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Food Awareness and Literacy Among Primary School Children in Serbia: Exploring Gender Differences

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Abstract

Understanding children's food awareness and literacy is an important task, with differences between girls and boys underexplored. Drawing on social learning theory, this extensive survey of Serbian schoolchildren (2020, N=406), aged between 6 and 10 years of age, investigates how gender influences primary schoolchildren's understanding of food and health. This study contributes to the literature by distinguishing between socially driven food awareness and education-based food literacy, while also introducing a set of novel indicators to measure both dimensions. Using ordinary least square (OLS) and linear probability models, we find that girls are more likely to be aware when food contains sugar and associate thinness with eating fruit, and no significant evidence was found that boys were more attentive to protein or strength-related foods. Girls also demonstrate higher levels of food literacy. However, gender differences in food literacy are accounted for largely by girls being more aware of unhealthy foods, rather than a superior understanding of healthy foods. Interaction effects by age or urban–rural background were largely unsupported, aside from urban girls' greater concern with body image.

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1. INTRODUCTION

Gender plays an important role in shaping food-related practices (Arganini et al., 2012; Cairns et al., 2010). Cultural expectations surrounding masculinity and femininity, along with societal

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pressures related to body image, gender roles, and media representations, all contribute to differences in eating habits and preferences. Women tend to place greater emphasis on healthy eating and weight management, with their dietary choices often reflecting these concerns (Arganini et al., 2012). Moreover, depending on gender, individuals develop specific food preferences. For instance, men are more likely to favor red meat-based dishes, whereas women often gravitate toward low calorie and vegetarian goods (Cline et al., 1998). Importantly, these differences in eating behavior and food preferences start to form during childhood, through social learning, and influence the dietary patterns of adults (Skinner et al., 2002).

Social learning theory (Bandura, 1969) posits that children learn behaviors, attitudes, and norms based on their observation of others, including parents, teachers, and other adults they frequently interact with, as well as their peers. Gender has an important role in social learning. Children imitate and adopt behaviors they observe in similar others, often based on gender, leading to the reproduction of gendered behaviors (Holmes, 2011; Rozin et al., 2004; Rubin et al., 2015). In the context of food, social learning theory can be useful in understanding and identifying gendered patterns of knowledge and awareness among children. The identification of these patterns helps reveal the social context in which children grow. Gendered knowledge and awareness may show that children, found in a development stage of learning and discovery, selectively pick up information and internalize it but are also influenced depending on the models provided by the adults they interact with, behaviors of school peers and friends, and exposure to the media (Andersen et al., 2016; Brody and Stoneman, 1981).

This study draws on social learning theory (Bandura, 1969) to explain children's awareness and knowledge concerning food, with a focus on gender differences. We contribute to the literature by analyzing novel food related indicators from a survey of elementary (primary) schoolchildren, aged between 6 and 10 years. Specifically, we study the awareness and conceptualization of healthy and unhealthy foods, amongst children in elementary school, through the lens of gender. This is the first study that makes a clear distinction between awareness and literacy concerning food, contributing to an understanding of the sociological factors influencing food perceptions. Also, exploring the reasons children give when evaluating foods as healthy or unhealthy can uncover hidden gendered patterns and meanings. How children justify the healthiness or unhealthiness of foods may reflect gendered meanings that remain underexplored in the literature (Castronuovo et al., 2021). The study is set in the context of Serbia which shows moderate to high

levels of child obesity in international comparison (WHO Regional Office for Europe, 2024) accompanied with rising obesity over years and gender differences. The article contains five sections, beginning with a review of gender differences in eating behavior amongst primary school children. The second section outlines the differences between the concepts of food awareness and literacy. The third section outlines the concepts and hypotheses and is followed by the description of the context of Serbia. An explanation of the survey, methods, and results follow, before, finally, drawing conclusions.

