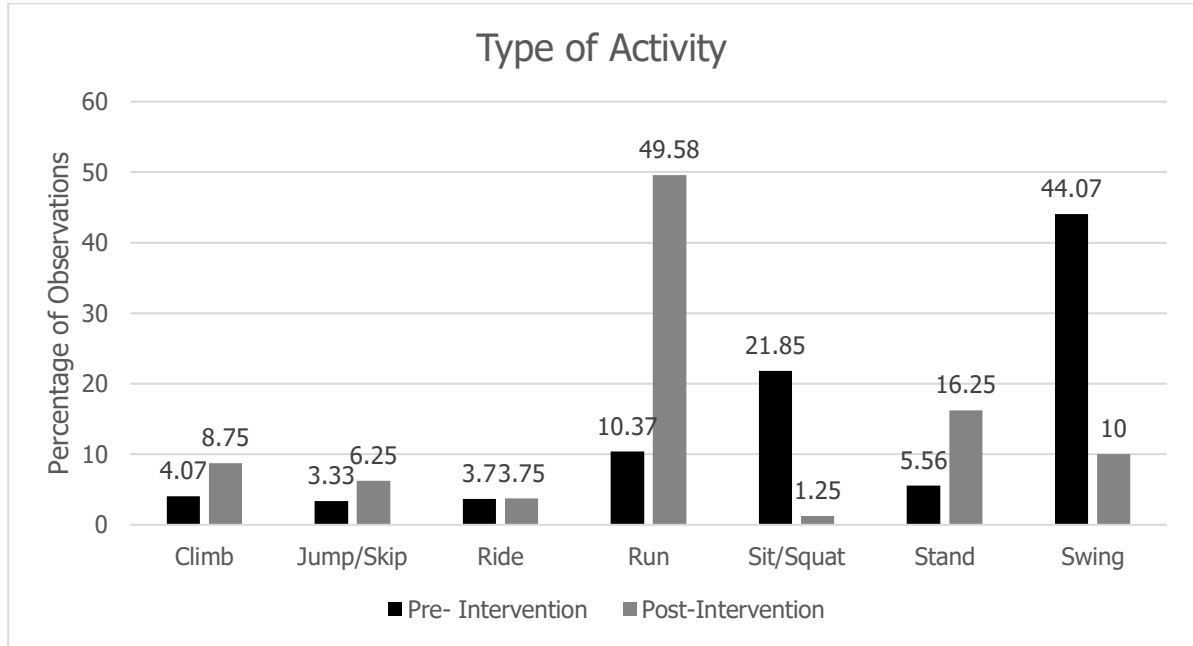
## 5 ANALYSIS OF RESEARCH RESULTS

The results shown in graph 1 clearly demonstrate the differences in pre- and post- intervention observation intervals. There was an increase in moderate activity by 11% and a much larger increase in fast or vigorous physical activity by 33% in the children.



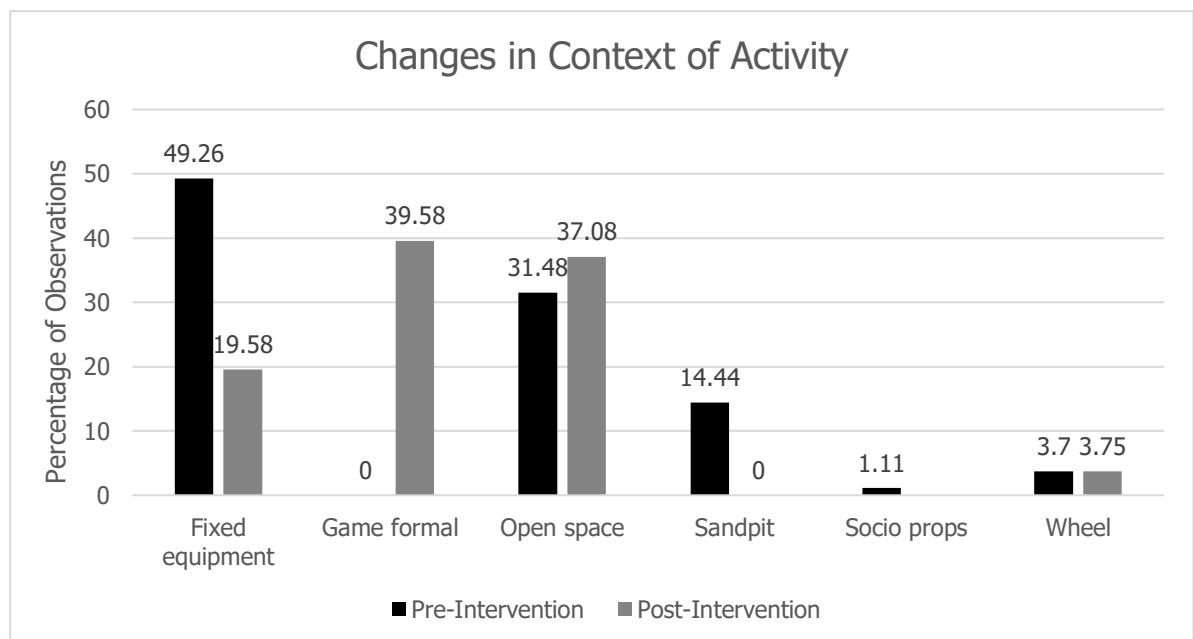
Graph 1: Observation intervals Physical Activity

