Young Children's Perceptions on Meals and Snacks: Quantity, Occasion, and Quality

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Abstract

This study investigated young children's understanding about meals and snacks, and their perceived differences between meals and snacks. Fifty-two children from preschool, kindergarten, and second grade shared their opinions. Qualitative results indicated the limited understanding about meals and snacks among this group of children; the physical attributes such as portion size, food examples, and time occasions were frequently used to describe and classify meals and snacks. Their perceptions and knowledge increased when aging; children in second grade hold more knowledge towards meals and snacks as well as their differences. Finding from this study is important and may hold important health implications for interventions towards child obesity.

Keywords: Child obesity; meals and snacks; food; health.

Introduction

Childhood obesity has been a serious public health crisis in the United States (Centers for Disease Control and Prevention [CDC], 2017); White House Task Force on Childhood Obesity, 2010). Despite the effort on obesity intervention and prevention in recent years, obesity rate is still high among children (CDC, 2017). Research has shown that childhood obesity has been associated with dietary behaviors with energy-dense, nutrients-poor food, large portion sizes, and more snack intake besides regular meals. Snacks have been increasingly consumed among young children and it was reported that less than 1% of children never consumed snacks. Snacking has resulted in higher energy intake among children and is positive associated with children' weight [1]. There is a positive relationship between the energy density and taste of snacks and child obesity among 8 to 10-year olds. However, the relationship between snacks and childhood obesity is still not quite clear. Some snacking patterns was associated with lower risk of overweight. Some research studies discovered that there was no relationship between snacking and weight or snacking does not predict weight gain. The problem is, increased snacking might result in meal skipping. Children who skip meals might have poor nutrient intake.

Given the controversial discussions about the snacks and meals, it seems to be logical to carry out interventions to change children' meal and snack eating behavior [2]. Since the conceptual understanding of a food as a meal and a snack influence their eating behavior, children's perceptions of the meals and snacks would be essential for dietary interventions. Surprisingly little is known about children's perceptions of meals and snacks. To add such information into literature, this study was to investigate young children's perceptions about meals and snacks, and their perceived differences between a meal and a snack.

Conceptual framework

Literature documented different ways in which people classify food. Research have found that adults prefer to use the type or time of the meal to classify food, such as meal food, snack food, holiday foods, summer foods. Some people like to use preference, healthiness, price, or context to classify food [3]. It is indicated two commonly used categories: Taxonomic categories which are based on properties, such as breads, meats, or diary and script-based categories which are based on role, such as meal food, snack food, healthy food, or junk food. The Taxonomic categories were often used in 4-to 7-year-old children. Food classification criteria are a bit different among adolescent and children. They discovered that healthy (i.e. fruits and vegetables) or junk foods (i.e. potato chips and chocolates) were used in young female adolescents. It is similar among children of 8 to 13 years old. Younger children like to use food groups to classify food [4].

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When specifically investigating the meal and snack classification, found that young adults like to use environmental cues and food cues to distinguish meal from snack. Take the environmental cues for example, meal takes places with family, sitting, in a large portion but snacks for eating alone, standing, in a small portion. Food cues are associated with quality of food, such as quality meals and low quality snacks. People's ways of classify the food as meal or snack food might be based on their experiences. Sometimes, the same food could be either recognized as a meal food or for a snack [5]. The perceived eating occasions have been found influential on meal and snack intake. People's view on meal verse snack would also affect people's eating behaviours. explained that if a food is perceived as a snack, then people ate more of them, it is opposite for a food being perceived as a meal food. also indicate that taking a small portion size of food and package of food as snacks can help adjust the calories intake later in the day [6].

However, there is limited information about young children's understanding about meals and snacks, the ways in which they categorized food for meals and snacks, as well as their perceived differences between a meal and a snack. As we all know that, nutrients in meals and snacks are important for young children's growth, how children categorized the food into meals and snacks might influence their eating behavior [7]. Based on the information obtained from literature, it might be challenging to young children due to the reason that to distinguish meals from snacks involving the classification skill, a skill that involves cognitive development and logical thinking. Young children might not be able to tell the differences due to immature development in cognition and logical thinking skills [8]. In addition, to distinguish meals from snacks might also be a complicated task for young children due to the reality that certain food can both be labelled as meal food and snack food. Therefore, this exploratory study intended to examine young children's perceptions of a meal and a snack and the differences between a meal and a snack. This study was guided by these research questions: 1) What are young children's descriptions of a meal? 2) What are young children's descriptions of a snack? 3) What are young children's understanding of differences between a meal and a snack? 4) What are young children's choices for a meal and a snack?