2. GENDER DIFFERENCES IN EATING BEHAVIOR AMONG PRIMARY-SCHOOL CHILDREN

Various studies investigate children's eating behavior for different age groups. Research focusing on adolescents describes and studies behaviors and attitudes regarding eating habits (e.g., Larson et al., 2006; LeBlanc et al., 2022; Otsuka et al., 2020). For example, LeBlanc et al. (2022) studied the relationship between adolescents' food literacy and their eating behaviors, Otsuka et al. (2020) looked at the gender differences in dietary habits among Japanese adolescents, and Larson et al. (2006) analyzed adolescents' involvement in food shopping and preparation. Comparatively, research focusing on the eating behavior of primary-school aged children (early and middle childhood) is more concerned with an understanding of the formation of eating habits, as well as children's understanding and awareness of food healthiness or unhealthiness (e.g., Dixey et al., 2001; Hart et al., 2002; Nguyen, 2007; Edwards and Hartwell, 2002). In this regard, Dixey et al. (2001) found that children recognize the repercussions of unhealthy eating habits, which included negative consequences on the health of the body, but also social reasons (e.g., being fat can be detrimental to one's social image). Hart et al. (2002) found that parents have an important role in shaping children's perceptions and knowledge of food. Edwards and Hartwell (2002) observed through their study that fruits are more popular and easier to recognize among children and that schools have an important role in shaping knowledge about food. Furthermore, Nguyen (2007) found that children can distinguish between most healthy and unhealthy foods, and as they increase in age, they develop the ability to justify why a certain food is healthy or not healthy.

Previous research exploring the eating behavior of primary-school children has also sought to understand gender differences in food preferences and attitudes (Cooke and Wardle, 2005; Caine-Bish and Scheule, 2009) and the social or gender aspects of eating behavior (Hill et al., 1994;

Holmes, 2011; Marecek and Arcuri, 1995). These studies demonstrate that, from an early age, individuals develop distinct food preferences according to gender. Caine-Bish and Scheule (2009) and Cooke and Wardle (2005) found that while school-age girls' food preferences included fruits and vegetables, boys' favorite foods were more diverse including meat products and high-caloric foods. Moreover, girls develop a preoccupation with healthy eating early in life, which is likely connected with expectations about appearance and looks. In Western culture the thin-looking body is often idealized (Walseth and Tidslevold, 2020). Hill et al. (1994) reveal that girls as young as 9 years of age can become preoccupied with their body appearance, which becomes more acute during adolescence. Moreover, in their study on the construction of femininity and masculinity in social eating interactions, Marecek and Arcuri (1995) found that girls often exhibit behaviors consistent with cultural expectations of a "small appetite." For instance, they would either eat less or discard food and, if they finished their entire meal, felt compelled to justify it. Group dynamics influenced how girls navigate eating, leading them to display selectiveness, such as "being easily 'grossed out' or disgusted" (Marecek and Arcuri, 1995, p. 8). In contrast, boys generally display a voracious appetite, reinforcing gendered norms around eating (Marecek and Arcuri, 1995). Regarding the social behavior of boys and girls while eating, gender differences were also observed. In her investigation of preschoolers' social behavior during meals, Holmes (2011) observed that girls tend to talk more with peers about food, while boys engage in play more often.

3. CONCEPTUALIZATION AND HYPOTHESES

3.1 Food awareness and literacy in relation to gender

In developing the hypotheses in relation to the theory of social learning, we distinguish between food awareness and food literacy. Regarding *food awareness* we refer the recognition of the potential negative or positive nutritional effects of specific foods. Food awareness is influenced by individuals' characteristics, such as age, gender, region of residence, nationality and does not necessarily result in a correct and incorrect evaluation of foods but in a particular awareness given by background (Hart et al., 2002). Gender is an important aspect to consider when investigating individuals' food awareness (Bogue et al., 2005). For instance, women are usually more familiar with sugar free foods or foods with special properties (e.g., superfoods) than men, and men are usually more familiar with protein rich foods and alcoholic beverages than women (Feraco et al., 2024).

Food literacy is an empowering ability that encompasses the "knowledge, skills and behaviors required to plan, manage, select, prepare and eat food to meet needs and determine intake" (Vidgen and Gallegos, 2014, p. 54). Empirically, we focus on the component of food literacy that refers to the ability of assessing the healthiness of foods, and recognition of their nutritional components. More specifically, a food literate individual is one who can accurately distinguish between healthy and unhealthy foods and indicate their nutritional composition (Bailey et al., 2019, Farrell, 2021).

While food literacy has been thoroughly defined (Farrell, 2021; Truman et al., 2017; Vidgen and Gallegos, 2014), food awareness, despite being central in some studies (Gaspar et al., 2014; Hart et al., 2002), has not been given sufficient theoretical importance or has been studied together with literacy without distinguishing between the two. In this study, we treat *food awareness* as a separate concept as defined above and underline its importance in the study of food choice and eating behavior.