Graph 2 highlights the changes in the type of activity with slight increases in climbing and jumping/skipping, but the largest increase of 39% was for running. The children ran more post-intervention and spent less time on the swings. There was a 10% increase in standing post-intervention as children spent time selecting games from the activity poster or deciding which game to play amongst themselves.



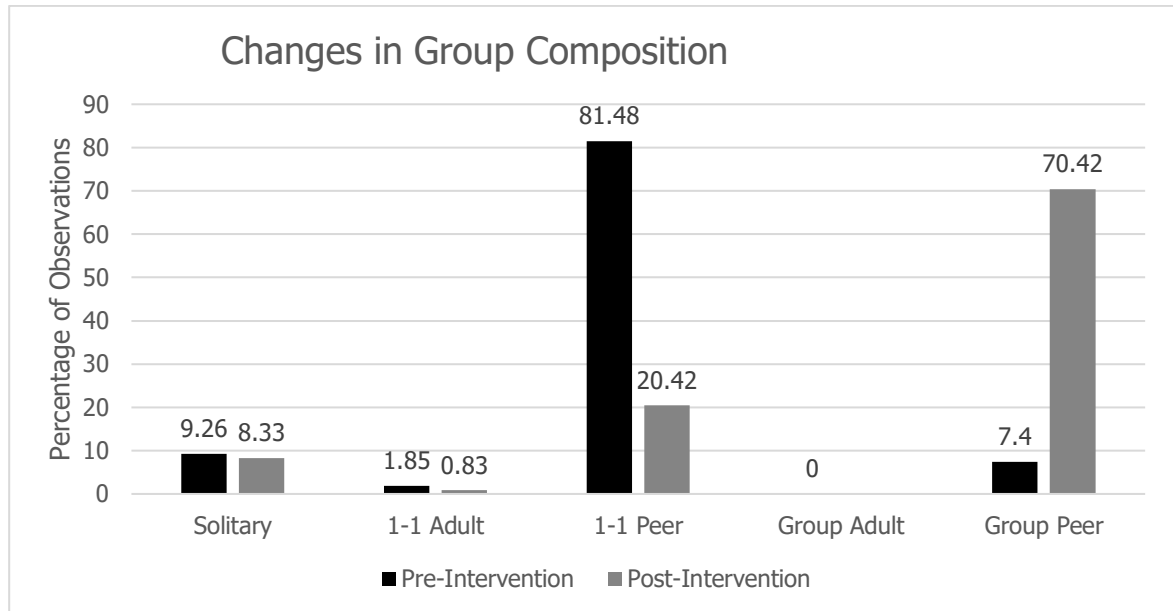
Graph 2: Observation intervals Type of Activity

Graph 3 compares the changes occurring in the context of play. Playing on fixed equipment (slides or swings) fell by almost 30% and none of the children played in the sandpit during post-intervention observations. Graph 3 highlights this move away from sedentary context to more active context. Open space usage increased slightly, and the playing of formal games jumped from zero to almost 40%.



Graph 3: Observation intervals Context of Activity

The most significant and unexpected changes occurred in the group composition observations. Graph 4 highlights how pre-intervention children played predominantly in pairs or alone. Post-intervention, children played as a group, an increase of 63%.



