



Children's Play and Physical Activity in Traditional and Forest (Natural) Playgrounds

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Abstract: Early childhood is a crucial period for the physical and cognitive development of children. A child's exposure to nature is proven to be beneficial in this period of human life. The aim of the present research was to investigate children's play and physical activity on a traditional playground and on a forest (natural) playground. Twenty-five observations took place on the traditional playground, and twenty-five observations were recorded on the forest playground. Twenty-five participating preschool children were observed in both playgrounds, but not necessarily in the same order. Research findings confirmed important qualities of natural playgrounds that provide children with a wide range of playing and learning opportunities not available on other playgrounds. Children were playing more with different natural materials in the forest playground and they more frequently played different chasing games and hide and seek in the forest playground. Participating children were also more physically active on the forest playground, and boys were more active on the forest playground than girls. The research concludes that it is important for preschool teachers to use natural playgrounds frequently and with regularity. Research design in this article is also an example of how GPS trackers can be beneficial for educational research.

Keywords: *Early childhood, playground, forest, play, physical activity, children*

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Introduction

Early childhood is a period of life in which lifelong attitudes, values and patterns of behaviour regarding nature are shaped. Children are motivated to explore the world around them, and preschool education should provide appropriate experiences for all children. Environmental engagement and effects are important during the early years of a child's development, and the lack of needed stimuli may result in a child's development not reaching its full potential (Hadzigeorgiou, 2002). Louv (2005) highlighted concurrent cautions regarding children's decreasing time spent in nature and limited experiences with the natural world.

Kos and Jerman (2013) examined play and learning in the natural environment and on traditional playgrounds of Slovenian preschools. They found that, on average, children spend 23% of their time at preschool outdoors during the warm months and 13% during the cold months, of which they generally spend three hours per week in the natural environment during the warm months and 1.5 hours during the cold. In the survey conducted in the United States (northern Minnesota) preschool teachers were asked about their use of natural outdoor environments. Results suggest that the most efficient way to impact their teaching practice is to focus on reducing barriers, such as lack of walking access to natural outdoor settings, lack of time, and safety concerns, and to increase the use of natural outdoor environments (Ernst, 2013).

A number of studies have documented that exposure to nature has beneficial effects on children's psychological and cognitive development, as well as their physical activity. For example, the study by Fjørtoft (2001) describes the relationship between the structure and functions of a natural landscape, its affordances for play, and the impact on motor development in children. Luchs and Ficus (2013) explored how diverse play environments afford different forms of play in preschool children and found differences in number and duration of play episodes as well as in the occurrence of different categories of play. They highlighted the need for further development of instruments for observing different forms of play in order to adequately evaluate the impacts of different outdoor playgrounds.

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Play is an active, spontaneous, fun, purposeless, self-initiated and serious activity (Frost, 1979). Smilansky and Shefta (1990) defined functional, constructive, and symbolic types of play. Functional play, also referred to as motor or practice play, is characterized by repetitive movements performed to gain mastery of a skill. In constructive play children use problem-solving skills to construct or create something meaningful. Symbolic play (also referred to as pretend or dramatic play) occurs when children use their imagination or role playing to transform themselves or objects around them. Similarly, Luchs and Ficus (2013) classified different forms of play:

- *Play with*: functional play and constructional play (own body, object and materials).
- *Play for*: play with rules (competition), organizing activities of several players.
- *Play as*: role play and symbol play (imaginative play object, a well-defined object loses its well-known meaning and represents a different object within the child's play and imagination, orientation on role-models, and not only copying but also developing their own play while realizing their own ideas, wishes and needs).
- *Combination*: play episodes that show an overlap of different categories.
- *Other*: not able to classify into any of the above categories.

Some studies evaluated children's play activities and physical activities in different outdoor play environments (e.g. Fjørtoft, 2001; Luchs & Ficus, 2013; Waller et al., 2010); however, outcomes of natural playgrounds remain a neglected aspect (Luchs & Ficus, 2013).

The aim and research questions

The aim of the present research was to investigate the children's play activities and physical activity on a traditional playground and on a forest (natural) playground. The research questions were as follows:

1. How do play activities differ on a traditional playground and on a forest (natural) playground?
2. On which playground were children more physically active?
3. Are there any gender differences in physical activity?