Based on the cited existing literature that highlights gender differences in food preferences and eating habits, we expect to find differences in food awareness and food literacy, according to gender. We detail our reasoning below.

Food awareness. Following the previous discussion of differences in socialization related to food, we develop several hypotheses related to food awareness. Our starting expectation is that children's awareness of food reflects early gendered concerns and preferences. More specifically, we expect that girls will be particularly influenced by appearance-related concerns (Hill et al., 1994; Scaglioni et al., 2011) whereas boys will be influenced by strength-related concerns, which has previously explored amongst adolescents and young adult men (Ganson et al., 2023). We expect that relevant factors that influence body image negatively and positively, depending on feminine or masculine standards, may affect schoolchildren's awareness. In the case of schoolgirls, the intake of sugar and fat might be particularly concerning, as these components are most frequently evoked as problematic among the female population (Germov and Williams, 1996). On the other hand, schoolboys might instead find concerning that certain foods do not directly affect strength and ability, as previous research underlined that boys and men are concerned with these aspects (Drummond and Drummond, 2010; Drummond and Drummond, 2015; Nakagawa and Hart, 2019). We therefore hypothesize that:

> *H1a. Schoolgirls are more likely to be concerned about foods that contain sugar and fat compared to boys.*

H1b. Boys are more likely to be concerned about foods that have a negative impact on strength compared to girls.

Food literacy. When it comes to literacy, we expect that children's food-related knowledge to differ based on gender. Previous research documents that women are more aware about the relationship between food choices and health and tend to know more about the nutritional components of foods (Arganini et al., 2012). Similarly, girls tend to distinguish unhealthy foods from healthy ones with greater accuracy than boys (Hart et al., 2002). This is also due to their early preoccupation with body appearance (Hill et al., 1994) that makes them more able to differentiate between foods with negative and positive impacts on body appearance. On the other hand, boys are usually less sensitized to the negative effects of different foods on the body, manifesting in an increased appetite (Marecek and Arcuri, 1995), and generally report lower food knowledge (Pirouznia, 2001). Consequently, we expect that to be the case among Serbian schoolchildren as well. As a result, we hypothesize that:

H2: Girls know more about healthy and unhealthy food as well as nutritional components of particular foods than boys.

3.2 How gender interacts with location and age in food awareness and literacy

Gender differences in food awareness and food literacy may also depend on age and location. The difference between rural and urban environments is important in the context of food awareness and literacy. Cities provide the opportunity to be exposed to a wider range of informational materials, campaigns and school interventions, which may raise both literacy and awareness compared to rural areas (Aljassim and Ostini, 2020). Previous research indicates that socioeconomic differences, associated with the urban-rural gap, impact on food awareness, with urbanization associated with greater awareness and healthy eating in some countries, such as Romania and Portugal (Gaspar et al., 2014). Sulibursk a et al. (2012) found that young adults in rural regions in Poland were more likely to consume fast food products and sweets, have fewer meals a day, but engage more often in physical activity than young adults in urban areas. In terms of gender differences, the proportion of young adult males classified as overweight exceeds the rate amongst young adult women, with this associated with the latter's greater predisposition to eat fruits and vegetables (Sulibursk a et al., 2012). These findings indicate that living in a city has

the potential to augment individuals' food awareness and literacy, even more so in the case of women and girls. Given the likely gender patterns, we also expect schoolgirls from urban areas to be more food aware and literate, as follows:

> *H3. Schoolgirls in cities are comparatively more food aware and literate than both schoolboys in general and other schoolgirls in rural areas.*

Younger children are more frequently targeted by parents and educators in food-related learning. Previous research found that food intervention educational programs are more effective among younger children (Chaudhary et al., 2020). This suggests that younger children are more responsive to new information about food components and consumption which can result in increased knowledge and awareness compared with older children, who are more influenced by peers with more or less healthy habits (Salvy et al., 2012). Furthermore, around the age of 6, children begin to develop their own preferences regarding food, which gravitate toward sweet tasting foods (Kostecka et al., 2021). This suggests that, at this stage, children could be more carefully supervised and directed into adopting healthy eating habits. Given the early socialization patterns that target boys and girls differently, we can expect young schoolgirls to be more impacted by early food-related learning than boys and older schoolgirls. Thus, we expect that:

> *H4. Younger schoolgirls are comparatively more literate and aware than both schoolboys in general and older schoolgirls.*