Graph 4: Observation intervals Group Composition

Children ranked the games and activities in the final outdoor play session. Coloured plastic rings were placed on the ground and children placed activity picture prompt cards into them. The green ring meant yes; I will play this game again. The yellow ring meant; I will maybe play this game again and the red ring meant; I would not like to play this game again. 73.3% of all games and activities were placed in the green ring, 6.7% in the yellow ring and 20% in the red ring. The children preferred the running tag games and balance activities compared to the ball games.



Image 3, 4 and 5: Children ranking activities and games into coloured rings.

Feedback from the teaching staff varied. One teacher said that the intervention “was very successful”. Noting that the children are playing games independently when they have outdoor playtime. They are more active playing chasing games. The older children are teaching the younger children the games. “Some older kids get frustrated when a younger child walks off mid explanation of the game’s rules”. Teacher 2 stated the children are more active, but they are even more active when you are in the playground. The children are playing more as a group and less in pairs.

Teacher 1 observed that children referred to the poster for inspiration and selected games to play from it and suggested that a poster that included rules of the games could be included. Teacher 2 observed that the children used the poster to select games but not so much. “They use it more when you are present. I think they see you as a visual prompt to play the games you have taught them.” Both teachers observed that the children are playing more as a large group. These teacher comments highlight the possible impact of the Hawthorne Effect on the results. The children increasing their activity levels because of my presence in the playground.

Another important researcher observation was the impact of place where games are taught. One of the intervention activity afternoons was instructed indoors, a teacher’s request. The program was modified to do more balance, teamwork activities and less running, however one running game was taught, Crocodile. When the Crocodile game prompt was presented again outdoors the following activity afternoon a child commented that “oh that’s an indoor game, we can’t play that out here.” I was surprised by this and started to realise that where the children learn a game has an impact on where they perceive that they can play the game.

## 6 CONCLUSION

The goal of this thesis was to find out how this intervention influenced the physical activity children in ECEC. Afternoon guided play has increased the physical activity of the children. The results clearly demonstrate there was an increase in moderate to vigorous physical activity by 11% and 33% respectively. As a result of guided outdoor activities, the children played more active games during their outdoor afternoon free playtime.

Unexpected findings were in the changes in group composition. Children moved away from playing in pairs or alone to playing games as a large group. The laminated picture prompt activity posters were used by children without adult prompting, for selecting games to play as a group.

Playing these rule-based games and activities increased moderate to vigorous physical activity of the target children. I think the children also demonstrated that they are also capable of autonomous play if provided with a repertoire of games and activities, and that these have been modelled with them, laying the foundation for a type of “code of conduct” when playing group games.

### 6.1 Outcomes and future development for ECEC

What do these findings mean for physical activities in ECEC settings?

ECEC centres are well positioned to create a positive impact on child health by providing opportunities for physical activity. As noted by Saunders, Dowda, Pfeiffer, Brown & Pate (2019, 3) ECEC centre policies and operating practices along with favourable environmental characteristics are known to influence children’s physical activity levels. While Barbosa (2016, 4) recognised that outdoor activities initiated by children resulted in higher levels of M-VPA, however it should be noted that swings and sandpits may limit physical activity.

It is my belief that ECEC centres can promote M-VPA through adult led outdoor activities that focus on the learning of rule-based games that can be played as a group. Initial activities led or guided by adults that phase into children being self-directed or autonomous game and activity players. I recommend exploring the implementation of short-term adult led rule-based outdoor activities to encourage M-VPA during afternoon outdoor playtime.

## 6.2 Reflection and future research

Areas for future research include the development of a seasonal 3 week bi-weekly program for M-VPA for afternoon free playtime. This could include the development of seasonal activity picture prompt posters that change every season. Further studies should observe M-VPA in children over a longer period of time to assess the sustainability of the increased physical activity. Research focusing on the transference of games and activities learnt in ECEC setting to the primary school playground as the children leave ECEC behind to start school. Exploration of the role of educators being physically active in the physical activities that they teach. The impact of teacher encouragement and involvement in physical activity in increasing children's physical activity levels could be investigated.

Should adult-led physical activities be included during afternoon playtime? Do the benefits of increased physical activity and increased group inclusiveness warrant investment in this? Should the role of afternoon outdoor playtime be reviewed through the physical activity lens and the policies of the ECEC centre changed to include adult participation in play? Should the early childhood operational culture use afternoon playtime as an opportunity for encouraging more M-VPA, helping children reach their daily recommendations for physical activity?