Methodology

Setting

Children were recruited from public kindergarten in a small town in north-western Slovenia. The children's activities were observed on a traditional playground and on a forest (natural) playground. Using an observation protocol, a total of 25 four and five-year-old children (9 girls, 16 boys) were observed in the described playgrounds for 20 minutes each. The preschool staff, the children and the children's parents were informed of the research project prior to the observations and gave their consent to the study.

Traditional playground

This improved traditional playground (Holmes & Procaccino, 2009) selected for the study shows devices with interesting and inviting materials, textures and heights all aesthetically designed. Playground equipment is fixed, monofunctional and multifunctional. The playground features a playhouse with climbers, aerial walkways and a slide, a sandbox, spring riders, a seesaw and a roundabout. The place is surrounded by football pitch and open basketball court. One side of the playground is surrounded by evergreen bushes and a few trees. Size of the area is approximately 500 m².

Forest (natural) playground

This natural playground (Luchs & Fikus, 2013) selected for the study was designed in an existing forest patch on the floodplain of the river Soča. Pine trees are the dominant tree species in the playground. The playground has many bushes and one fallen tree trunk suitable for sitting and climbing. The area contains trails and one small forest clearing. There is one bench with table and simple wooden arbour. The area is delimited from the rest of the forest with wooden fence. Size of the area is approximately 500 m².

Procedures and protocol

A total of 50 individual field observations were carried out. 25 observations took place on the traditional playground, and 25 observations were recorded on the natural playground. All twenty-five children were observed in both playgrounds, not necessarily in the same order. The whole group of children went seven times to each playground. Each time, four (or fewer) different children were observed. The observed children were given small GPS (Global Positioning System) trackers in bags around their waists. The equipment was small and not heavy. Each observation lasted for 25 minutes with a 5 minute 'warm up' period that was designed to allow the children to be habituated to carrying the equipment. The first five minutes of observation were excluded from the analysis. Every four minutes the target children were observed and their activities recorded in a research diary. The observer recorded each episode within the observation time. Information about each play episode included the social category of play (solitary, group of two children, or group of more than two children) and narrative information about the play itself. The coding of the play episodes happened after the direct observation. The period of observation lasted from the beginning of April 2016 until beginning of May 2016, always at the same time of day. Data-capture days included a weather range from sunny days to cloudy days. Only one observer was used for the entire study. The observer visited the participating kindergarten group and the playgrounds prior to the study in order to become acquainted with participants and settings. The observer had been trained before collecting all data and did not take part in the children's play. The children quickly adapted to the situation and the presence of the observer.

Ethical considerations

Ethical rules in social science research were considered and observed. Rules of confidentiality, information, autonomy and voluntary participation were followed. Parents received a letter of information about the study. Consent of the parents, pre-school teachers and children were gained before the study.

Observed categories of play

The first two categories of play described above by Luchs and Ficus (2013) were applied in the research because these two categories were most frequently observed in the preliminary observations of the children.

Results and discussion*Children's observed play activities*

Altogether, 25 children were observed playing in traditional and forest (natural) playgrounds. Children were observed in the categories of play presented in Table 1. The aim was only identification of different categories of play and not the time spent playing. As expected, children's play differed substantially on the two playgrounds. Children were playing more with different natural materials (i.e. leaves, seeds, wooden sticks) in the forest playground with the exception of stones. The variety of natural materials was greater in the forest than on the traditional playground. Some were simply not available at all to children on the latter, such as the fallen tree trunk. On the traditional playground children spent most of the time playing on a swing, an aerial walkway and in the playhouse with climbers. Children also played different chasing games, and hide and seek. The latter was observed only in the forest playground, which provided to children much better conditions for hiding. Interestingly, there is a substantial difference in the frequency of chasing games in the two playgrounds, which could also be a result of the more versatile environment in the forest playground. Frost (1992) argued that natural features are important qualities of playgrounds and that the natural features allow a wide range of learning opportunities not available on other playgrounds.

Table 1. Frequency of observed categories of play on the playgrounds.