4. RESEARCH CONTEXT: GENDER AND DIET IN SERBIA

The hypotheses are tested drawing on data from Serbia. Serbia provides an interesting environment for testing for gender differences in schoolchildren's food awareness and literacy. In 2015, the World Health Organization (WHO) European Childhood Obesity Surveillance Initiative (COSI) ranked Serbia 11th out of 40 participating countries in terms of obesity prevalence among boys and girls aged 7 to 9. As observed in other countries, obesity rates were higher among boys than among girls. Serbia is culturally relatively masculine, characterized by a strong presence of traditional gender roles and divisions (Janićijević and Marinković, 2015; Filipovic, 2023).

An analysis of the empirical evidence for Serbia indicates that obesity among children is rising (Marković et al., 2021), and that there are socio-economic (Puškaš et al., 2022) and gender differences (see Jovičić, 2015; Šumonja and Jevtić, 2021; Šumonja and Jevtić, 2017) in both

obesity and food knowledge. Regarding obesity, Rakić et al. (2016) highlights that boys are consistently more likely to be overweight or obese than girls, reflecting enduring gender disparities in childhood obesity rates. Likewise, Djordjic et al. (2016) examined 5102 children aged 6-9 years and found that obesity rates were highest among 6-year-old boys compared to other age groups, with a notable gender disparity in obesity rates across different localities. The findings suggest that boys are generally at higher risk of being overweight or obese than girls, with environmental factors such as poor community development and lower urbanization levels significantly associated with obesity rates among children in Serbia. Worryingly, obesity levels are rising (Marković et al., 2021). The latter study reports that the prevalence of overweight and obesity combined rose from 30.7% to 34.8% among children aged 7-9, reflecting an upward trend in both boys and girls, although boys exhibited a slightly higher prevalence rate. The increase was consistent regardless of the definitions applied.

Regarding knowledge concerning food, the more educated the parents, the better a child's nutritional knowledge, regardless of gender (Puškaš et al., 2022). However, girls demonstrate a slightly superior understanding of nutrition, particularly concerning calorie-dense foods and portions than boys (Bjelanovic et al., 2017). Consistent with this, Marković et al. (2021) document how cultural perceptions and gender norms play a crucial role in shaping nutritional knowledge and behavior. The latter study highlights that societal expectations in Serbia position girls as being more responsible for maintaining a healthy diet and body image. This socialization process may lead girls to pay more attention to nutrition-related topics, thereby displaying better knowledge about healthy eating habits compared to boys. Boys, on the other hand, may prioritize physical activity over dietary choices, reflecting a gendered understanding of health and fitness.

Bozic et al. (2021) found that dietary patterns among Serbian children were characterized by low fruit and vegetable intake and high consumption of sugary beverages and processed foods. The findings also indicated that boys were more likely to consume an unhealthy diet than girls. These unhealthy dietary patterns were more prevalent in urban areas, where children had greater access to fast food and fewer opportunities for physical activity. The study also noted that boys were more likely to consume high-calorie, nutrient-poor foods than girls, contributing to the higher obesity rates observed among boys. Finally, Cvetković et al. (2021) assessed the dietary habits and nutritional knowledge of Serbian schoolchildren aged 11-14. The study found that while children generally have some basic understanding of nutrition, substantial gaps exist, particularly in

recognizing the importance of fruits, vegetables, and balanced meals. Notably, the study highlighted that girls tend to have slightly better nutritional knowledge than boys, particularly regarding the benefits of eating fruits and vegetables and avoiding high-sugar foods. However, the differences were not statistically significant, suggesting that overall awareness is not largely gendered.

Reviewing the evidence suggests that ours is the first study to make a clear distinction between literacy and awareness through the lens of gender in the context of Serbia and beyond.

5. METHOD

5.1 Dataset

Our hypotheses were tested using a novel dataset collected in 2020 via schools in Serbia. The study encompasses seven different municipalities, including the capital city, Belgrade (Beograd), a suburban city, Obrenovac, and five towns/villages: Arilje, Bajina Bašta, Ivanjica, Osečina, and Latvica. A total of 576 children were initially included in the study. After removing cases with missing data, the final number of respondents was 406, 178 boys and 228 girls, all aged between 6 and 10 years. All respondents have Serbian nationality.

