Appetite 120 (2018) 136–144

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Salad bar selection patterns of elementary school children

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ARTICLE INFO

Article history:
Received 13 June 2017
Received in revised form
29 July 2017
Accepted 28 August 2017
Available online 31 August 2017

Keywords:
Salad bar
Food selection
Elementary school children
Digital photography

ABSTRACT

From the perspective of child-focused nutrition research, the analysis of the school cafeteria culture and environment is critical. Most children eat at least one meal at school per school day, thus elementary schools are a good setting for influencing the early development of healthy eating habits. The salad bar in particular has gained attention as a means of increasing fruit and vegetable consumption. The purpose of the present study was to provide insight about the types of items children choose or do not choose from the salad bar. Our aims were to document elementary school children's food selection patterns by examining photographs of 2903 cafeteria trays. Our results show students in this study took very few items – and a substantial number did not take any at all. We examined three factors, gender, grade, and item placement, in relation to food selection. Gender was the most significant factor, with girls being more likely to choose both fruits and vegetables. Students in lower grades were more likely to select vegetables and to choose more of them. Finally, item placement did not affect choice. Our findings lead us to suggest the importance of integrating information about fruits and vegetables into the school curriculum and that schools strongly consider which items to offer because our results indicate children consistently do not choose certain items and probably do not conceive of them in the context of the adult concept of a salad. Finally, because a child's choice of food is not always a simple act we suggest ethnographic research on how children perceive and use salad bars would provide important insight into the value of retaining or expanding salad bars in elementary schools.

1. Introduction

Food selection, deciding what to eat, is a large part of our daily lives. Wansink & Sobal (2007) found that adults made over 200 food and beverage decisions a day; many more food-related decisions than they thought they made. Children also have many opportunities to engage in this decision-making process and their food selection is a dynamic process influenced by a variety of factors. Understanding children's food-related decision-making is important because children often do not meet their nutritional requirements, do not consume the recommended amount of fruit and vegetables and childhood overweight and obesity continue to be a major concern and focus of public health efforts in the United States (Capps, Ishdorj, Murano, & Storey, 2016; Condon, Crepinsek, & Fox, 2009; Hanks, Just, & Brumberg, 2016; Jones, Steer, Rogers, & Emmett, 2010; Madden et al., 2017; Olsho et al., 2015). After years of increasing prevalence of childhood obesity, recent studies have indicated decreases in obesity in specific populations and leveling off in others (CDC, 2013; Ogden, Carroll, Kit, & Flegal, 2014; Pan, Blanck, Sherry, Dalenius, & Grummer-Strawn, 2012; Robbins, Mallya, Wagner, & Buehler, 2015; Wen et al., 2012). However, recent research suggests an increase in severe obesity among children and adolescents in the previous 14 years (Skinner & Skelton, 2014; Skinner, Perrin, & Skelton, 2016). Children's food choice and decision-making processes are important pieces of the complexity of child nutritional status and childhood obesity.

Research has shown children's food preferences are important predictors of their food intakes (Bere & Klepp, 2005; Birch, 1979; Domel et al., 1996; Birch & Fisher, 1995; Resnicow et al., 1997). The processes of food preference development involve the interaction between genetics, biological taste biases and social experiences such as parental and peer influences, previous food experiences and food marketing (Birch, 1999; Houldcroft, Haycraft, & Farrow, 2014; Johnson, Gerson, Porter, & Petrillo, 2015; Jones et al., 2010; Lehto et al., 2015; Rasmussen et al., 2006; Russell, Worsley, & Liem, 2015; Wardle & Cooke, 2008). Food preferences, largely learned in early childhood, can track into adolescence and

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http://dx.doi.org/10.1016/j.appet.2017.08.034
0195-6663/

adulthood (Batsell, Brown, Ansfield, & Paschall, 2002; Nicklaus, Boggio, Chabanet, & Issanchou, 2004; Skinner, Carruth, Bounds, & Ziegler, 2002; Unusan, 2005). Additionally, research has found that children's food preferences differ between genders (Jones et al., 2010; Kimura et al., 2014). Specifically, Jones et al. found girls had a higher median daily consumption than boys and Kimura et al. (2014) found fat energy content and saturated fatty acid score were significantly higher in boys than in girls in both the 7–9- and 10–12-year-old age groups.

From the perspective of child-focused nutrition research, the analysis of the school cafeteria culture and environment is critical. Most children eat at least one meal at school per school day; thus elementary schools are an attractive environment for influencing the development of healthy eating habits. The National School Lunch Program (NSLP) provides nutritionally balanced, low cost or free lunches to more than 30 million U.S. children every day (USDA, 2016). The school cafeteria is a place children can make their own choice within a specific food environment and, as Salazar (2007) suggested, their food selection behavior can reveal their cultural, social and economic issues. The school cafeteria presents a unique position in the dietary landscape of children because it is a composite of three important inputs: 1) school district wellness policy; 2) school district economics and 3) the Food Service Director's attempts to create a nutritious menu that meets federal requirements, is child friendly in terms of child preferences, eating patterns and availability, and the structure of time for lunch versus time for recess.