Categories of play	Forest (natural) playground			Traditional playground		
	Male	Female	Total	Male	Female	Total
Play with						
- leaves	1	1	2	0	0	0
- seeds and fruits	4	5	9	0	0	0
- wooden sticks	8	2	10	0	0	0
- fallen tree trunk (climbing)	7	1	8	NA	NA	NA
- stones	2	1	3	5	1	6
- sandbox	NA	NA	NA	1	1	2
- roundabout	NA	NA	NA	5	4	9

Table 1. Continued

Categories of play	Forest (natural) playground			Traditional playground		
	Male	Female	Total	Male	Female	Total
Play with						
- spring riders	NA	NA	NA	1	3	4
- swing	NA	NA	NA	6	4	10
- large slide	NA	NA	NA	3	3	6
- small slide	NA	NA	NA	3	2	5
- aerial walkway	NA	NA	NA	9	2	11
- playhouse with climbers (climbing)	NA	NA	NA	12	5	17
Play for						
- chasing games	14	3	17	4	3	7
- hide and seek	2	1	3	0	0	0
Total number of children	16	9	25	16	9	25

NA – not applicable; not present/available in the playground

Children's physical activity on the playgrounds

Participating children were more mobile on the forest playground ($M = .72$ km, $SD = .49$) than on the traditional playground ($M = .49$ km, $SD = .19$) in 20 minutes. A Mann-Whitney test, however, indicated no significant differences: $U = 235.0$, $p = .132$, $r = .21$. Nevertheless, this result is in line with the findings of previous studies reporting that natural environments invite more physical activities than traditional playgrounds (Boldermann et al., 2006; Fjørtoft, 2004; Fjørtoft & Sageie, 2000). Since children were playing chasing games more often in the forest playground, this result was expected. While on the traditional playground children spent more time climbing, swinging, etc., which also contributed to less distance covered. Figure 1 shows results for each individual male (M) and female (F) child participating in the study. Boy under code M13 covered 2.25 km in 20 minutes, which is very impressive result.

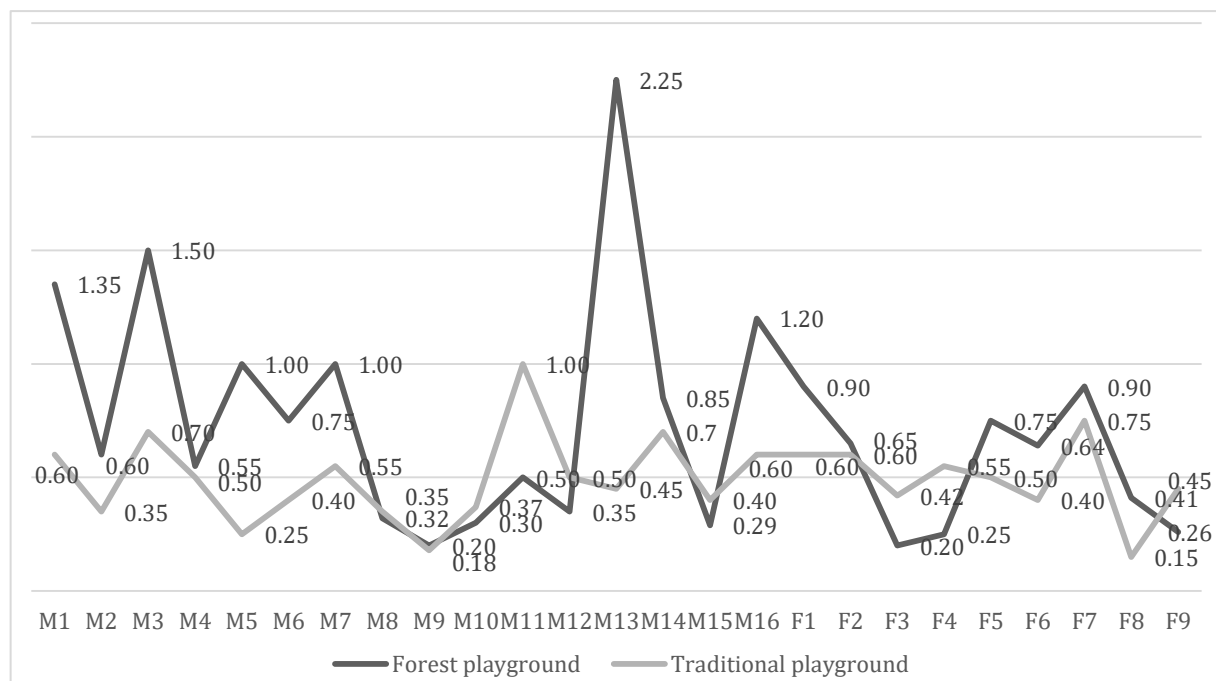


Figure 1. Distance (Km) covered in 20 minutes on the playgrounds for each individual male (M) and female (F) child.