5.2 Research Ethics

The study was approved by Serbia's Ministry of Education, collaborating with academic partners as part of a wider European Union funded research project, which received ethical approval from the European Commission's Research Executive Agency. School directors also approved the research and agreed to data collection, in line with country's requested protocols (Filipović, 2011). Parental and children's consent was also solicited, with participation in the study voluntary. Children did not report their name when completing the survey and at the outset of the survey they were informed that it was not a test on which they would be graded. Moreover, children were reassured that none of their family or friends will ever see their answers.

5.3 Survey Design

Data used in the study relies on a questionnaire specifically developed to understand elementary school children's ability to recognize healthy and unhealthy foods and their ingredients. Moreover,

the questionnaire includes several items that tested children's understanding of eating outcomes (see Appendix 2).

Our two main dependent variables are food awareness and food literacy. To measure food awareness, we use multiple indicators. In the first one, children were asked to list three types of healthy and three types of unhealthy foods and explain why they are healthy/unhealthy. The created variable indicates when one type of food is at least once out of three times nominated in relation to its contents: 1. Sugar, 2. Fat, 3. Protein, 4. Makes you fat. Consequently, a set of dependent variables took the form of dummy variables indicating the presence of a specific reason (1) and the absence of it (0).

In the data preparation stage, we also categorized all the reasons given for what would happen if a person ate only one meal a day or too much food every day, as well as the types of foods associated with the exemplified cartoon characters. Therefore, children were asked to answer, "What would happen to a person who would eat only one meal a day?" and "What would happen to a person who eats too much food every day?" For these questions, children had the possibility to give one to three answers. These answers were coded 1 if at least once a certain consequence was mentioned: becoming fat for a person who eats too much or becoming sick if a person eats one meal per day. Adopting a projective technique (Gambaro, 2018), children were also presented with photos of cartoon characters depicting different body shapes, health and energy levels (i.e., Skinny Peter, Fat Nicholas, Peppy Luke, Lazy Alex, Healthy Philippe, and Sick Mark) and asked to indicate what kinds of food these cartoon characters eat. Here, in the analysis, we focus on answers relating to the Skinny Peter and Fat Nicholas characters. The indicated food was coded 1 (eating fruit for Skinny Peter or eating sweets for Fat Nicholas) versus 0.

To measure food literacy, meaning children's understanding of foods' healthiness or unhealthiness, as well as foods' nutritional composition, we presented children with a list of 28 commonly known foods and asked them to indicate whether these foods are healthy or unhealthy. Additionally, children answered four more questions meant to capture their understanding of foods' nutritional content. Specifically, they were asked to choose which food type from a predefined list contains vitamins, fiber, protein, or fat. The dependent variables in the food literacy category were created by considering the correctness of the answer. This involved creating new variables that separated the correct answers from the incorrect ones. For the answers to the list of unhealthy and unhealthy foods we created an index from 0 (lowest) to 28 (highest), indicating the level of correctness of

each respondent. This means that first an index with correct answers about healthy and unhealthy food was created, followed by two indexes concerning correct answers relating to the recognition of healthy and unhealthy foods, respectively. To ensure comparability, all three indexes underwent normalization, taking values from 0 to 1. For the questions regarding vitamins, fiber, protein, or fat content of foods, we created dummy variables for each nutritional component with values of 1 when correct and 0 when incorrect.

Background variables used in the study are gender, age, location or area type (urban-above 10000 inhabitants versus rural-below 10000 inhabitants), or school, information collected during the data collection stage. Additional analyses were performed by comparing the capital city of Belgrade with other localities (available upon request).

The analysis relies on ordinary least square (OLS) and linear probability models, with the results presented in the form of coefficients and average marginal effects. To determine statistical significance, we used the p-value of ≤ 0.05 threshold. Stata 18.5 software was used for data cleaning, preparation and analysis.

6. RESULTS

6.1 Descriptive statistics

Table 1 details the characteristics of the sample in relation to the dependent and independent variables. The sample is balanced in terms of gender. Concerning age, 48% of the children were 10-year-olds, 24% were 9-year-olds, 12% were 8-year-olds, and 16% were either 6 or 7 years of age. About 70% of children were from urban areas. Regarding the dependent variables, we observed that approximately 31% and 40% of children were aware of foods that contained fat or sugar, respectively; 20% of children were aware that eating a certain food leads to an increase in weight, but only 9% of children were aware that a specific food contained protein. Awareness is therefore the highest for sugar. Almost 88% of children knew that eating too much is associated with being overweight, while only around 31% of children knew that one can become ill if eating too little.

