



Influencing factors of children's fruit, vegetable and sugar-enriched food intake in a Finnish preschool setting – Preschool personnel's perceptions



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ABSTRACT

Introduction: A large proportion of young children spend most of their weekdays at preschool in Western countries. In Finland, three meals are included in a full day at preschool. These meals have the potential to promote healthy eating. This study aimed to obtain the personnel's (preschool teachers, day-care nurses) views on the factors influencing children's fruit, vegetable, and sugar-enriched food intake at preschool.

Study design: Four focus groups, in all 14 preschool personnel. Two researchers independently analysed the data using a socio-ecological framework.

Results: At the child level, age, peers, and the child's personality were recognized as factors influencing the fruit and vegetable (FV) and sugar-enriched food intake. At the preschool level, both the physical and social environments were discussed thoroughly, whereas at the societal level, policies of the EU, the state, and the municipality were mentioned as factors that influence what children eat in preschool. The personnel also discussed the interactions between factors both between levels and within levels.

Conclusions: In Finnish preschools, children's food intake is influenced on and within several levels of the socio-ecological model. The identification of the factors influencing food intake allows different methods of intervention at multiple levels to promote healthy eating behaviours in preschools.

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1. Introduction

Preschool as a potential setting for health promotion and obesity prevention has attracted increased interest in recent years (Larson, Ward, Neelon, & Story, 2011). A large proportion of children attend some form of preschool or formal childcare, and many children spend a substantial amount of their time there (Blackburn, 2006; Säkkinen & Kuoppala, 2015). This makes preschool an important setting impacting children's energy balance-related behaviours (EBRBs), including dietary habits such as the intake of foods high in sugar and fat (Kremers et al., 2006; Larson et al., 2011). Some previous studies conducted in the United States (US) and Europe have found that fruit and vegetable (FV) intake in

preschools, which is part of healthy eating, is low (Ball, Benjamin, & Ward, 2008; Erinosho, Dixon, Young, Brotman, & Hayman, 2011; Gubbels, Raaijmakers, Gerards, & Kremers, 2014; Padget & Briley, 2005). The US studies also found that the intake of sugar is higher than recommended in preschools (Ball et al., 2008; Erinosho et al., 2011; Erinosho, Ball, Hanson, Vaughn, & Ward, 2013; Padget & Briley, 2005). In contrast, findings from some European studies report lower sugar intake among those at preschool compared to children who are not attending preschool (Lehtisalo et al., 2010; Sepp, Lennernas, Pettersson, & Abrahamsson, 2001). A Portuguese study reported significantly higher FV intake among 4–5-year-olds at preschool than those who are taken care of at home (Moreira et al., 2015).

Overall, the major challenges in the diets of preschool children are the lack of FVs and an excessive intake of sugar-enriched foods, including sugary drinks (Erkkola et al., 2009; Lynch, 2015; Svensson et al., 2014). To identify the factors influencing children's food intake at preschool, a socio-ecological model has been found to be a

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useful framework (Sallis, Owen, & Fisher, 2008). The model identifies factors on multiple levels: individual (e.g. age), environmental (e.g. preschool), and societal (e.g. the municipality). Socio-ecological models also propose that these levels interact with each other (e.g. societal to environmental); in addition, several factors on each level can interact with each other. For example, in the preschool environment, interactions can occur between the social (e.g. teachers' self-efficacy) and the physical (e.g. the availability of vegetables) environments (Gubbels, Van Kann, de Vries, Thijs, & Kremers, 2014). Qualitative methods, such as focus groups and interviews, can help researchers delve deeper to understand factors that contribute to food intake in preschoolers and reveal previously undetected interactions (Stewart, Shamdasani, & Rook, 2007).

Prior qualitative studies have focused mostly on parents to understand food and beverage intake at home (De Lepeleere, DeSmet, Verloigne, Cardon, & De Bourdeaudhuij, 2013; Dwyer, Higgs, Hardy, & Baur, 2008; Haerens et al., 2008). Only a few focus groups have been conducted among preschool personnel about food intake at preschool (De Craemer et al., 2013; Lloyd-Williams, Bristow, Capewell, & Mwatsama, 2011), and to the best of our knowledge, no studies have been reported from Finland. The European Toy Box study explored personnel's views on beverage intake (De Craemer et al., 2013). In most of the preschools in that study, only water was offered to drink, but some of the preschools offered chocolate milk and fruit juices. In general, the personnel did not perceive that this practice needed to be changed. In Lloyd-Williams' study carried out in the UK, the focus was on nutrition policy and practices (Lloyd-Williams et al., 2011). The study found that preschool personnel were interested in offering healthy food at preschools, but several factors at the societal level needed to be improved, such as menu planning and the effectiveness of the communication between all levels involved in the food offering. Earlier, an interview study in Sweden (Sepp, Abrahamsson, & Fjellström, 2006) found that the personnel at preschools felt ambivalent and uncertain as teachers in meal situations (Sepp et al., 2006). The results of these studies show that many factors on several levels influence the food intake in preschool.

