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Physical activity and learning environment qualities in Finnish day care

Anna-Liisa Kyhälä^{a,*}, Jyrki Reunamo^b, Heikki Ruismäki^a^a Department of Teacher education, Faculty of Behavioural Sciences, Siltavuorenpenger 10, P.O. Box 9, FI-00014 University of Helsinki, Finland^b Department of Teacher education, Faculty of Behavioural Sciences, Siltavuorenpenger 7, P.O. Box 9, FI-00014 University of Helsinki, Finland

Abstract

When evaluating children's physical activity in day care, both the direct education and the children's activities in their personal contexts must be studied. In this study children's physical activity level was systematically observed in 2010 in 47 day care centre groups. Other children increased children's physical activity ($p < .05$). If the educators had spent more time planning activities or concentrated more on children's social relations, children were more physically active ($p < .05$). The planning of educational activities and interaction planned between children in the group may activate them more effectively than traditional planning for the group.

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1. Theoretical Introduction

Physical activity (PA) affects health in many ways, for example by protecting children from obesity (Ogden, Carroll, Cutrin, Lamb & Flegal, 2010; de Onis, Blossner & Borghi, 2010) and preventing diabetes, cardiovascular disease and cancer, among other disorders (Bouchard, Blair & Haskell, 2007).

Good physical health is not the only reason for promoting PA. Neuropsychological research has pointed to the importance of PA in brain development as well. Motor and cognitive skills progress

* Corresponding author. Tel.: +358503183998
E-mail address: anna-liisa.kyhala@helsinki.fi

together, and PA can be seen as a simple, effective method of enhancing children's mental functioning (Davis et al., 2011). Jumping, rolling as well as 'pitch and catch' have been found to enhance children's cognitive skills (Haywood & Getchell, 2009). When children learn new and more challenging physical skills they encounter unprecedented problems to be solved and can thus expand their cognitive capacity (Viholainen, 2006). Good physical condition and motor skills later in primary school appear to be connected with better academic achievement in mathematics, languages and science (Castelli, Hillman, Buck & Erwin, 2007; London & Castechini, 2011; Tremarche, Robinson & Graham, 2007).

Early childhood education and care (ECEC) environments (learning environments) are many-sided, and consist of physical, psychological and social elements including the facilities, immediate neighbourhood, and social and psychological settings as well as various materials and equipment (Ministry of Social Affairs and Health, 2003).

A common conception is that preschoolers engage in high levels of physical activity. As well, according to O'Connor and Temple (2005) parents tend to think that their children are very active in day care. However, studies have revealed this to be wrong. As low an amount as 3% of moderate to vigorous physical activity (MVPA) was observed in a study implemented by Pate et al. in 24 preschools. In the same study, carried out with more than 400 3-5-year-old children, over 80% of the observations were encoded as sedentary (Pate, Mc Iver, Dowda, Brown & Addy, 2008; Dowda et al., 2009). Even during outdoor play, 56 % of children's activities were sedentary and 17 % was coded MVPA (Brown et al., 2009).

Many studies have indicated that the ECEC environment has a significant impact on children's PA (Hodges, Smith, Tidwell & Berry, 2012; Bower et al., 2008), in particular structured physical activity, outdoor play and time allotted for both. Less fixed playground equipment as well as the big playground size seems to increase the amount of MVPA (Bower et al., 2008; Dowda et al., 2009). Conversely, other findings suggest that PA depends on the child, not the environment, and therefore is difficult to modulate through intervention (Wilkin, 2011). As well, children's lack of ability to follow the rules of organized physical play, or personality traits like shyness and anxiety, have been found to reduce PA (Dwyer, Needham, Simpson & Heeney, 2008).