The literacy index measures knowledge about the healthiness of foods and counts the number of correct answers. After rescaling through normalization, the answers are shown as ranging from 0 to 1. The mean is high at .84 out of 1 which means that literacy is high in this respect. There is a

similar situation when decomposed into healthy and unhealthy food indices, which have means of 0.91 and .79 out of 1. The mean of the unhealthy food index is lower than the healthy food index signaling lower recognition of unhealthy foods. Finally, when it comes to recognizing the composition of foods, most children could recognize vitamins (93%), but other scores are disappointing: fat and protein (around 50%) and the lowest score is 39% for the recognition of foods that contain fiber.

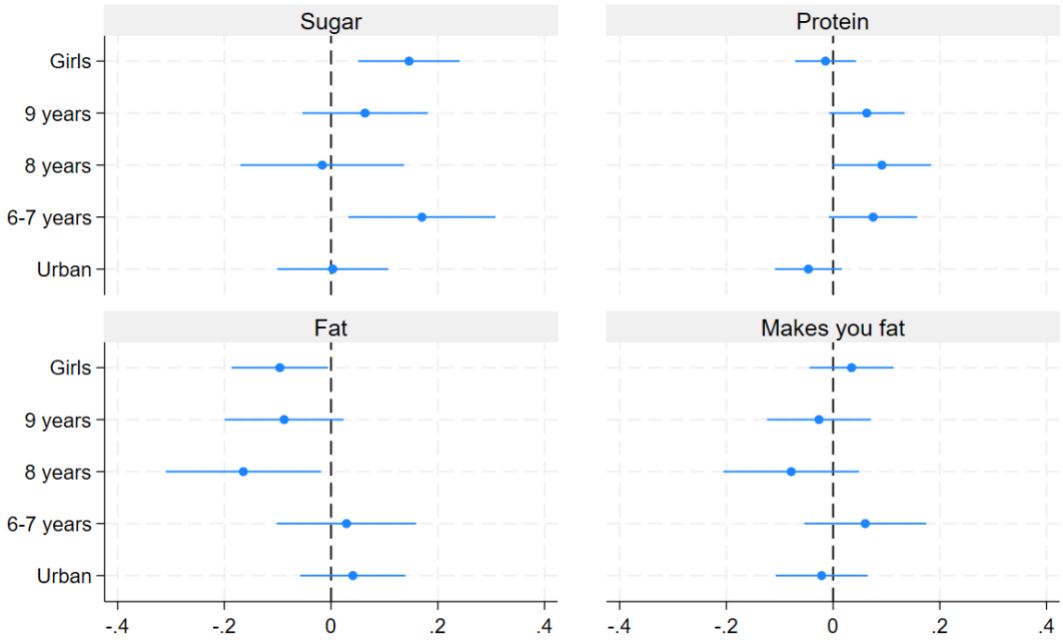
TABLE 1. MEAN AND STANDARD DEVIATIONS, AND FREQUENCY OF VARIABLES

Variables	Obs.	Mean	Std. Dev.
Dependent variables			
Food Awareness			
Contains fat	406	.31	.463
Contains sugar	406	.397	.49
Contains proteins	406	.094	.292
Makes you fat	406	.2	.4
Eating too much: fat	406	.877	.329
Eating too little: sick	406	.31	.463
Being plumpy: eats sweets	406	.33	.471
Being skinny: eats fruit	406	.33	.471
Food Literacy			
Literacy index – total	406	.844	.125
Total healthy	406	.912	.12
Total unhealthy	406	.786	.2
Protein correct	406	.505	.501
Fiber correct	406	.392	.489
Fat correct	406	.5	.501
Vitamins correct	406	.931	.254
Independent variables			
Female	406	.562	.497
Urban	406	.695	.461
Age			
10 years	194	48%	
9 years	99	24%	
8 years	48	12%	
6-7 years	65	16%	