In Finland, all 3–5-year-old children have the legal right to attend preschool, and about 76% of all children attend preschool (Säkinen & Kuoppala, 2015). Of those 76% in preschool, about 80% are provided full-time care, which means more than seven hours/day, five days a week. The majority of preschools are arranged by the municipalities for an affordable price (€290 per month at the maximum – about \$310 US dollars including all meals), and in addition, lower income families are charged reduced fees. In most municipalities, the menu planning and often also the food preparation is centralized, meaning that all of the preschools in the municipality serve the same food. Children are served three meals per day in preschool: breakfast, a hot lunch, and an afternoon snack. These meals, based on the national recommendations, should cover two-thirds of children's nutrient requirements (Hasunen et al., 2004). Usually FVs are served at each meal; at breakfast as a small piece of fruit or vegetables, at lunch as a salad and sometimes as boiled vegetables, and at afternoon snack as a small piece of fruit or vegetable. Food intake at preschool thus plays a major role in the diets of young children.

The Finnish concepts of permitting every child to attend public preschools, setting national nutrition recommendations for preschools, and as a consequence, serving the children in preschools the same food are quite unique, at least in the context of Europe or the Nordic region. The context in Sweden is similar, whereas the Norwegian context is quite different. Norway has no national nutrition recommendations for what foods should be served at preschools, and the food service system differs in each preschool;

some preschools provide three meals per day, others provide hardly any meals (parents bring the food for their child), while most have a mixed system of food provided by the preschool and food brought by parents. The concepts of preschools attended by the majority of children independently of their socio-economic background and of preschools in different municipalities that provide uniform meals according to the national recommendations need to be further studied as environments promoting healthy eating.

The aim of this study was to explore preschool personnel's opinions and perceptions about the influential factors on children's food intake, namely FVs and sugar-enriched foods, in preschool based on the socio-ecological model.

2. Material and methods

This study is part of a larger research project called Increased Health and Well-being in Preschools (DAGIS) that aims to decrease socio-economic inequalities in children's energy balance-related behaviours. A description of the DAGIS study is found elsewhere (Määtä et al., 2015).

2.1. Recruitment

To ensure that the study covered a range of socio-economic levels, the personnel were recruited through preschools situated in low socio-economic neighbourhoods. The definition of a low socio-economic neighbourhood was that it belonged to the lowest tertiary of educational and income levels in the municipality according to national and municipal statistics. Two municipalities were invited to the study. Based on statistics from these municipalities, preschools in low socio-economic areas were selected for the study. After permission was obtained from the municipalities, the principals of the preschools were contacted, and all seven of the contacted preschools agreed to participate. Information letters and consent forms were distributed through the preschools to the preschool personnel, and the personnel were told that participation was voluntary. Written consent was obtained from all of the participants in the focus groups. A recruitment criterion for personnel was that the participants needed to spend most of their work time in groups consisting mainly of 3–5-year-old children. The anonymity and confidentiality of the participants was ensured at all stages of the study; for example, the moderator was not given the participants' names, the discussions were coded anonymously, and the participants were not introduced to each other. The ethics approval for the focus groups was obtained from the Coordinating Ethics Committee of the Hospital District of Helsinki and Uusimaa in May 2014.

2.2. Participants

A total of 14 preschool personnel from the seven preschools participated in four focus groups. All of the participants were women, and they all worked with children in preschool groups. The participants' mean age was 46 years (range 29–59 years). The mean length of working experience in preschools was 19 years (range 4–41 years), and the mean working time at the current workplace was 10 years (range 3 months–25 years). Six of the participants had a degree in early childhood education (bachelor's degree), whereas eight had completed an educational programme in child care that is considered below the bachelor's degree level.

All four focus groups conducted discussions in October 2014. In order to facilitate participation, a number of options for the time and place of the discussions were offered. This resulted in groups with two to five participants. Two focus groups were held during preschool hours, and in total nine individuals participated in these

two groups. The participants represented two preschools and five different units within the two preschools. The other two focus groups were conducted in the evening at the preschools after closing time. The five participants in these groups represented four different preschools that were situated nearby within the same district.

2.3. The focus group procedure

The participants completed a brief demographic questionnaire at the beginning of the focus group. The focus groups were led by a moderator, who was familiar with the aim of the study and the guide for the discussions. The moderator ensured that all the themes were covered and that the atmosphere was open and relaxed. A co-moderator participated by taking notes and being responsible for recording. The participants received a small compensation for their participation. Directly after the focus groups, the moderator and co-moderator shared their impressions regarding items such as group characteristics, the most important themes that emerged, and possible new ideas and issues. After the fourth focus group, it was agreed that saturation of the factors that influence FV and sugar-enriched food intake in the preschool setting had been reached. The focus group discussions lasted about one and a half hours.

The researchers had developed, pretested, and refined a semi-structured guide for the discussions, which included four broad open-ended themes. The two main themes that concerned food intake were: "What do you think about children's food and beverage intake in preschool?" and "What are your personal and the preschool's responsibilities as a nutrition educator?" The moderator ensured that the main themes were discussed and asked follow-up questions focused on FVs and sugar-enriched foods. If the participants' discussion did not continue spontaneously, the moderator would prompt the discussion with optional questions that focused on FVs and sugar-enriched foods.