The pedagogical style and curriculum have an impact on children's physical activities. In an eight-week intervention programme PA components from existing curricula were integrated into all activities during the half-day curriculum of a preschool. The children exhibited significantly higher levels of MVPA in free-choice time indoors and outdoors during the final weeks of the intervention when compared with the control group (Troost, Fees & Dzewaltowski, 2008). Similar results were found in successfully implemented PA interventions, where PA was integrated into the classroom curriculum, for example by adding 10 or 30 minutes of gross motor activities per day (Larson, Ward, Neelon & Story, 2011), but outcomes could vary significantly depending on teaching style, child characteristics and physical environment (Williams et al., 2009). Dowda et al. (2004) highlighted the personnel's influence in promoting children's PA.

Children's physical and social context affects PA. For example, safety has been identified as a factor limiting children's outdoor playtime in their own neighbourhood, but may hinder to some extent the PA in the day care environment as well. In studies concerning social context, the interaction among the preschoolers and between the preschoolers and teachers have been perceived as important (Dowda, Pate, Trost, Almeida & Sirard, 2004). Livesey, Mow, Toschack and Zheng (2010) and Vannatta, Garstein, Zeller and Noll (2009) examined peer relations and motor performance in elementary school: children with poor motor performance had lower levels of PA and were less preferred by their peers. Interesting findings have been made about the adult's influence on PA. Brown et al. (2009) found that MVPA was most likely in situations where children were solitary without adults and child initiated activities resulted in more MVPA than adult-initiated activities. Cardon et al. (2008) noticed that PA decreased when more

teachers were supervising. The conventional ‘isolated’ view of physical environment should thus change towards one that considers social environment as child-initiated rather than staff-initiated play (cf. Brown et al., 2009).

The ECEC curriculum (2003) together with the Core Curriculum for Pre-School Education (2010) forms a national framework for promoting children’s well-being, development and learning in day care. According to the national curriculum, the local day care centres and preschools form their own unit-specific ECEC curriculums, in which the units’ special features, priorities and goals are described in more detail. (Ministry of Social Affairs and Health, 2003; Finnish National Board of Education, 2010). Hence there are differences between day care centers with respect to organizing physical activities for children. The Ministry of Social Affairs and Health’s recommendations for PA support the curriculums and recommend daily activity for children to be at least two hours of MVPA (Ministry of Social Affairs and Health, 2005).

As the healthy and active lifestyle once gained is often permanent (Reilly et al., 2004; Pate, Baranowski, Dowda & Trost, 1996), and since children are in day care for a significant amount of time it is important to promote PA in day care centers. Especially it should be done during free play and transition situations, not only in direct education, because there are also other goals and activities in the day care centers. On the other hand physical activities are a good way of learning social skills, inclusion and understanding (Davis et al., 2011).

96% of six-year-olds attend primary school and an average of 62% of children aged 1–6 attend municipal or private daycare (Ministry of Education and Culture, 2011). Children’s differing rates of maturation and development add to the variance of physical activities in day care. A high degree of PA and learning takes place in highly variable and non-structured learning environments often created by the children themselves. When we evaluate children’s physical activity in different learning environments, we must look at both the direct education and the children’s activities in their personal contexts, which they have themselves helped to create.

2. Research problems:

The objective of this article is to discuss how the PA in different ECEC environments is affected by the pedagogical choices and planning and how children’s personal object of attention is related to physical activity? The research problems in this study are:

- How are the children’s objects of attention related to their physical activity?
- How are the teacher’s pedagogical choices and planning practices related to children’s physical activity?

3. Methods

Fifty day care centre teams, 14 child minders and 892 children aged 1–7 took part in the research. Children’s physical activity level and the learning environment qualities were systematically observed from January to May 2010 between 8:00 and 12:00 hours. Each child was observed in every four minutes according to a systematic sampling. To add to the reliability of the observations the observers were trained for observation during autumn 2009.

The educators evaluated the learning environment qualities on a Likert scale from 1 (does not describe) to 5 (describes very well). Among the observed items were children’s physical activity levels from one to three: 1) Low (sitting, using pen, eating etc.) 2) Intermediate (walking, whole body movements) and 3) High (includes at least some running, romping or physical exertion).