6.2 Gender differences in food awareness

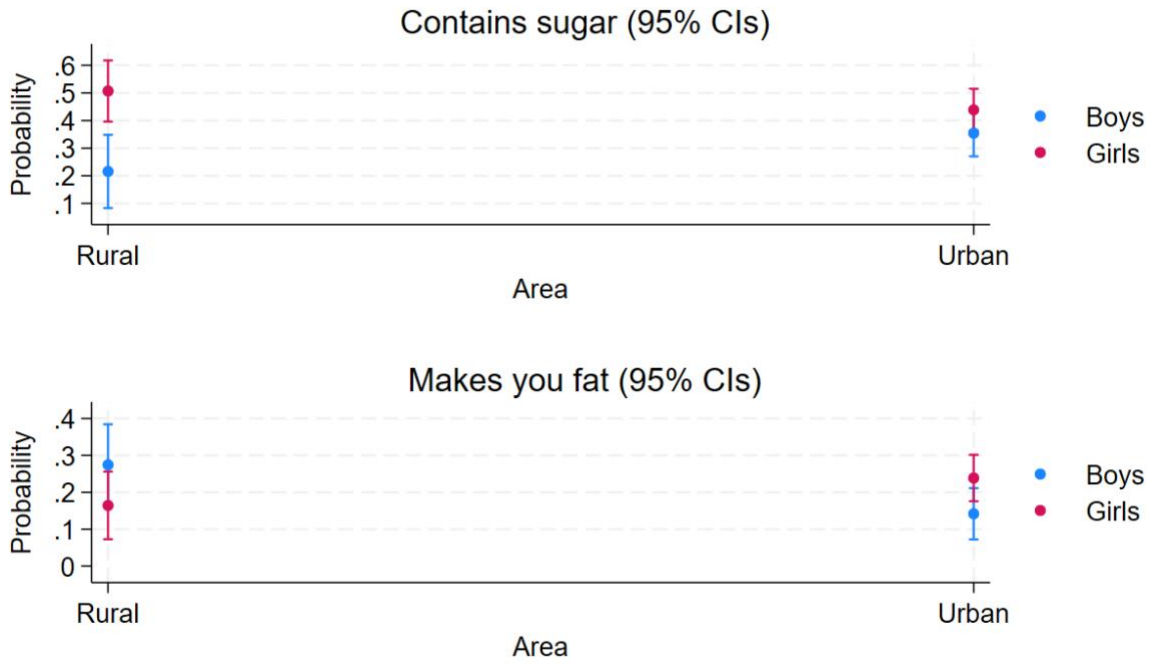
The first part of the analysis addresses food awareness in terms of being aware that particular foods contain sugar, fat, or protein. In most cases, there is no strong gender difference in food awareness. The difference in awareness was found around sugar and fat but no protein. More specifically, we found that girls have a higher probability of 15 percentage points to know when something contains sugar net of age and area. There is also a statistically significant difference of 10 percentage points between boys and girls in knowing if a food contains fat, with girls being less aware than boys. Concerning awareness about which foods contain protein or increases one's weight, there are no significant differences between boys and girls. Regarding control variables, younger children are more aware than older ones when it comes to sugar and protein, which is in line with some of the reviewed empirical evidence, while the differences between young and old children are found for fat only between the age 8 and the reference group of age 10. No statistically significant differences were found between children in urban vs rural areas. Figure 1 plots coefficients from the four models which are available in Appendix 1.

FIGURE 1. GENDER DIFFERENCES IN FOOD AWARENESS IN SERBIA: CONTAINING SUGAR, PROTEIN, FAT AND BEING AWARE THAT A CERTAIN FOOD MAKES YOU FAT. COEFFICIENTS FROM LINEAR PROBABILTY MODEL (LPM). 95% CLS.



The interaction effects between the gender of pupils and age or area reveal some interesting results. While overall there do not seem to be strong additional differences depending on area or age, some divergences were found. Girls from urban areas showed less awareness than others in relation to what contains sugar (-0.21, $p<0.05$). However, girls from urban areas were more aware of foods that are fattening—the interaction is positive of 0.20 ($p<0.05$). Regarding the interaction between gender and age, girls at age 9 are less aware about what contains sugar compared to the reference group of girls aged 10 (-0.22, $p <0.1$) and girls at age 6 to 7 are less aware about what contains protein compared to the age 10 (-0.16, $p <0.1$). There do not seem to be consistent findings regarding the interaction between gender and age for other outcomes, and most of the interactions are not significant. Figure 2 plots the two interactions between urban area and gender, including awareness about sugar and making you fat. Regarding sugar content, girls in rural areas demonstrate a higher awareness in comparison to boys, and girls from urban areas. The gap in awareness between girls and boys is larger in rural areas than in urban areas. Regarding food that is fattening, city girls are slightly more aware than boys when foods make one fat, but the gap is opposite in rural areas.