2.4. Data analysis

The interviews were audio-recorded and transcribed verbatim. Two of the researchers independently conducted deductive content analysis using Nvivo 10 qualitative data analysis software (Version 10, 2013; QSR international Pty Ltd., Doncaster, Victoria, Australia). The analyses of the interviews were performed at the group level, that is, background information on the participants was not connected to the interview.

Two researchers coded the data using the socio-ecological model as a framework. The researchers individually listed factors that the personnel considered to influence children's FV and sugar-rich food intake in preschool. After completing individual analyses, the researchers met to compare and agree upon the identified themes in the data.

3. Results

Important factors that the personnel mentioned as influencing children's FV and sugar-enriched food intake in preschool are included in Fig. 1. In Fig. 1 the main influencing factors are placed on the different levels of the socio-ecological model: the child, the preschool environment, and the societal level.

3.1. The child level

At the child level, factors that affect FV intake were discussed more extensively than those for sugar-enriched foods. The personnel noticed that the child's age is an important factor for FV

intake. Younger children, 2–4-years-old, generally did not eat large portions of FVs at lunch, whereas the portions increased when the children grew older. The younger children were also more prone to modelling their peers, meaning that if one child expresses that the salad is not good, the others in the group will also dislike it. This was something that the personnel said that they would sometimes take advantage of when they talked with the children.

Personnel (P): Then there is the role of the adults to point out that you should taste the salad, it is really good, look how your friends are eating. And many times the child then eats it. First, the child needs to taste it. In this case, you as an adult use any opportunity – you take advantage of the times the other children in the group are eating.

The personnel stated that older children (5–6-years-old) are aware of personal variations in preferences; in addition, they knew what kind of behaviour is expected from them at the table. Therefore the older children were more interested in the food/meal itself rather than thinking what other children considered about the served food.

P1: Some children do not like the food and push the dish aside. Among older children it does not matter, the others are hungry, and they'll eat even if someone else does not like the food.

P2: Yes, in the preschool group of the younger children, the two- to four-year-olds, it is more common that if someone pushes their dish away, all the others around the table will do the same.

P1: Yes, it goes just like that among the younger ones. In the preschool group with older children, you might see that the one who has pushed his dish aside looks around. If the others continue to eat, the child might take the dish back and start to eat.

The personnel discussed that the child's personality, such as a tendency to be anxious, was an important factor for the FV intake. This was noticed when unfamiliar FVs were served.

P: Like oranges. They are afraid of the consistency of oranges.

Another topic discussed in all the groups was about picky children and very selective children afraid of new tastes or food consistencies.

P: We had last autumn a boy who did not eat any vegetables, hardly even a boiled potato. Now in the preschool group, which as a group eat vegetables very well, he has tasted and learnt to eat all the salads that are served. It is like a process that needs to be started.

In addition, the personnel talked about those whose portions, especially portions of vegetables and salads, were very small. In addition to the concern about the children not receiving enough nutrients, the personnel mentioned that they noticed that the children who did not eat much had no energy to play with the other children.

P: I have always had in my group some who are not good eaters. Now they have learnt to eat, but you have to start with very small portions and increase them over time. I have one child in my group that if you serve the child too big a portion of potatoes, it will cause him to stop eating immediately, and the child will not eat any of them.

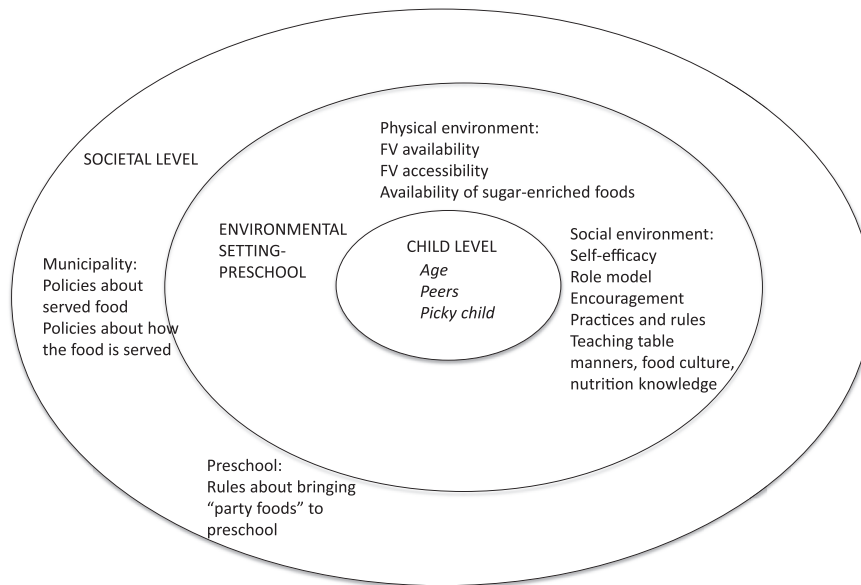


Fig. 1. Influences on preschool children's FV and sugar-enriched food intake: key themes from focus groups with preschool personnel (FV=fruit and vegetables).