To better analyze the learning environment qualities and their relationship to physical activity, the two datasets were merged. Children's interview results, children's skills and the learning environment qualities were attached to each observation data.

4. Results

Totally there were 19,608 observations. The age of the children varied between one and seven years, the mean being 4.7 years ($SD = 1.3$). The percentage of boys was 51%. The mean value of children's physical activity between 8:00 and 12:00 hours was 1.54 ($SD = .670$). Figure 1 presents the mean values of the children's physical activity levels with different objects of attention.

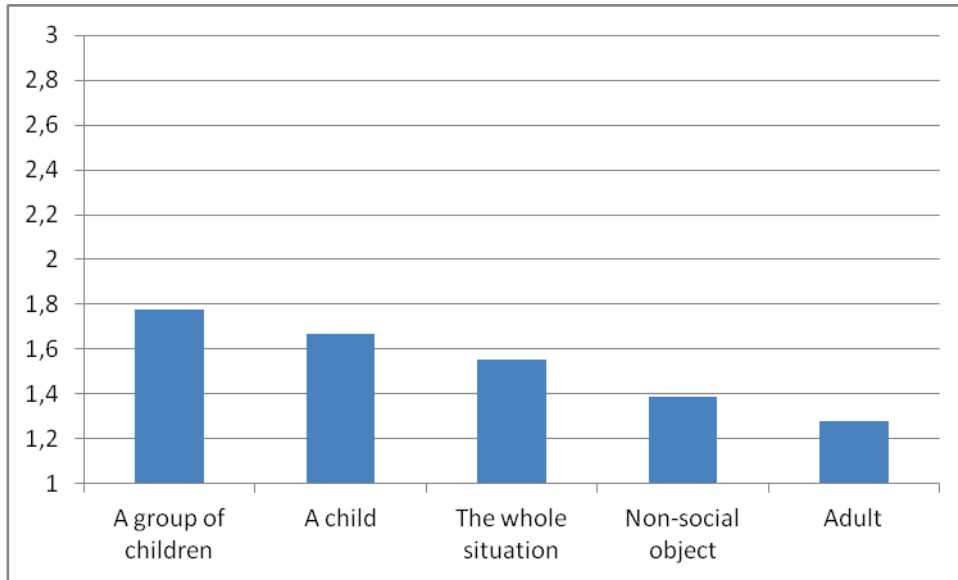


Fig. 1. Children's mean physical activity level with different objects of attention between 8:00 and 12:00 hours

The adult as an object of attention was associated with the lowest physical activity level ($M = 1.28$, $SD = .508$). Clearly, if the child was focused on an adult, this did not lead to greater physical activity; rather, the attention limited it. A group of children ($M = 1.76$, $SD = .760$) or one child ($M = 1.67$, $SD = .689$) aroused the most physical activity. Due to the many observations ($n = 19608$), the differences are statistically very significant, $F(3, 19547) = 137.259$, $p < .001$. Findings from Brown et al. (2009) are in line with these results. They found (in outdoor activities) that if compared to activities with adult present, MVPA was (3.55 times) more likely if children were alone. Now in this study we must remember that the observation included all the activities inside and outside between 8.00 and 12.00 hours, e.g. direct education, children's own activities, manipulative situations etc. The teacher has e.g. organizing and controlling to do. Children inspire other children and get inspired by each other. There is a common thought that adults increase children's PA, but this study revealed it partly wrong. Of course it is important that children learn different things, also in the field of physical activities, and adults are the best

who can teach children games and plays that they can play with each other, when they have once learned them.

In this study no differences were found between girls or between age groups. The age was not an important factor in the PA level. Children's physical activity increased somewhat from 1-year-olds ($M = 1.48$, $SD = .590$) to seven-year-olds ($M = 1.57$, $SD = .69$). Boys were a little bit more physically active ($M = 1.57$, $SD = .70$) than girls ($M = 1.50$, $SD = .65$). Brown et al. (2009) registered that 3-year-old children engaged in more MVPA than 4- and 5-year old children, but the difference was not obtained for females.