Method

Data Source

The current study was part of a large study. Data source included 17 preschool, 17 kindergarten, and 18 second-grade children, a total of the 52 children. It included 31 boys and 21 girls. The majority of children (n=36) were from the families high on the measure of social economic status (SES), the rest were from low SES families. Children's demographic information is presented in (Table 1).

This study adopted a qualitative research design and used individual interviews to collect the data. The interview questions were developed with information obtained from literature and revised based on the feedback from early childhood professors and classroom teachers. Child interview was furtherly piloted with a small group of children of five, who were excluded in the final data collection [9].

		Preschool		Kindergarten		Second Grade		Total	
		(n =17)		(n =17)		(n =18)		(N =52)	
Children	SES								
	Low	3	-17.65%	5	-29.41%	8	-44.44%	16	-30.77%
	High	14	-82.35%	12	-70.59%	10	-55.56%	36	-69.23%
	Gender								
	Boy	12	-70.59%	9	-52.94%	10	-55.55%	31	-59.61%
	Girl	5	-29.41%	8	-47.06%	8	-44.40%	21	-40.39%

Table 1: Demographic characteristics of the participants

Twenty food photos were used to facilitate children to explorations on their concepts of meals and snacks. These food items were careful selected based on the information obtained from the nutritional guideline from the United States Department of Agriculture (USDA). During the interview, the research assistant asked individual children to: a) define a meal, define a snack, and describe the differences between a meal and a snack, b) make a favorite meal, make a good meal, and make a bad meal, c) choose a favorite shack, a healthy snack, and an unhealthy snack. The research assistant recorded the responses on an individual answer sheet. All interviews were recorded in case further verifications and clarifications were needed [10].

Data Analysis

The videos were transcribed and labeled with numbers. The data analysis regarding the descriptions of a meal and a snack, as well as meal and snack differences were carried out using three-step interpretive approach. Data were first grouped based on categories (i.e. grade). The researcher and the research assistant discussed the data from each grade levels and identified the initial codes. The data were then analyzed crossed grade levels based on the constant-comparative method [11]. The similarities and differences in those codes used by children across each grade levels were

compared. Frequencies of codes were furtherly analyzed to establish the patterns for their descriptions of a meal, a snack, and meal and snack differences. The check code was measured to ensure the quality of data coding and inter-rater reliability showed a 95% agreement.

Results

Children's Meal Descriptions

Two common themes were evidence across the three grade levels. The first common theme was that children used associated food examples to describe a meal.For example, a preschool child provided food examples for a meal such as "chicken nuggets with chips… or hotdog, milk, pizza and cheese."One second grader explained: "A meal may be pizza, cheese, broccoli, a glass of milk, and dessert… a bow of ice cream." One kindergartner kindergarten child said: "Hamburger and pizza, those two are meals." The second common theme was that children used portion size to describe a meal [12]. They explained that a meal usually has "a lot of food" or "big patch of food". For example, a second grader described "a meal is…a lotta food to fill you up." One preschool child said: "Meal is a lot of food, such as a hotdog, chips, and pineapple."

Some differences among children's understandings of a meal were also observed across these three grades. Preschoolers had limited understanding of a meal; most of them perceived meal was equivalent to food, and they viewed a meal as dinner. Kindergarten children described meal as breakfast, or dinner, or lunch, or snack, or any of those two combined. They frequently used certain food items to represent a meal. One child mentioned: "Meal is kinda like lunch, when you can eat food." Mostly interestingly, some kindergarten children described the meal as a pack or a bag of food. For example, "Meal is when go out to Chick-fil-A that has a pack that is called meal that has food in it" or "You got a bag, has hamburger, hotdog, donuts, pineapple." Children in second grade frequently described meal as "something you eat every day, three times a day", or "meal is breakfast, lunch and dinner". In addition, they were more aware of the healthy value of the meal and they believed that a meal should be healthy [13]. For example, one second grader said: "A meal is something you eat at dinner, something good and healthy." Another second grader explained a meal should include dairy, protein, fruit, vegetable, and grains. The frequency counts for all codes of meal are presented in (Table 2).