3.2. The environment at preschool

3.2.1. The physical environment

The availability and accessibility of foods at preschools were topics that engaged the participants. The main source of vegetables was usually a salad (for example, grated carrots or cabbage). In one municipality, two alternative salads were provided at lunch. However, the variety of ingredients in the salads was described as monotonous and poor. The availability of seasonal fruit, berries, or vegetables was poor, which was seen as a barrier for increasing intake.

The personnel described how they had made FVs accessible for children. In one preschool the personnel circulated with the salad bowl when children were finishing their meal to increase their intake. This procedure was also necessary in another preschool, since the children no longer had the served FVs in front of them at the table. Instead, all food was served from a trolley, which was too high and far away from the children sitting at the tables.

The personnel stated that hardly any sugar-enriched foods were served at preschool, and some seemed to feel that the restriction on these was almost too strict. As an example of this, they discussed how the lingonberry jam without any added sugar was so tart that nobody ate it.

P1: Then when the serving is unsweetened and plain yoghurt without

P2: With lingonberry jam

P1: No one eats it, neither the children nor the adults.

Moderator (M): The foods served at the preschool, is there a rule for restricting the servings of sugar-enriched foods at the preschool?

P1: I do not think it is a problem at the preschool, I really do not...I was really upset, when I read in the paper that parents want to forbid pancakes.

P1: I am still upset that there is nothing (sugar in the food). In my opinion, sugar-enriched food is mainly eaten at home, at preschool you are not able to enjoy it, except on birthdays, when you might get one biscuit.

In one focus group they wondered about where the media had obtained the information that a great deal of sugar-enriched food is served and that it should be reduced. In several of the focus groups the personnel mentioned that sugar-enriched foods were seldom available at preschool nowadays.

P1: Sweetened fruit and berry juices were very common, but nowadays I think it is rare.

P2: In fact, yes, in the past there was a lot.

P1: There were sweetened juices at breakfast and at afternoon snack.

P2: Thinking about all those dairy products nowadays, they are barely sweetened.

P1: So, what do we have in the menu that is sweet? Sweet rolls, but they are offered so seldom, sometimes you should be able to offer something good and tasty for the children as well.

3.3. The social environment

In all of the focus groups, the personnel saw themselves as "nutrition educators". Most mentioned that it was obvious that all the personnel were role models for children during meals, lunches in particular. Through their own food choices during lunches, they acted as role models, and through their talk and other actions, they were able to socially support the children's healthy eating. Most of the personnel also perceived that they had the self-efficacy to act.

M: What is your and the preschool's role as a "nutrition educator"?

P1: Well, at the least it is being a role model.

P2: To encourage, and again to encourage.

The nutrition education related to lunches, as well as to breakfast and afternoon snacks, was strongly emphasized among the personnel. They felt that it was their responsibility to educate children about good table manners, Finnish food culture through

the food served, the origin of the food, food preparation, and healthy eating.

P: We eat a meal used for pedagogical purposes each day at lunch. We eat together with the children, so simultaneously we are role models, and I think that at the same time I show in practice how you should eat. For example, I have salad on my plate, and...

Role modelling was seen as one of the most efficient ways to encourage the children to taste and eat, and to shape their attitudes towards the food and their liking of it. The personnel ate lunch together with the children, and they shared how they are able to shape attitudes towards the food by the way they talk about the food when the food is being served. They also felt that the children clearly notice what the personnel eat at lunch, and therefore, several mentioned that they tried to eat as much as possible of the salads. Some of the personnel would bring their own lunches, and they recognized that it was not suitable to include “not recommended” foods in the lunch boxes. Those with lunch boxes had divergent views on role modelling. Even though they saw themselves as role models, at the same time they were not interested in eating the same food that the children ate. Some brought their own lunch boxes because they thought that the quality, the appearance, or taste of the food served was not good. Others were not forthcoming about their reasons for bringing their own lunch boxes.

P: We have this situation where we all bring our lunch boxes. It is my personal statement, let's not talk more about that, ... but I always bring a hot lunch.

M: But the children notice that you eat different food?

P: Yes, and we talk about what they have on their plates and what I have. They ask me about what green food (vegetables) I have on my plate, and we discuss that both my food and their dishes both look delicious. There is no discrepancy.

The strong opinion that the personnel were role models for eating at lunch still existed in the discussions, despite the fact that in practice the personnel's actions were diverse.

The personnel recognized that sweetened juices contained a high amount of sugar and should not be served every day. The personnel also discussed the recommended level of FVs, but few were able to give an exact amount of what the level should be.

P1: Drinking habits are nowadays more healthy, we hardly offer any sweetened juices at all, and all of the children drink milk, buttermilk, or water with their meals.

P2: The amount is half a kilo for adults, well, I don't know what the recommendation for children is, but you need to eat 500 g of fruits and vegetables. On the other hand, the preschool is only part of the day, then you have the opportunity to eat more at home in the evenings, so the preschool doesn't have to cover the whole recommendation, but it could be more at preschool.