The non-social objects aroused the second lowest amount of physical activity among children ($M = 1.39$, $SD = .600$). In this study the biggest amount of all observations positioned themselves in the category "playing with toys, non-social material and equipment". How can we get children more physically active when playing with non social objects? In the study of Bower et al. (2008) less fixed playground equipment seemed to increase PA. Perhaps there is a lesson to plan the equipment also. The day care context is definitely influencing the children's physical activity level, which is also reflected in the learning environment characteristics (cf. Figure 2).

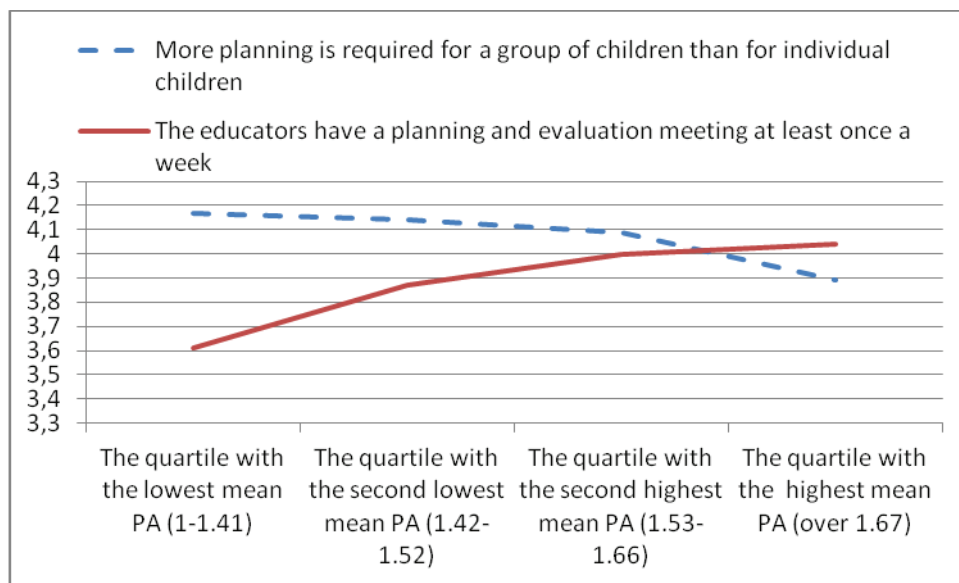


Fig. 2. Different educational planning practices in relation to children's physical activity level in Finnish day care centers between 8:00 and 12:00 hours

If the educators had spent more time planning the activities, children were more physically active. The differences are statistically significant at a .05 level, $F(3, 826) = 3.568$, $p = .014$. Although planning is important and educators are educated to plan it seems that the educators' planning of activities is not a sufficient predictor of children's physical activity.

The content of the planning also plays a role. If the planning concerned about group activities, the children were less physically active. If the educators focused their planning on individuals, the activity level was higher. The differences are also statistically significant, $F(3, 834) = 3.180$, $p = .001$. Concentrating on group activities perhaps restricts children's personal activities. When children act within the limits of teacher-defined activities planned for the whole group, children's physical activity tends to

be lower. Perhaps this should be taken care of in the curriculum, so that the group of children should be seen not just one group but as a team of many different persons. The educators need to plan wider possibilities for children’s activities, not just the direct education. This could happen by listening more to the children’s own ideas and opinions about e.g. the activities, making teams etc. and thus let them learn how to influence their own things, in this case to the learning environment.

The common way of planning activities in physical education has occurred by planning the physical education sessions, but there are many possibilities to get more PA into day care centers by taking it into all activities during the day, e.g. in transitions and other pedagogical activities.