Meal	Grade					
Codes	Preschool		K		2nd	
	n	%	n	%	n	%
size (lot of food)	2	11.76%	2	11.76%	5	27.78%
something to eat			1	5.88%	2	11.11%
food	2	11.76%	1	5.88%	1	5.56%
eat in a day			1	5.88%		
dinner (only)	2	11.76%	1	5.88%	3	16.67%
type (B, L, D)			3	17.65%	6	33.33%
associated food	6	35.29%	4	23.53%	3	16.67%
food groups			1	5.88%	1	5.56%
don't know	2	11.76%	2	11.76%		
when hungry	2	11.76%				
like snack			1	5.88%		
at restaurant	1	5.88%				
healthy			1	5.88%	1	5.56%

Table 2: List of meal coding categories used by children

Note: K= kindergarten; 2nd = second grade; B = breakfast, L= lunch, D = dinner

Children's Snack Descriptions

Similar to children's meal descriptions, they frequently used associated food examples to describe a snack. Cheerios, crackers, apples, goldfish, ice cream, candy, pretzel, donuts, and cheese sticks were some examples mentioned. One preschooler provided several snack examples, such as chicken nuggets, chips, pizza, and cereal. One kindergarten children said a snack was "something might be chips". One second grader explained "snack is small piece of food, like granola bar" [14].

Time occasions were associated with a snack. Children frequently mentioned a snack was something to eat when they come back from school, or in the afternoon, or after naptime, or after breakfast, or before lunch, or between meals, or when watching TV, or take a break. For example, one preschooler said: "Snack you eat when watching TV, when you hungry, or after nap time." Some children in second grader mentioned that snack was "something before dinner" or "something that you have when hungry… you can eat it before dinner" [15].

Portion size was also used among these children to describe a snack. They perceived a snack was "a small piece of thing," or a little bit of food," "small little thing."All of their descriptions highlighted the character of small size for a snack.

Differences in their understanding of a snack also occurred across these three grade levels. Preschool children preferred to use time occasions to describe the snack. In addition to that criteria, more kindergarten children like to describe a snack using "associate food examples". Children in second grade mostly use portion size and viewed a snack as something small. They also distinguished the snack from a meal, and they knew that time to eat a meal and a snack were different, such as "something you eat when you hungry, not dinner, lunch or breakfast," or "a little food that you eat between meals." Below displays the frequency counts for all codes used for 'snack' by children.

Differences between a Meal and a Snack

Children were asked to describe the differences between a meal and a snack.Their narrative descriptions were recorded and subsequently classified into themes.All the coding categories for meal and snack differences are listed.

The portion size was the criterion that children used most to differentiate between a meal and a snack, with the bigger size for a meal and a smaller size for a snack. Among these children, two were in preschool, five were in kindergarten, and eleven were in second grade. “A meal is bigger than a snack” were frequently mentioned as the major differences. One preschooler said, “Snack just has one [thing], meal… [you] get a lot of food.”

Time was used to distinguish a meal from a snack; a snack was taken before or after meal. This criterion was used by eight children in preschool, seven children in kindergarten, and five children in second grade (n=20). One kindergarten child said: “Meal is something like lunch or dinner. Snack is after that.”Another child was more specific saying that “Meal is four things: Dinner, snack, breakfast and lunch that make your computer [brain] work. Snack you eat at last, before dinner”. One child in the second grade said, “Snack is eaten before dinner, lunch [16]. Meal is dinner, right after the snack.” One preschooler explained, “Snack is different. When you eat lunch, take a nap… when you wake up, you have a snack.” Meal and snack were eaten at different time of the day were also mentioned with explanations such as “meal is for lunch stuff, snack is for you at home”, “snack is at morning, meal is at night”, “meal is later on, snack is earlier”.