In the discussions about how to encourage picky or selective children (“bad eaters”) to eat or how to enlarge the portions of the picky ones, the personnel felt that they had the self-efficacy to handle such situations. Several of the personnel mentioned that training a child to taste new foods or to eat more is a long process and that you have to be patient and encourage the child. Some also talked about making a distinction between those who have minor problems and those who need professional help for their eating. When major problems occurred, such as eating only a few foods, the shared opinion was that the family is responsible for asking for

help for the problem. In these cases, the personnel talked about obtaining instructions from the health care system and then acting according to those instructions. When discussing practices regarding eating at preschool, some mentioned that the personnel cannot force children to taste or eat foods such as unfamiliar vegetables, but there is usually a rule that everyone should taste the served food. The role of the personnel was seen as encouraging the children to taste new foods.

P: As a teacher you might say, “You were so brave, so brave when you tasted this (a vegetable). How do you feel about that?” In that way you might encourage their tasting, and with a child who is not speaking so much, together we just form like a smiling face or a “sad smiley” with our hands. Usually you get a response; a gestured smile that the child agreed that he was brave to taste it, and he was pleased with tasting it.

3.4. The societal level

3.4.1. Policies at the preschool and in the municipality

The preschools as well as the municipality each had their own policies that influenced the availability of food, both FVs and sugar-enriched foods. For example, the personnel discussed the policies on how to celebrate birthdays. In order to restrict sugar intake at the preschool, some had a rigid policy that the children are not allowed to bring any food to the preschool to celebrate their birthday. The reason was that with the high numbers of children in the groups, too many sweet foods would be available too often. In other preschools, the personnel explained that they had limited what and how much children are allowed to bring. Some of the personnel also mentioned that it is not the role of the preschool to teach the youngest children to eat sweets or drink sugar-sweetened beverages, and therefore, the personnel had decided to set up rules about what children are allowed to bring when celebrating birthdays.

P: We (the personnel) decided in our preschool group, since we have the youngest ones, three years old or even younger, that we will have some restrictions on what you are allowed to bring for birthday celebrations. I said that it is not the role of the preschool to introduce or to teach young children to eat sweets. We restricted sweets and soft drinks; so it is then biscuits or ice cream that you are allowed to bring. It is like the preference of the preschool, you are allowed to bring something, but only a small amount and all sweets are left out.

There were no discussions among the personnel about policies that were set up by the preschool to increase FV intake.

The personnel also discussed policies set by the municipalities that influenced the children's eating habits in the preschools. According to the personnel in one municipality, one FV-promoting decision was to always serve two different salads at lunch. The personnel trusted that the municipalities, who were responsible for planning the menus, had based their menu planning on national nutrition guidelines.

P: The nutrition content of the food is the responsibility of the municipality; they plan the menus so they follow the guidelines.

In many groups it was discussed that for hygienic reasons the children were not allowed to serve the food themselves, nor were they allowed to take part in the serving of the food. These restrictions were based on policies from the EU and the state, which

were further spread to preschools through written instructions from the municipalities.

P: The health authorities in the municipality have given the instruction that children older than three years are not allowed to serve themselves if they are sick. We are not able to distinguish between those having a mild cold or a cough and so on. Are we supposed to judge who is healthy enough to serve the food by themselves or not? That is too tricky, and therefore we prefer to serve all the food to all the children.

This municipality had also instructed that salads should be served from one big bowl placed on a trolley. This rule was set, since the central kitchen that delivered the salads did not have the resources to clean several bowls from each preschool. However, the opinion of the personnel was that by engaging children more in the cooking and serving, the children would become more interested in the food. The municipality had also set a policy that no homemade food could be brought to the preschool for a celebration for hygienic and safety reasons to protect children with food allergies.

P1: In our city, the tradition used to be that parents made a big cake that they brought to the preschool. But now that is forbidden. You are not allowed to bring anything homemade to the preschool. So if you are going bring anything, it is then something from the shop where you have a list of ingredients.

P2: Yes, we give a sort of ...information sheet at the parent's meeting or by mail to all parents at the beginning of the autumn. We inform them that they are not allowed to bring any homemade food. Well, the hygienic and safety instructions from the municipality strongly ... emphasize this ...

4. Discussion

The aim of this study was to explore the factors that preschool personnel identified as influencing children's intake of sugar-enriched foods and FVs in their preschools. The conducted focus groups verified that the socio-ecological model is a useful framework when exploring children's food intake in preschool. Factors on several levels of the socio-ecological model were perceived and discussed as important for preschool children's FV and sugar-enriched food intake. At the level of the child, preschool personnel reported that the children's age, the food eaten by their peers, and their personalities were important, especially when discussing which children taste new vegetables and eat vegetables. At the environmental level of the preschool, some factors regarding the social environment were raised by nearly all of the personnel in the focus groups. The personnel felt that they had the self-efficacy needed to influence the children's dietary intake, and most felt that they are role models and perceived themselves as educators regarding nutrition, food, and food culture. The personnel believed that the physical environment in the preschool promoted a low sugar intake, whereas the availability and accessibility of FVs varied, but were mostly low. At the societal level, the municipalities seemed to have a dominant role as they decide the menus and rules, and provide the food served. Many of the municipalities' policies and instructions were based on policies at the state and EU levels. Overall, when examining the results through the socio-ecological model, the factors acknowledged by the personnel interacted between the levels of the child and the preschool as well as within each level, as was seen in the low variability in vegetables and the personnel's self-efficacy to motivate children to eat vegetables. This interaction between levels and within levels in the

socio-ecological model has been previously proposed by [Gubbels, Van Kann et al. \(2014\)](#).