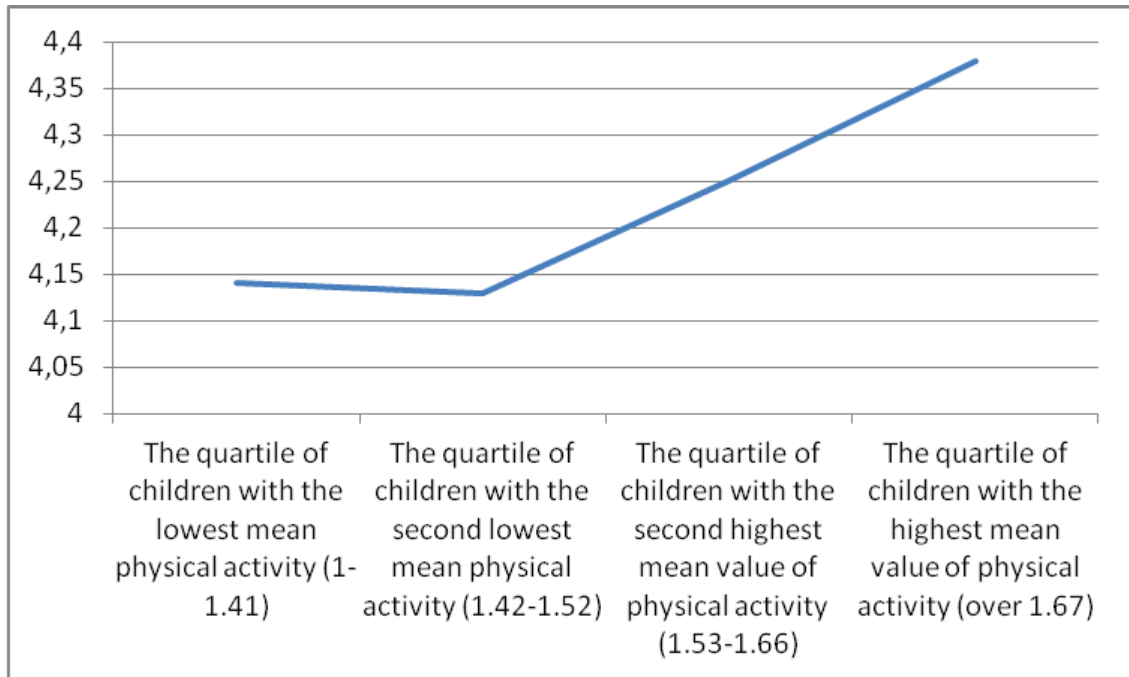


Fig. 3. The mean value (1-5) of educators’ concentrating on children’s social relations in each quartile of children’s physical activity

The planning of group activities was associated with less physical activity in children (Figure 2). However, if the educators concentrated on children’s social relations, children’s physical activity was higher (Figure 3). The mean differences are statistically significant, $F(3, 830) = 4.069, p = .007$. It seems that if the educators shift their perspective from looking at the children as a single block or group and instead concentrate on social interaction, physical activity has more chances of increasing.

The groups of children consist of socially, physically and mentally different persons. We can somehow take care of the children’s different physical needs when planning, but it seems this is not the case with the social needs. Should we concentrate more on social skills and social relations with each other? Children’s lack of ability to follow the rules of organized physical play, have been found to reduce PA (Dwyer, Needham, Simpson & Heeney, 2008). If we plan situations where they “practice” to get along with other children it might improve their social skills, add cosiness and self-confidence in the group and hence lead to more physical activity. A good resource to practice these skills is physical activities. Games and plays require the children social intercourse with peers, assimilation of different roles, agreeing on

rules and sorting out their differences. The teacher can plan and choose games and plays that improve children's social skills.

5. Discussion

In this article we have examined how the PA in the day care is affected by the pedagogical choices and by planning and how children's personal object of attention is related to physical activity. It seems that in early childhood physical activities and physical education, adults are not the most important source if we want to increase children's physical activity during the whole day in day care centers. Planning was found to be an important, but not a sufficient predictor of children's PA. The content of planning also plays a role and pedagogical choices go alongside the planning.