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## APPENDICES

### Appendix 1: OSRAC-P CODING SYSTEM FOR RECORDING PHYSICAL ACTIVITY IN PRE-SCHOOL CHILDREN

Observational System for Recording Physical Activity in Children Preschool (OSRAC-P)

OSRAC-P Training Manual for Observers

Link for full manual

[https://sc.edu/study/colleges\\_schools/public\\_health/research/research\\_centers/usc\\_cparg/instruments/osracpm.pdf](https://sc.edu/study/colleges_schools/public_health/research/research_centers/usc_cparg/instruments/osracpm.pdf)

The OSRAC-P Coding System was initially developed in 2002. It is a combination of three different observational systems, the CARS [by Jackie Puhl et al.], the CASPER II [by William H. Brown, Samuel L. Odom, Ariane Holcombe, and Grant Youngquist for the Early Childhood Research Institute on Inclusion (ECRII) which was funded by the Early Education Programs for Children with Disabilities (EEPCD) of the U.S. Department of Education (Grant #H024K40004)], and the Observational System for the Environmental Determinants of Physical Activity in Preschool Children Study [which was funded by Gerber Foods]. William H. Brown, M. João Almeida, Karin A. Pfeiffer, and Kerry L. McIver made the modifications and developed the OSRAC-P during the summer of 2003, while funded by the National Institutes of Health (NIH), National Institute of Child Health and Human Development (NICHD, Grant #R01 HD43125-01). Jon Tapp developed the Interval Manager System (INTMAN) for the Dell Axim X5 handheld computers.

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The Observational System for Recording Physical Activity in Children- Preschool (OSRAC-P) is a direct observational system designed to collect information about children's physical activity in preschools (e.g., classrooms, child care settings) and the behavioral (e.g., prompts for physical activity) and contextual circumstances (e.g., location of physical activity, immediate educational/play context, group composition) of their physical activity in those environments. The OSRAC-P is known as a focal child system because a single child serves as the focus of the observation and all decisions about categories to be coded are made in reference to that focal child. The OSRAC-P consists of three types of coding categories: (a) those that give information about the focal child's physical activity level or intensity and type, (b) those that give information about the focal child's physical environment (e.g., location indoor or outdoor, immediate educational/play context) and (c) those that give information about the social environment relative to the focal child (i.e., group composition, activity initiator, and prompts). The OSRAC-P system incorporates a momentary time sample procedure for collecting observational information. Using this procedure, observers watch a child for a five-second observation interval and then, during the next 25 seconds, record one code for each of the eight variables. Five-second observation intervals are repeated every 25 seconds across a 30 minute period of time to create an individual session for each focal child. Observational data are collected on Dell Axim handheld computers and later downloaded into a database. The data obtained from the OSRAC-P can provide systematic information about preschool children's physical activity and the contextual and behavioral circumstances of their physical activity. In addition, the temporal relationships among physical activity and physical and social circumstances can be systematically recorded and analyzed.

Contents of The OSRAC-P Manual The OSRAC-P Manual begins with an I. INTRODUCTION. In the next section, entitled II. CODES AND CODE NAMES, we provide the observational codes and their respective names arranged by physical activity and contextual and behavioral categories. For example, the first category is Physical Activity Level and it has five possible options (i.e., stationary/motionless, stationary with movement of limbs or trunk, slow/easy movement, moderate movement, fast movement). In the next section, entitled III. CODE DEFINITIONS, we delineate the operational definitions and examples for the eight categories and their respective codes. In the next section, entitled IV. QUIZZES, we provide sample forms of quizzes for each category, which can be copied for taking tests to assess the memorization of observational codes for each category and respective codes.

OSRAC-P used in thesis interval observations.