On average boys were more active on the forest playground than girls, but there were no major differences on the traditional playground (Figure 2). A Mann-Whitney test indicated no significant differences between boys and girls in distance covered on the traditional playground ($U = 65.0$, $p = .690$, $r = .07$) and on the forest playground ($U = 52.0$, $p = .257$, $r = .22$). Boys were more physically active in the forest than on the traditional playground ($U = 89.5$, $p = .146$, $r = .26$). Bohn-Goldbaum et al. (2013) also found that boys tend to be more physically active on playgrounds than girls.

Children's speed profiles were used to determine their maximum speed (profiles for 20 children were available and analysed). The speed reached up to 11 km/h, and twelve out of twenty children reach the maximum speed on the traditional playground. We assume that the rugged terrain with several obstacles in the forest limits the building of children's speed more than the flat grassland on the traditional playground. Speed profiles were also used to count the number of times a child stopped to rest for more than one minute. Fourteen out of twenty participating children stopped more often in the traditional playground.

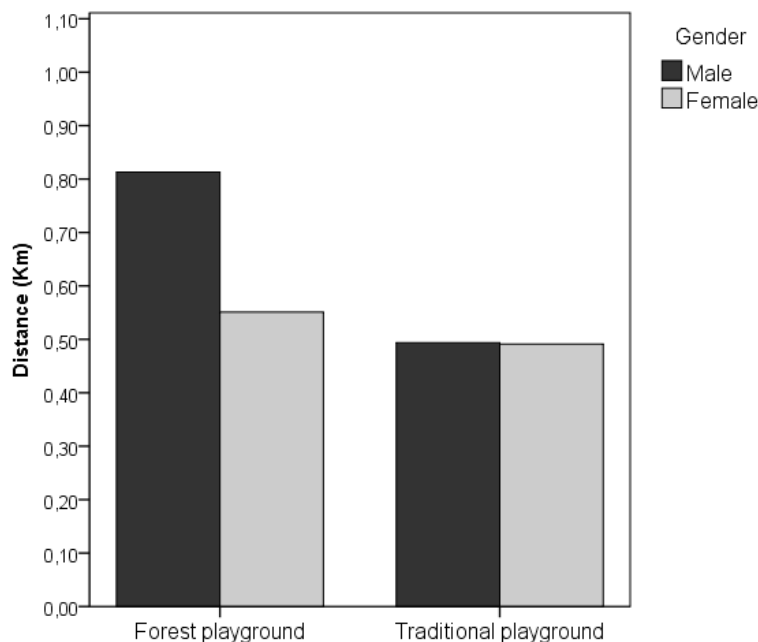


Figure 2. Average distances (Km) covered by children in 20 minutes on the playgrounds.

Conclusions

This study provided empirical evidence on the impact a traditional playground and a forest (natural) playground have on preschool children's play and physical activity. Children's play differed substantially on the observed playgrounds. Children were playing more with different natural materials in the forest playground. They also more frequently played chasing games and hide and seek in the forest playground. These findings confirm important qualities of natural playgrounds that provide children with a wide range of playing and learning opportunities not available on other types of playgrounds. It is therefore important for preschool teachers to use them frequently and regularly. The next two research questions focused more on children's physical activity. Participating children were more physically active on the forest playground. This is in line with the findings of previous studies reporting that natural environments invite more physical activities than traditional playgrounds. Boys were more active on the forest playground than girls, and there were no major differences between them on the traditional playground. Boys were also more physically active in the forest than on the traditional playground. This indicates that forest (natural) playgrounds hold some innate value for boys in particular, providing them with extra motivation to be physically active.

Research design in this article is also an example of how GPS trackers can be beneficial for educational research. In our case they served to measure children's physical activity in the different playgrounds. In future research, we intend to use them also to measure spatial distribution of play activities.

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