This study was carried out in kindergartens between 8:00 and 12:00 hours and it focused on the whole range of day care activities. However, the results can be thought to be accurate throughout the preschool day. There are many objectives and subjects to share the day. They are all important for children's wellbeing. Many recent studies have proved that children do not participate in enough physical activity. Additionally, they spend most of their time in sedentary activities in day care. At the same time it seems that the families are not physically active in the evenings. Studies have proved the importance of the physical activity for children's health and holistic wellbeing, and the national recommendations for PA suggest the daily activity for children to be at least two hours of MVPA (Ministry of Social Affairs and Health, 2005). Therefore it is important to find all the possible tools to increase PA during the preschool day. Our results highlight that children's own impact on the nature of the learning environment affects this amount positively.

There is perhaps an important lesson here for planning educational activities. The personnel's planning and evaluation meetings are important in activating children. When educators concentrate on managing activities with the group as a reference point, children's social and interactive stimulation is seen as a disturbance. Perhaps this should be taken into consideration in the curriculum, so that the group of children should be seen not just one group but as a team of many different persons and social relations. The educators need to plan wider possibilities for children's activities, not just the direct education. This could happen by listening more to the children's own ideas and opinions about e.g. the activities, making teams etc. and thus let them learn how to take responsibility about their own learning and learning environment. Obviously the adults supervise the process and ensure that the decisions are right and appropriate for everybody.

Day care centers can form their own unit-specific curriculums, in which the units' special features, priorities and goals are described in more detail. To add PA, focus could be more on planning of interaction between children instead of having the single entity or performative group as a starting point for planning. If teachers view children the latter way, it is probable that they will concentrate more on controlling the group. Thus the teacher is inclined to restrict children's physical activity.

Further, in activating children, other children are important. Findings from Brown et al. (2009) are in line with these results. They found (concerning outdoor activities) that if compared to activities with adult present; MVPA was (3.55 times) more likely if the children were alone or not led by the adults. There is a common thought that adults increase children's PA, but this study revealed it partly wrong. If the child was focused on an adult, this did not lead to greater physical activity; rather, the attention limited it. A group of children or one child as a focus aroused the most physical activity. This is good to keep in mind if the tendency is to increase children's PA in day care.

Children's physical activity seems to depend considerably on their own initiatives; children themselves create the circumstances for physically active learning environments. This does not mean that adults are not needed. Perhaps adults should create circumstances where the children have more possibilities to

express their own ideas and choose activities. In a previous study of Bower et al. (2008) less fixed playground equipment seemed to increase PA. These results get support in this study. Children themselves want to create the circumstances and choose the equipment. Very often they choose twigs, boards, stones, ropes and other more fixable and movable equipment, if they exist. Would it be good to plan the schoolyards more natural for children to create inspiring and motivating learning environments? We can ask the children how they would like to use and maybe change the interior of the kindergarten. We can have regard to children's initiatives in many ways to promote their physical activity during the day, in e.g. the transitions. We can ask the children how they would like to move from one place to another. It is quite obvious that they wouldn't like to go by walking, but by crawling, crab walking or like bears. Does running always have to be forbidden indoors? We can also put forward a question: do forbidden things always have to be forbidden? Of course we must take care of safety, but we can ask ourselves if all the forbidden things are necessary. This requires the adults to change their attitudes towards the tolerance of uncertainty and patience.

It seems that PA in day care can be increased by both good planning and pedagogical choices, and by taking consideration into children's initiatives, ideas and social needs. Although teaching is important in physical education and in activating children it also seems that child-initiated activities in child-created environments might lead to higher PA than teacher-initiated activities in adult-created environments. These emphases could lead to increased physical activity, and at the same time nurture children's growth as whole, not only physically, but mentally and socially as well.

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