Research in the school setting has provided important insight into children's food intake. Some studies have focused on aspects such as dietary quality (Au, Rosen, Fenton, Hecht, & Ritchie, 2016), intake of food groups or nutrients (Martin et al., 2010; Condon et al., 2009; Cullen, Chen, Dave, & Jensen, 2015a; Hanks, Wansink, & Just, 2014), selection/intake of fruit and vegetables (F/V) (Adams, Bruening, Ohri-Vachaspati, & Hurley, 2016; Amin, Yon, Taylor, & Johnson, 2014; Cullen, Cullen, Chen, Dave, 2015b; Elsbernd et al., 2016; Hendy, Williams, & Camise, 2005; Miller et al., 2015; Slusser, Cumberland, Browdy, Lange, & Neumann, 2007; Zellner & Cobuzzi, 2016) or plate waste (Adams, Pelletier, Zive, & Sallis, 2005; Byker, Farris, Marcenelle, Davis, & Serrano, 2014; Cohen, Richardson, Austin, Economos, & Rimm, 2013; Smith & Cunningham-Sabo, 2014; Yoder, Foecke, & Schoeller, 2015). The salad bar is one specific aspect of school cafeteria food-environment that has been gaining attention. At the national level, there has been a significant increase in support for the inclusion of salad bars in school cafeterias because of its touted potential to improve F/V consumption and reduce waste (Adams, Bruening, & Ohri-Vachaspati, 2015). However, they suggest little peer-reviewed literature has examined the independent effects of salad bars on F/V consumption, waste, or participation rates in school settings. After reviewing the existing literature at the time of their 2015 commentary, they suggest many gaps appear to exist in the information on the effectiveness of school salad bars.

A close examination of the salad bar choices that children make can provide important information about the role of salad bars in increasing F/V selection as well as clues about children's preferences. This, in turn, can help shape projects or programs that focus on changing either student food choices or cafeteria options provided by school food services. The purpose of the present study was to provide insight about the types of items children choose or do not choose and thus are resisting or rejecting from the salad bar. The specific aims were to document elementary school children's food selection habits by examining their cafeteria trays after they selected their food. Photographs of student's trays were used to compare choices: 1) between gender groups in order to examine if boys and girls consistently make different choices; 2) across grades in order to examine food choice differences as children mature and begin to internalize food information and messages; and 3) between different ways in which foods were offered to see the extent to which changes in placement of food items were related to students' choices.

2. Methods

2.1. Approach and design

This study employed digital photography methods to evaluate what elementary school children selected for lunch in a school cafeteria setting. Visual evaluation and estimation methods using digital photography for school cafeteria research (Hanks et al., 2014; Handforth, Gilboy, Harris, & Melia, 2016; Olafsdottir et al., 2016; Salazar, Feenstra, & Ohmart 2008; Schwartz, Henderson, Read, Danna, & Ickovics, 2015; Smith and Cunningham-Sabo 2014; Swanson, 2008; Taylor, Yon, & Johnson, 2014) are increasing in popularity because of their ease of implementation and cost effectiveness. Such studies have demonstrated that digital photography is a means of estimating cafeteria consumption and consequently used here to provide an objective record of what children chose in the cafeteria setting. The data reported here are part of a larger study that was conducted over a three year period, however this was the only research period where children were provided with tray identifiers that included grade, tray number and gender signifiers. All photographs were taken after students chose their food and were on their way to their seat. The children chose their tray identifier as they waited on line, and thus knew their lunch was going to be evaluated, however since trays had been photographed over several years we believe this did not influence their choices. We used a longitudinal, trend study design, gathering data in spring and fall of 2012.

2.2. Sample

The data for this project came from cafeteria observations and tray photographs taken in seven elementary schools in one Oregon school district. This district, the third largest in the county, encompasses 31.7 square miles and borders the Eugene–Springfield metro community and an agricultural–rural section of the county. The district has one regular high school, one alternative high school, two middle schools, two K–8 schools, and five elementary (K–5) schools and serves approximately 6000 students (2700 elementary school children). In general, the district was fairly similar (or did not differ substantially) from the state as a whole although it had a larger percentage of students eligible for free & reduced lunch (41.5% state vs. 46.8% district).

Table 1 gives descriptive data regarding the seven schools in the analysis. They varied in the representation of minorities, and percent of Free and Reduced Lunch (F/R). In general, schools that

Table 1
Demographic composition by school.

School	School Size	% FRL	% Hispanic	% Male
#1	295	53.8	14.6	55.4
#2	338	63.9	28.0	52.0
#3	306	80.0	27.8	43.0
#4	377	32.7	6.3	46.5
#5	357	67.6	15.1	49.9
#6[a]	513	31.2	6.7	50.1
#7[a]	486	51.9	15.4	52.4

[a] These schools included grades K-8, however the n reported here is only for grades K-5. Gender composition reflects the sample used in this paper.