Most personnel pointed out that they have the self-efficacy to act as "nutrition educators" and that it is a part of their job. These results are not in line with a previous interview study from Sweden, where the preschool context is similar to that of Finland. The Swedish preschool personnel felt ambivalent about how to integrate food and meals into their pedagogical activities ([Sepp et al., 2006](#)). The staff in Sweden reported that they felt that their own education about healthy food and eating among children was lacking. Interestingly, in our study the personnel did not discuss whether they had the needed educational background; instead, many spoke of using "common sense" when talking about healthy foods with the children. The personnel with more working experience shared much more about eating situations in general and were more likely to report that they had the self-efficacy to act during them. Overall, the participants in the focus groups had a positive approach to acting as role models and nutrition educators. This is in line with what was reported from a more recent British qualitative study conducted in nurseries ([Lloyd-Williams et al., 2011](#)), where the personnel had the enthusiasm and interest to promote healthy eating among children. Since overweight in children is currently a growing challenge, preschool personnel could adopt a role in promoting healthy eating behaviours. Recently, Hart et al. published a study reporting on childhood professionals' views on healthy food, in which they also emphasized healthy eating behaviours and habits ([Hart, Damiano, Cornell, & Paxton, 2015](#)). Acting as a role model and eating together with children have also been widely discussed in other studies ([Lloyd-Williams et al., 2011](#); [Lynch, 2015](#)), and these concepts seem to be widely applied ([Gubbels, Gerards, & Kremers, 2015](#); [Sisson et al., 2012](#)). Eating together allows a natural conversation about healthy eating, and these conversations seem to be common practice in preschool ([Lloyd-Williams et al., 2011](#); [Lynch, 2015](#)).

Verbal encouragement and positive statements about food seem to increase the effect of role modelling. These practices were discussed both among the personnel in this study as well as in a study by [Hendy \(1999\)](#). The personnel also pointed out that young children are prone to imitating their peers, whereas older children pay less attention to what their peers eat. In the Finnish preschool system, the younger children are usually about 3–4-years-old, and the older children are 5–6-years-old. Contrary to our results, [Hendy and Raudenbush \(2000\)](#) reported that peers might influence eating more than the positive statements of personnel. The contradictory results might be due to the age of the children. In Hendy's study the mean age was slightly more than four years, which in our study was more comparable to the younger children. According to a recently published review ([Cardona, Hoek, & Bryant-Waugh, 2015](#)), picky eating is common among preschool children, beginning to decline by around 4–5 years of age, and the incidence is lower at the age of 6. Still, the presence of picky children can have an influence, for example, when introducing unfamiliar vegetables in a preschool group, and this should be taken into account in preschools.

In the Finnish context, the availability of both FVs and sugar-enriched foods was strongly connected to the societal level. Most preschools are municipality driven, and the menus for the preschools are planned centrally by the municipality. The menu planning is driven both by national nutrition recommendations as well as by how much of the municipality budget is allocated for providing meals at preschool. Based on the discussions in the focus groups, the researchers noticed small differences in the policies on the serving of FVs at the municipality level. One municipality had decided to continuously offer two different salads at lunch, thus providing the children with more choices, whereas in the other

municipality, the personnel talked about the low variety in the salads served. Two different salads provide children more possibilities, but it might not be enough to increase the amount of vegetables eaten. An experimental study in preschools found that in order to increase the eaten amount of FVs, they should be served before the main dish (Harnack et al., 2012). However, in that study a clear association between offering the FVs first and the eaten amount was only found for fruit. In the Finnish context, fruit is usually not served at lunch. Still, an experimental study on serving two salads before the main dish would be of interest. In addition, future research should investigate whether a significant difference exists in the eaten amounts when the child is allowed to serve itself or when the personnel serve the salads as the children ask for them, as is current practice in most preschools in Finland.

The availability of sugar-enriched foods has been recently reduced. The opinions of the personnel about the low availability of sugar-enriched foods in the preschools reflect the results in some previous quantitative studies conducted in Finland (Erkkola et al., 2009; Lehtisalo et al., 2010). In those studies, children who were cared for at home had a higher sugar intake than those who were cared for outside the home. Correspondingly, the municipalities, which are responsible for the menu planning and the food provision, have taken a quite restrictive line in offering sugar-enriched foods. Further, the personnel also discussed the policies concerning celebration days. The policies differed depending on the preschool, but it seemed that all of the preschools had taken the approach that it is possible to celebrate without serving high amounts of sugar-enriched foods. Referring to the socio-ecological model, the interaction here may be between both the societal and the preschool levels as well as within the social and physical environments at the preschool level. In a study by Lloyd-Williams, one of the main conclusions was that preschools need support at all governmental levels when they aim to provide healthy food (Lloyd-Williams et al., 2011).