Healthiness was also used to distinguish a meal from a snack; they mentioned that a meal was healthy and consisted of real food while a snack may or may not be healthy. One preschool children explained that “A meal is…when it is breakfast time, snack isn’t like when breakfast time [17]. Because breakfast is healthy food… some snacks are healthy.” For children in kindergarten, one child viewed both "meal and snack were healthy, the same thing. Another child said: “…you have sweet stuff in snack. Meal is the real stuff you eat.”For children in second grade, they insisted that “Meal is big healthy thing. Snack isn’t healthy, unless you get a healthy snack.” “Meal, mostly needs to be good. Snack can be healthy or bad for you.” “Meal mostly needs to be good; snack can be healthy or bad for you” agreed by another child.

There were some differences in their understanding regarding the differences between a meal and a snack. For children across these three grade levels, preschool children had limited understanding of the differences between a meal and a snack; seven of them having difficulties distinguishing a meal from a snack, and they believed they are the same. Over 40% of preschoolers were unable to differentiate a meal from a snack. They knew they were differences but they could not provide detailed explanations. A child indicated “food are different.” Another child argued, “meal is not dessert”. It was similar among kindergarten children, with approximately 35% of them not being able to tell the differences. Some kindergarten children started to realize that a meal was healthy but it was not for a snack. Children in second grade provided specific explanations. They used portion size to differentiate between a meal and a snack, with a majority (61%) of children indicating that a meal was larger than a snack. They also understood that meals were things to eat during the day, such as breakfast, dinner, and lunch; snack were things to eat when hungry between meals.

Food Choices for a Meal

Children were asked to make a favorite meal, a healthy meal, and a bad meal out of 20 food items provided. Food frequency was used to present their choices for each meal. For the favorite meal, the most frequently chosen food items for their favorite meals included pizza (n=35), milk (n=33), chicken nuggets (n=28), donuts (n=27), and apple (n=27). More than half of children placed them into their favorite meal list. Potato chips were favored by 25 children. The least chosen food items were cauliflower (n=6), celery (n=9), tomato (n=9), and bread (n=10). Frequency counts for food items chosen for the favorite meal are presented in (Figure 1).

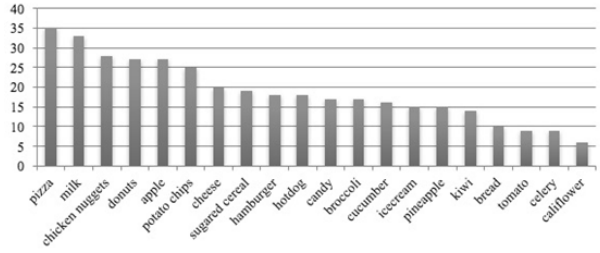

Figure 1: Frequency of food items chosen for the favorite meal

The most frequently chosen food items for the good meal included broccoli (n=41), apple (n=33), milk (n=32), tomato (n=30), and celery (n=29). More than half of children placed them in the good meal plate. The least chosen food items for a good meal were candy (n=2), potato chips (n=4), donuts (n=5), ice cream (n=5), sugared cereal (n=9), and pizza (n=9). Frequency counts for food items chosen for a good meal are presented in (Figure 2).

Children also asked to choose food items for a bad meal. The most frequently chosen items were ice cream (n=53), donuts (n=47), candy (n=45), and potato chips(n=27). The least chosen items for a bad meal were cucumber (n=2), milk (n=2), apple (n=2), pineapple (n=3), celery (n=3), broccoli (n=3), kiwi (n=5), and tomato (n=5). Frequency counts for food items chosen for a bad meal are presented in (Figure 3).