<b>A PHYSICAL ACTIVITY</b>						
STATIONARY						
LIMBS						
SLOW/EASY						
MODERATE						
FAST						
CAN'T TELL						
<b>B ACTIVITY TYPE</b>						
CLIMB						
CRAWL						
DANCE						
JUMP/SKIP						
LIE DOWN						
PULL/PUSH						
ROUGH&TUMBLE						
RIDE						
ROLLING						
RUN						
SIT/SQUAT						
STAND						
SWIM						
SWING						
THROW						
WALK						
OTHER						
CT						
<b>C LOCATION</b>						
INDOORS						
OUTDOORS						
TRANSITION						

E CONTEXT						
BALL						
FIXED slide swings						
GAME formal						
OPEN SPACE						
POOL						
PORTABLE						
SANDBOX						
SNACKS						
SOCIO PROPS cars,buckets						
TEACHER ARRANGED						
TIME OUT						
WHEEL riding or push toys						
OTHER						
N/A						
CT						
F INITIATOR						
ADULT						
CHILD						
CT						
G GROUP COMPOSITION						
SOLITARY						
1-1 ADULT						
1-1 PEER						
GROUP ADULT						
GROUP PEER						
CT						
H PROMPT FOR PA						
NONE						
TP-INCREASE ACTIVITY						
TP-DECREASE						
PP-INCREASE						
PP-DECREASE						

## A. PHYSICAL ACTIVITY LEVEL CATEGORY AND CODES

The Physical Activity Level Codes represent five different levels of the intensity for the focal child's physical activity. The intensity level of physical activity is based on several considerations. Intensity may depend on (a) the speed or vigorousness of child movement ranging from slow easy to moderate to fast movements, (b) whether the movement is assisted by others, (c) whether the child movement is repeated within the observational interval, and (d) if there is any weight being moved, held, or translocated. If there are multiple body parts involved in the movement, the intensity is usually higher. Stationary activities represent a resting state or involve extremely limited or confined movement. Limb physical activity involves non-vigorous arm, leg, and trunk movements but no actual translocation from one place to another (i.e., remember "two-step rule" where both feet have to move to another spot for walking to be coded). Any activity normally classified as limbs, slow easy, or moderate can be "upgraded" to the next intensity code, if it is performed more vigorously or if the activity requires more effort (carrying a heavy object, pushing a swing). Can't tell is coded only if you cannot see the focal child or you really cannot determine a particular code within a category. Remember, the physical activity level is defined by what the focal child is doing during the five-second-observation interval.

**Level 1 Stationary:** Stationary/motionless (resting state/motionless with head, finger, hand, or foot, or writing and drawing movement only and no major limb movement or two major joint movements) • Sleeping, lying, standing, sitting, squatting, or kneeling • Riding passively in a wagon

**Level 2 Stationary/Limbs:** Stationary with easy movement of limb(s) or trunk (arm, trunk, or leg movements without moving the entire body from one place to another) • Standing up, sitting down, bending and squatting, or kneeling down with limb or trunk movement • Holding an moderately heavy object while unsupported • Hanging or partially hanging off of something, leaning on a pole, fence, or wall (includes a partial climb - one leg up and arms holding on) • Swinging passively (being pushed by another), bending, digging in the sand, twisting • Throwing ball or object without translocating • Leaning back on arms while sitting down • Resting head on arms on a tabletop • Sliding down a slide (without pushing self)

Add-on rule example: Standing motionless while holding object (1) + moderately heavy object (1) = 2

**Level 3 Slow-Easy Movement:** Translocation (moving body from one location to another at a slow and easy pace) • Walking • Walking at a slow or easy pace and focal child MUST translocate with BOTH feet (3 continuous steps) • Slow and easy marching (in place or translocating), crawling, skipping, hopping, jumping, rolling • Riding • Slow and easy cycling, skateboarding, roller skating, scooter • Slow and easy crawling on a flat surface • Swinging without assistance from others or leg kicks • Slow and easy tumbling/wrestling

Add-on rule example: Going down a slide (2) + pushing self (1) = 3 Throwing a ball (2) + heavy ball (1) = 3

**Level 4 Moderate Movement:** Translocation (moving body from one location to another at a moderate pace) • Walking • Walking at a brisk or rapid pace • Walking up at least 2 stairs or a hill • Two repetitions of skipping, hopping, jumping, leaping, kicking, or



galloping • Riding • Two repetitions of cycling at a moderate pace • Climbing • Climbing on monkey bars, jungle gym, fence • Climbing backwards up a slide or an incline (or stairs) with arm usage • Hanging from bar with legs swinging • Tumbling • Two repetitions of a forward or backward roll • Fighting or wrestling at a moderate pace • Swinging with legs kicking