This study has some limitations. The preschool personnel who volunteered to participate in this study might have been more eager and motivated than the other staff members to consider children's health behaviours and share their thoughts on how to influence these behaviours. Therefore, the results of this study are limited to our sample. Some of the focus groups were smaller than the targeted group size of four, but the smaller group size allowed more in-depth conversations. The social pressures of a larger group might have had an influence on the practices reported. However, the recurrence of several factors in multiple interviews supports the results. The recruitment of preschools was done in low socio-economic areas. However, areas of both higher and lower socio-economic brackets are usually located next to each other (and are relatively small). Therefore, even when families enrol their children in preschools nearby their homes, the preschool might be located in a different socio-economic area from that of the family. Therefore, in this study conclusions could not be made about any influencing factors concerning only lower socio-economic groups.

A strength of the study was that all the levels of the socio-ecological model, as well as interactions within the levels, were mentioned in nearly all of the focus groups. This shows that the model is suitable for use when exploring the factors influencing food intake in preschool and that preschool personnel are aware of many factors at different levels that influence children's food intake. A clear strength of the study is the study sample, the preschool personnel. Few studies exist on how preschool personnel view their role and the preschool in promoting healthy eating. Since the majority of children in Finland spend much of their time on weekdays at a highly standardized preschool, preschools have a large potential to promote healthy eating, both through their physical as well as their social environments.

5. Conclusions

This study was conducted in a Finnish preschool context. The food offered in preschools in Finland is highly standardized. However, using the socio-ecological model as a framework in the analyses, the study produced valuable knowledge about many factors that influence what children eat at preschool. The great number of factors and their interactions discussed by preschool personnel are valuable knowledge when planning interventions that aim to promote healthy eating among all children at preschools.

Conflict of interest

None declared.

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References

- Ball, S. C., Benjamin, S. E., & Ward, D. S. (2008). Dietary intakes in North Carolina child-care centers: are children meeting current recommendations? *Journal of the American Dietetic Association*, 108(4), 718–721.
- Blackburn, P. (2006). *Childcare services in the EU – what future?*. Retrieved from <http://www.eurofound.europa.eu/observatories/emcc/articles/childcare-services-in-the-eu-what-future>, 08.03.16.
- Cardona, C. S., Hoek, H. W., & Bryant-Waugh, R. (2015). Picky eating: the current state of research. *Current Opinion in Psychiatry*, 28(6), 448–454.
- De Craemer, M., De Decker, E., De Bourdeaudhuij, I., Deforche, B., Vereecken, C., Duvinage, K., et al. (2013). Physical activity and beverage consumption in preschoolers: focus groups with parents and teachers. *BMC Public Health*, 13, 278–2458-13-278.
- De Lepeleere, S., DeSmet, A., Verloigne, M., Cardon, G., & De Bourdeaudhuij, I. (2013). What practices do parents perceive as effective or ineffective in promoting a healthy diet, physical activity, and less sitting in children: parent focus groups. *BMC Public Health*, 13, 1067–2458-13-1067.
- Dwyer, G. M., Higgs, J., Hardy, L. L., & Baur, L. A. (2008). What do parents and preschool staff tell us about young children's physical activity: a qualitative study. *The International Journal of Behavioral Nutrition and Physical Activity*, 5, 66–5868-5-66.
- Erinosho, T. O., Ball, S. C., Hanson, P. P., Vaughn, A. E., & Ward, D. S. (2013). Assessing foods offered to children at child-care centers using the Healthy Eating Index-2005. *Journal of the Academy of Nutrition and Dietetics*, 113(8), 1084–1089.
- Erinosho, T., Dixon, L. B., Young, C., Brotman, L. M., & Hayman, L. L. (2011). Nutrition practices and children's dietary intakes at 40 child-care centers in New York City. *Journal of the American Dietetic Association*, 111(9), 1391–1397.
- Erkkola, M., Kronberg-Kippilä, C., Kytälä, P., Lehtisalo, J., Reinivuo, H., Tapanainen, H., et al. (2009). Sucrose in the diet of 3-year-old Finnish children: sources, determinants and impact on food and nutrient intake. *The British Journal of Nutrition*, 101(8), 1209–1217.
- Gubbels, J. S., Gerards, S. M., & Kremers, S. P. (2015). Use of food practices by childcare staff and the association with dietary intake of children at childcare. *Nutrients*, 7(4), 2161–2175.
- Gubbels, J. S., Van Kann, D. H., de Vries, N. K., Thijs, C., & Kremers, S. P. (2014). The next step in health behavior research: the need for ecological moderation analyses – an application to diet and physical activity at childcare. *The International Journal of Behavioral Nutrition and Physical Activity*, 11, 52–5868-11-52.
- Gubbels, J. S., Raaijmakers, L. G., Gerards, S. M., & Kremers, S. P. (2014). Dietary intake by Dutch 1- to 3-year-old children at childcare and at home. *Nutrients*, 6(1), 304–318.
- Haerens, L., Craeynest, M., Deforche, B., Maes, L., Cardon, G., & De Bourdeaudhuij, I. (2008). The contribution of psychosocial and home environmental factors in explaining eating behaviours in adolescents. *European Journal of Clinical Nutrition*, 62(1), 51–59.
- Harnack, L., Oakes, J., French, S., Rydell, S., Farah, F., & Taylor, G. (2012). Results from an experimental trial at a Head Start center to evaluate two meal service approaches to increase fruit and vegetable intake of preschool aged children. *The International Journal of Behavioral Nutrition and Physical Activity*, 9, 51–58.
- Hart, L. M., Damiano, S. R., Cornell, C., & Paxton, S. J. (2015). What parents know and