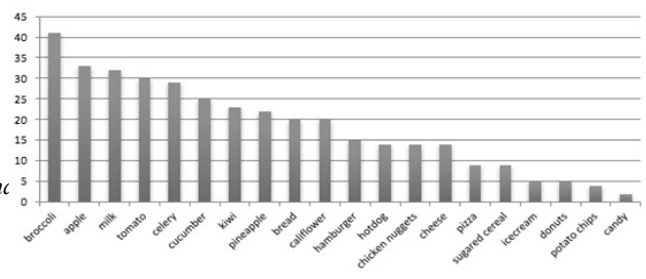

Figure 2: Frequency of food items chosen for a good meal

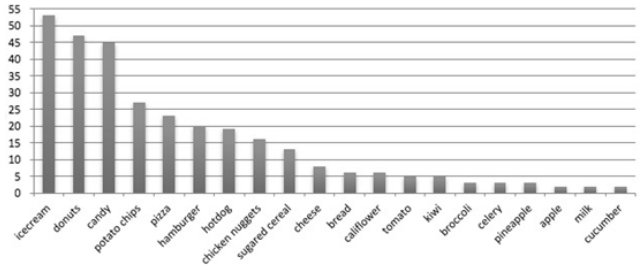

Figure 3: Frequency of food items chosen for their bad meal

Food Choices for a Snack

Snack choices were investigated by asking children to pick up their healthy snack, unhealthy snack, and favorite snack among the 20 food items provided. The tops three choices of healthy snack were apple (n=13), kiwi (n=8), and celery (n=8).The top three choices of unhealthy snacks were candy (n=22), donuts (n=16), and ice cream (n=15). The top three choices of favorite snack were donut (n=18), pizza (n=9), and apple (n=7). Young children's snack choices are displayed in the following (figures 4).

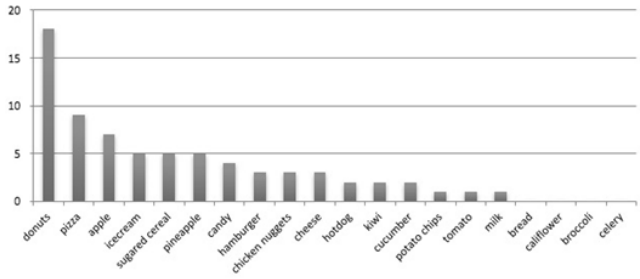

Figure 4: Favorite snack choices among children

Discussion

This study investigated young children's understanding of the meal and snack, which has rarely been studied with limited information available on this topic in the literature. Findings of this study suggest overall participants seemed to have a limited understanding of a meal, often describing the meal as food or dinner. Children's understanding of a meal ranges from physical attributes to nutritional content. Preschool children simply view a meal as "a lot of food". Kindergarten children and children in second grade could provide more descriptions of a meal; most of them described a meal as breakfast, lunch, or dinner. Older children in this group started to notice a meal contains more healthy food. The potential reason towards this phenomenon is that children at this young age might not fully describe a meal and their knowledge about meals might increase when aging. This finding is also supported in other literatures that children develop and increase their food knowledge when they grow older. It is also explained in theory of cognitive development that children develop knowledge and skills at different cognitive development stages through maturation, the physical experience, and social interactions, from concrete to abstract. Children's daily experiences with meal and snack food shape and modify their perceptions on meals and snacks.

Children's understanding of a snack varies from simply considering the physical attributes among preschool children to the purpose of eating a snack explained by children in the second grade. Children's cognitive development seems to play an important part; children learned the physical appearance to abstract knowledge alongside their age. In current study, the common finding is that children across three grades all believed a snack should be small. The differences were: The preschool children frequently used food examples to explain a snack such as cracker, which might due to their limited understanding. It is also found in other research study that children like to use food content to distinguish a meal from a snack. Children in current study also described a snack as something to eat when arriving home from school in the afternoon or after breakfast. Preschool and kindergarten children provided similar understanding of a snack; most of them like to use time of day to separate a meal from a snack. This finding is aligned with that children aged 4 to 6 like to use time of the day to distinguish a meal from a snack. Children in the second grade could make distinctions between a meal and a snack, and they understood that a snack should be taken between meals. They also started to understand the purpose of having snacks (e.g., 28 %, n=5) as something to eat when hungry before the mealtime. However, the variety of snacking occasions described among this group of children raises the question regarding snacking frequencies. It might be meaningful to investigate the snack frequencies and the obesity rate among this age group of children with a large group of participants to detect if there is a tendency of weight gain among children who eat more snacks on a daily basis.

Regarding the differences between a meal and a snack, the portion size is frequently mentioned. This finding is aligned with, who also found that children used portion size to classify meals and snacks. Children also like to use the time when meals and snacks served during a day to distinguish the meal from the snack. The most often time for them to have snack was in the afternoon and at home. This finding is also echoed in that people like to classify meals based on the time of the meal.Children in this group demonstrated their categorization skills, not only using Taxonomic category but also use Script category.