Level 5 Fast Movement: Translocation (moving body from one location to another at a fast or very fast pace) • Running • Walking up 3 or more stairs or an incline fast or with vigorous arm movement • Three repetitions or more of skipping, hopping, jumping, leaping, kicking, or galloping • Riding • Three repetitions or more of fast cycling, skateboarding, roller skating, scooter • Three repetitions or more jumping jacks or jumping rope • Three repetitions or more of tumbling • Vigorous fighting or wrestling • Climbing • Translocating across bars with hands while hanging

Add-on rule: Walking (3) + carrying very heavy object like another person (2) = 5

## B. PHYSICAL ACTIVITY TYPE CATEGORY AND CODES

The Physical Activity Type Codes represent what type of activity the focal child is performing at the highest physical activity level recorded. They literally correspond to exactly what the child was doing during the most intense physical activity for the five-second observation interval. For example, if a child is sitting on a tricycle and not moving, the observer should code the Sit/Squat Code for the Physical Activity Category because that is the exact behavior in which the child is engaged. However, the observer should code the Wheel Code for the Outdoor/Gym Educational/Play Context Category. This type of systematic coding will allow us to determine that the focal child was sitting on the tricycle but not moving. Thus, physical activity type is different from activity context. Physical activity type reflects the focal child's actual behavior, while activity context represents the environmental circumstances that are associated with the child's physical activity.

### Coding Rules

- A focal child may perform more than one physical activity type during the five-second observational interval, however, the physical activity type must coincide with the highest activity level recorded for the observational interval
- If the focal child performs two physical activity types that are within the same physical activity level, code the last physical activity type performed in the interval. For example, if a child sits for the first two seconds and stands for the last three seconds of a five-second observation interval, the observer should code the Physical Activity Level

Category as the Limbs Code. The Physical Activity Type should be recorded as the Stand Code given that standing was the last physical activity type performed in the interval.

- Hanging or swinging from a bar is recorded as Climb Code but swinging on an actual swing is recorded as Swing Code.

- If the focal child has her stomach on a swing and is running around pushing the swing, the Physical Activity Level is coded as 5-Fast and the Physical Activity Type is recorded as the Swing Code.
- The Throw Code is an exceptional case. Because a throw happens very quickly in many cases, the focal child is likely to be performing some other activity within the five-second observation period. If the focal child is playing with a ball or similar object and throws it during the observation period, then the physical activity should be coded as THROW (i.e., the other physical activity will be interpreted as related to throwing). If the child stands in one place without translocating and throws a ball or object then it is 2-Limbs. If a child walks at a slow-easy pace and throws an object like a ball during the five-second observation interval, the Physical Activity Level should be recorded as 3-Slow-Easy Movement, while the Physical Activity Type Code should be Throw. If the child throws the object AFTER the five-second interval is over, the Physical Activity Level would be coded as 3-Slow-Easy, and the Physical Activity Type Code would be Walk. If a higher level of activity occurs in the interval, the higher level activity type should be coded.
  - o Throwing heavier objects will increase the activity level, i.e. throwing a basketball while standing still should be coded as 3-slow/easy and throw.
- Ride is coded as an activity type only when wheels of the riding object are in motion or when the focal child is attempting, with noticeable effort, to pedal or move the riding object. If the child is merely sitting on the object and no effort to ride the object, physical activity type should be coded as sit/squat.
- Similar to the ride code, swing is coded as an activity type when the swing is in a swinging/pendulum motion. If the swing is merely moving as a function of a child climbing on to it or there is residual movement from a former bout of swinging, coding is based more on the actual activity of the focal child (sit, stand, etc.)
- The action of pushing a swing is coded as pull/push for physical activity type, and fixed for outdoor context. Determination of the appropriate activity level is based upon the weight/type of the swing, the number of children on the swing, and the type of movement done by the focal child to aid the push (walk/pivot, run, etc.)
- Climb is coded as an activity type when the child is climbing OR hanging, dependent upon their apparent weight distribution. If the focal child is grasping an object with an

upper body limb(s) and is clearly bearing their weight on that limb(s), physical activity type should be coded as climb. If a child is merely holding onto a bar or rail but their weight remains in the lower body, the physical activity type should be coded as stand. Specifically, a “partial climb” (defined in the OSRAC-P manual as having one leg up and arms holding onto an object) should be coded as, 2- limbs for physical activity level and stand for physical activity type.