- want to learn about healthy eating and body image in preschool children: a triangulated qualitative study with parents and early childhood professionals. *BMC Public Health*, 15(1), 596–015-1865-4.
- Hasunen, K., Kalavainen, M., Keinonen, H., Lagström, H., Lyytikäinen, A., Nurttila, A., et al. Talvia, S. (2004). Lapsi, perhe ja ruoka [The Child, Family and Food]. In *Nutrition recommendations for infants and young children as well as pregnant and breastfeeding mothers*. Helsinki: Sosiaali- ja Terveysministeriö julkaisuja 11. Retrieved from <http://www.ravitsemusneuvottelukunta.fi/attachments/vrn/lapsi.perhe.ruoka.pdf>, 08.03.16 (in English).
- Hendy, H. M. (1999). Comparison of five teacher actions to encourage children's new food acceptance. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 21(1), 20–26.
- Hendy, H. M., & Raudenbush, B. (2000). Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite*, 34(1), 61–76.
- Kremers, S. P., de Bruijn, G. J., Visscher, T. L., van Mechelen, W., de Vries, N. K., & Brug, J. (2006). Environmental influences on energy balance-related behaviors: a dual-process view. *The International Journal of Behavioral Nutrition and Physical Activity*, 3, 9.
- Larson, N., Ward, D. S., Neelon, S. B., & Story, M. (2011). What role can child-care settings play in obesity prevention? A review of the evidence and call for research efforts. *Journal of the American Dietetic Association*, 111(9), 1343–1362.
- Lehtisalo, J., Erkkola, M., Tapanainen, H., Kronberg-Kippilä, C., Veijola, R., Knip, M., et al. (2010). Food consumption and nutrient intake in day care and at home in 3-year-old Finnish children. *Public Health Nutrition*, 13(6A), 957–964.
- Lloyd-Williams, F., Bristow, K., Capewell, S., & Mwatsama, M. (2011). Young children's food in Liverpool day-care settings: a qualitative study of pre-school nutrition policy and practice. *Public Health Nutrition*, 14(10), 1858–1866.
- Lynch, M. (2015). Kindergarten food familiarization. An exploratory study of teachers' perspectives on food and nutrition in kindergartens. *Appetite*, 87, 46–55.
- Määttä, S., Lehto, R., Nislin, M., Ray, C., Erkkola, M., Sajaniemi, N., et al. (2015). Increased health and well-being in preschools (DAGIS): rationale and design for a randomized controlled trial. *BMC Public Health*, 15, 402–015-1744-z.
- Moreira, T., Severo, M., Oliveira, A., Ramos, E., Rodrigues, S., & Lopes, C. (2015). Eating out of home and dietary adequacy in preschool children. *The British Journal of Nutrition*, 114(2), 297–305.
- Padget, A., & Briley, M. E. (2005). Dietary intakes at child-care centers in central Texas fail to meet Food Guide Pyramid recommendations. *Journal of the American Dietetic Association*, 105(5), 790–793.
- Säkinen, S., & Kuoppala, T. (2015). *Lasten päivähoido 2014 [The children's daycare 2014]*. National Institute for Health and Welfare. Statistical Report 28/2015. Retrieved from http://www.julkari.fi/bitstream/handle/10024/129632/Tr28_15.pdf?sequence=5, 08.03.16.
- Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In K. Glanz, & B. K. Rimer (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 465–482). San Francisco CA: Jossey-Bass.
- Sepp, H., Abrahamsson, L., & Fjellström, C. (2006). Pre-school staff's attitudes towards foods in relation to the pedagogical meal. *International Journal of Consumer Studies*, 30(2), 224–232.
- Sepp, H., Lennernas, M., Pettersson, R., & Abrahamsson, L. (2001). Children's nutrient intake at preschool and at home. *Acta Paediatrica*, 90(5), 483–491.
- Sisson, S. B., Campbell, J. E., May, K. B., Brittain, D. R., Monroe, L. A., Guss, S. H., et al. (2012). Assessment of food, nutrition, and physical activity practices in Oklahoma child-care centers. *Journal of the Academy of Nutrition and Dietetics*, 112(8), 1230–1240.
- Stewart, D. W., Shamdasani, P. N., & Rook, D. W. (2007). Focus groups and the Research. In D. W. Stewart, P. N. Shamdasani, & D. W. Rook (Eds.), *Focus groups* (2nd ed., pp. 37–51). Thousand Oaks, CA: SAGE Publications, Ltd.
- Svensson, A., Larsson, C., Eiben, G., Lanfer, A., Pala, V., Hebestreit, A., et al. Lissner, L. (2014). European children's sugar intake on weekdays versus weekends: the IDEFICS study. *European Journal of Clinical Nutrition*, 68(7), 822–828.