Besides the concrete concepts regarding the meal and snack differences, it seems to challenging for children to perceive abstract conceptual differences between a meal and a snack. In this study, many of the participants used physical attributes such as portion size and the time for meals and snacks to differentiate between these two. Suggested by that children in the pre-operational stage focused on physical and sensory

aspects rather than on abstract similarities or differences to group objects. It is also supported by Piaget's cognitive developmental theory which indicated that children in the operational stage of cognitive development have difficulty solving abstract problems. This characteristic of abstract thinking is also reflected health concepts of a meal and a snack. Children in kindergarten and second grade believed that a meal should be healthy but that was not always true for snack. It became obvious among the children in the second grade. This healthiness criterion was also found in other research [18].

Children in the current study had demonstrated their perceptions on healthy, unhealthy, and preferred food items. Among their food choices, there was an opposite relationship between the healthy food they perceived and food they preferred. Some food items perceived to be the healthiest but least preferred, such as celery. On the contrary, some food items perceived to be the least healthy but most preferred, such as donuts. It was reflected not only in their snack choices but also in their meal choices. Overall, vegetables are most likely to be placed in the healthy but least preferred group and the sweets are mostly likely to be placed in the unhealthy but most favorite group. Research suggested that children is likely to accept fruit than vegetables, however, when other food which high in sugar, salt or fat are available, fruit and vegetables are become their least choices to eat. This finding also suggested that the criterion of "healthiness" might not be important at all for children's food preferences and choices. A couple of studies had the similar findings. It would be meaningful to investigate these discrepancies among their food choices to detect their actual influential factors on their food intake.

Children's understanding of meals and snacks has important health implications. As previous research indicated that perceptions on meal and snack differences affect meal and snack intake, it seems to be logical to educate children appropriately on their perceptions of meals and snacks, ultimately guide their meal and snack eating behaviors [19]. However, the problem is, although the United States Department of Agriculture (USDA, 2017) have provided some meal and snack examples through the My Plate, there is no explicit guideline specifically recommending meal and snack daily intake in any Dietary Guidelines for Americans. Since meal and snack eating behaviors is important for children to development healthy habits, meal and snack guidelines shall be included in the next Dietary Guidelines for Americans. Given the reality that meals and snacks are consumed both at school and home, nutritional education with a focus on appropriate meal and snack choices and health benefits shall be carried out at both places to guide children's meal and snack consumptions. School nutrition guidelines should be implemented; it has been shown to improve children's dietary intake, with less fat intake and increased fruit and vegetable consumption. Nutrition education at school should also emphasize the importance of food for growth and well-being given their cognitive development levels, and can be incorporated into health literacy. Nutrition education at home can be carried out during the family meal time or story time with emphasize on nutrition basics, portion size, and food preparation of food consumed on the daily basis. Children like to mimic eating behaviors from adults, parents and other caregivers shall model healthy eating habits, emphasize a balance diet, andHome environment should be healthy with availability of a variety of healthy food and snacks. New food can be introduced and encouraged but not forced in different times and ways based on children's acceptance levels. Home and school collaboration in nutrition education suggested by shall also be encouraged to facilitate children's learning about meals, snacks, and other food related nutritional knowledge.

Conclusion

While this study may have important implication for children's dietary intervention, the limitations shall be acknowledged. First, due to the relatively small sample size in this study, the finding shall be taken with caution and cannot be applied to whole population. Second, this study only investigated the children at preschool, kindergarten, and 2nd grade; the results cannot be applied to children across all ages. In addition, children's view on their meal and snack choices and their actual eating behaviors might not be aligned.

Despite these limitations, this study indicated that children have developed their conceptions towards meals and snacks and started to realize the differences between a meal and a snack. Although their perceptions are still at the primary stage, their knowledge and perceptions are growing with aging. Their perceptions might drive their food consumption on the daily basis. This study adds to the literature about children's ways to distinguish meal and snacks and provides suggestions to guide children's eating behaviors based on their cognitive development levels. A longitudinal research might be helpful to examine the relationship between children's understanding of meals and snacks and their actual daily food intake for meals and snacks.

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None

Conflict of Interest

None

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