- Sit should be coded when the child’s knees are bent past 90 degrees. If the child is bending his or her knees and leaning over, stand should be coded. Both of these situations should be coded as 2-Limbs for the activity type since the child’s center of gravity has shifted and they are having to stabilize themselves.

### C. LOCATION CATEGORY AND CODES

Location represents the global physical location of the focal child. The observer should record one of three possible location codes (a) inside of the building, (b) outside of the building, or (c) transition; when the focal child is clearly moving between the inside and outside of the building or he is clearly moving between two different rooms or settings in the building (e.g., adult has prompted children to line up for outside, teacher told children come inside while she attends to another child’s personal needs during outdoor play, adult lines up children and takes them to an indoor gym or the cafeteria).

### D. OUTDOOR/GYM EDUCATIONAL/PLAY CONTEXT CATEGORY

The Outdoor/Gym Educational/Play Context Codes represent involvement with specific outdoor play settings (e.g., fixed equipment, open space) or materials (e.g., portable equipment, balls and throwing or jumping objects) and is ONLY recorded when the focal child is located outdoors or in a large gymnasium/room during the observation interval.

Twelve outdoor/gym educational/play contexts along with Other, NA, and Can’t Tell codes may be coded and are described below. Higher order activities are those, which “trump” location such as riding a scooter in an open space. We want to capture the activity in which the focal child is engaged.

1. Ball- Ball and object play should be coded when the focal child is clearly engaged in a play activity with balls or other equipment for gross motor activities, such as hula-hoops, jump ropes, Frisbees, etc. If the child is carrying a ball with them or playing with a ball in any location, ball should be coded for outdoor context.

2. Fixed- Fixed equipment should be coded when the focal child is engaged with an activity

involving the use of fixed equipment such as a jungle gym, play house, swing set, spring toys, etc. Fixed equipment should also be coded when the focal child is waiting for his or her turn on the equipment (waiting in line to ride the tire swing). Fixed equipment should not be coded when the focal child is engaged in some other activity while on the fixed equipment, i.e. socioprop or ball/object play while sitting in the play house.

3. Game- Game should be coded when the focal child is clearly engaged in an outdoor game such as tag, red rover, duck-duck-goose, etc. These games should be formal, meaning they have rules, rather than just a child chasing another child around the playground. It will be important to look for verbal and behavioral rules as to the formality of the games.

4. Open Space- Open Space should be coded when the focal child is in an open area not defined

by the other codes and is not engaged with any other activity or material such as games, socioprop, ball/object, wheels, etc. This is similar to the transition code for indoor, in that the child should not be engaged in other activity and the area, which they are in, is not defined.

5. Pool- Pool should be coded when the focal child is physically located in a portable pool (baby swimming pool) or involved in water play such as sprinklers, hoses, and slip-n-slides. If the focal child is playing with other objects while in the pool, the outdoor context should be recorded as Pool. Regardless of what the child is doing, if the child is involved in water play, pool should be coded.

6. Portable- Portable equipment should be coded when the focal child is engaged in activity involving portable equipment that the teacher has brought out for play. This does not include balls/objects, socioprops, wheel toys, etc., but does include sand/water tables, pop-up tents, etc. Similar rules apply for portable equipment as for fixed equipment. If the child is engaged in a higher order activity (balls, socioprops, wheels) while using portable equipment, the higher order activity should be coded.

7. Sandbox- Sandbox should be coded when the focal child is physically located in the sand-box

or clearly defined digging/sand play area, regardless of what he or she is doing. Similar to pool, sandbox should be coded when the focal child is in or around the sandbox, even if they are playing with other objects in the sandbox.

8. Snacks- Snacks, meals, and food activities should be coded when the focal child is participating in an activity that involves the preparation of and the eating of real food. Snacks should be coded when children are setting the table, passing out food, cooking and preparing foodstuffs, and eating or have food accessible. If teachers are using a cooking activity such as popping corn during large group time with about 50% of the children present, indoor context should be coded as Group Time. This will most likely only occur outdoors during warm weather months, when the children may have ice cream or special frozen treats, fruit, etc.

9. Socioprops- Socioprops should be coded when the focal child is engaged with play involving

a prop that can be used for sociodramatic play or any prop that is not used for gross motor play or wheels. Socioprops does not include any organic objects such as sticks, leaves, or bugs. Socioprops are typically small objects that are brought from inside for play outside. Examples include: dolls, cars, trucks, books, buckets, blocks, sidewalk chalk. Remember that water toys such as water guns, and spray bottles are considered socioprops when they are removed from the water play area. Similarly when digging tools are removed from the sandbox or digging area, they are considered socioprops.

10. TeacArranged- Teacher arranged and led gross motor physical activity should be code only

when the teacher arranges or transforms space, materials, or an activity for the purpose of gross motor activities. In addition, formal gross motor activity with the focal child has to be led or supervised by an adult with (e.g., obstacle course, bean bag race) or without equipment (e.g., exercising, gymnastics without apparatus).

11. Time Out- Time out should be coded when the child is placed in a separate area as a punishment for disciplinary reasons. Regardless of where the child is or what he/she is doing, if they are in “time-out”, it should be coded. Activity level and type should match the child’s behavior. If it is not clear whether or not a child is in time-out, the observer should ask the appropriate adult.

12. Wheel- Wheel should be coded when the focal child is engaged in play with a wheeled object such as a bicycle, tricycle, scooter, wagon, Hotwheels, etc. If the focal child is pushing,

pulling, or sitting on any piece of wheeled equipment, that is not fixed, the outdoor context should be coded as Wheels.

13. Other- Other is recorded if the child is somehow participating in or located within an educational/play activity or area not otherwise designated above. If other is recorded, the observer should make a note indicating what the child is doing.

14. NA- NA is coded when the focal child is located in the Transition or Indoors Location

#### E. INITIATOR OF ACTIVITY CATEGORY AND CODES

Activity initiator is defined by who selected the activity area where the focal child is located or the activity in which he is involved. Although observers watch the focal child during the five-second-observation interval, they should remember that information about who started the activity might be obtained from adult or child behavior before any specific five-second observation window. For example, a teacher may initiate a painting activity during the 25-second recording time period before a five-second observation interval. If the child is involved in that adult initiated painting activity or is located in the activity area for painting, then the activity initiator is coded as adult initiated even though the activity was started prior to the five-second observation interval. In addition, the activity may last for a relatively long period of time (e.g., 15 minutes) and the initiator will still be an adult if the teacher had initially arranged the area for art activities and the focal child continued to paint during that time period without becoming involved in another activity.

#### F. GROUP COMPOSITION CATEGORY AND CODES

Group is defined by the number of children and adults who are in the same activity area as the focal child or who are engaged in activity with the focal child or are in proximity of the focal child. Group composition is defined first by interaction with another child, group of children or adult, and secondly by proximity (within 5 feet) of another child, group of children or an adult.

Solitary: • Engaging in an activity alone and not in proximity to children or adults • Being in an activity area alone, clearly without peers or adults.

1-1 Adult: • Engaging in an activity with or in proximity to only an adult • Being in an activity area with only an adult.

1-1 Peer: • Engaging in an activity with or in proximity to only a single peer • Being in an activity area with only a single peer.

Group Adult: • Engaging in an activity with or in proximity to one or more peers and an adult • Being in an activity area with one or more peers and an adult.

Group Child: Engaging in an activity with or in proximity to two or more peers, without an adult in the group • Being in an activity area with two or more peers, without an adult in the group.

## Appendix 2: TEACHER FEEDBACK

1. How do you see the results of the intervention?

T1: Very successful.

T2: The children are more active, but they are more active when you are in the playground.

2. How has the intervention impacted outdoor playtime?

T1: The children are playing games independently. They are more active playing chasing games. The children are teaching the younger children the games. Some of the older children get frustrated when a younger child walks off mid explanation of game rules.

T2: The children are playing more as a group, less in pairs or alone.

3. How has the picture prompt poster functioned?

T1: The kids refer to the poster for inspiration. They use it to decide what to play. Maybe include a poster with the rules of the games could be included as a separate poster.

T2: The children use the poster to pick games but not so much. They use it more when you are present. I think they see you as a visual prompt to play the games you taught them.

4. Any other observations?

T1: The children are playing more as a large group during outdoor playtime.

T2: The children are playing more as an active group.

### Appendix 3: PICTURE PROMPT ACTIVITY POSTERS

Free images sourced: <http://clipart-library.com>