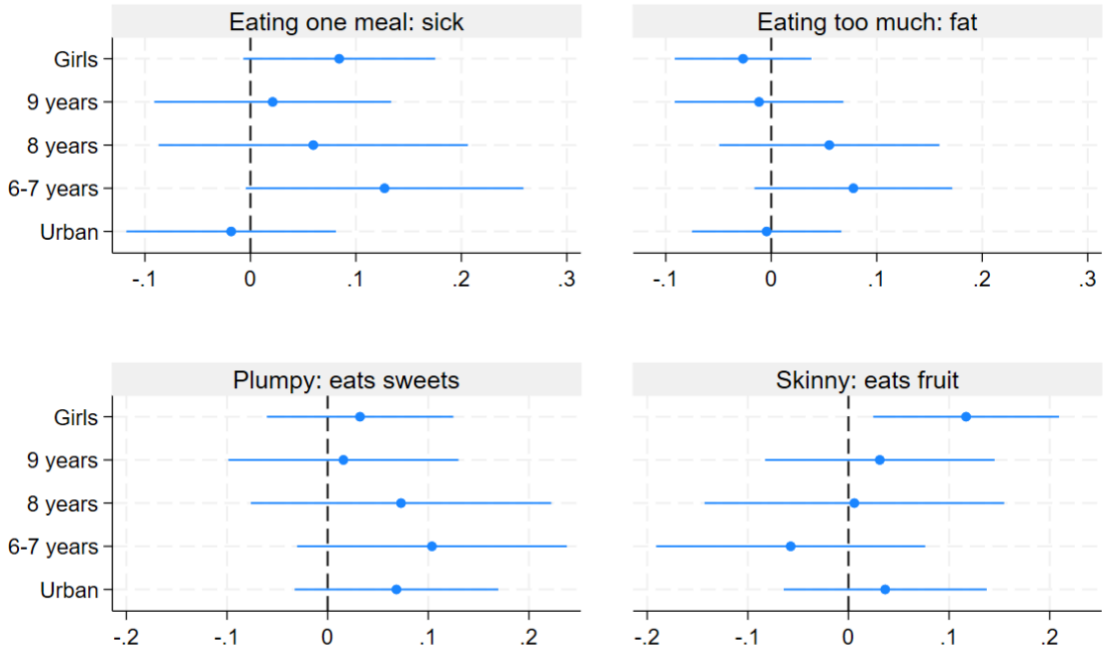
FIGURE 2. GENDER DIFFERENCES IN FOOD AWARENESS IN SERBIA BY AREA: CONTAINING SUGAR AND AWARENESS OF MAKING YOU FAT. PREDICTIONS FROM LINEAR PROBABILITY MODEL (LPM). 95% CLS.



The second group of variables refers to children's understanding of the health and social consequences of eating. First, we looked at awareness in relation to the consequences of overeating and undereating. The results indicate that girls compared to boys are more likely to think that eating one meal per day makes you sick, by 8 percentage points ($p<0.1$) but no difference between girls and boys is evident for the consequences of eating too much, such as gaining weight.

In relation to the kind of food overweight children eat—the example of "plump Nicholas" suggests that girls are *not* significantly more likely to associate the stereotype with eating sweets compared with boys. By contrast, regarding associations with thinness, girls were 12 percentage points ($p<0.05$) more likely to link "skinny Peter" with eating fruit. Interactions between gender and age, or area were not found with the exception of two cases: girls at age 9 are less aware that somebody is plump due to sweets compared to the reference age of 10, while younger girls at age 7 and 8 are more aware that someone is fat due to eating much ($p<0.1$). To sum up, there is evidence of gendered food awareness—girls are more aware of foods with sugar content, but the same does not apply to fat, as boys are more aware. Additionally, girls are more aware of the consequences of under-eating. The interactions of gender with area and age do not reveal consistent directional patterns. Figure 3 (*below*) summarizes the regression coefficients.

FIGURE 3. GENDER DIFFERENCES IN UNDERSTANDING THE CONSEQUENCES OF EATING: BEING SICK DUE TO HAVING ONE MEAL A DAY AND BEING FAT IF EATING TOO MUCH VS WHAT IT TAKES TO BE SKINNY OR FAT. COEFFICIENTS FROM LINEAR PROBABILITY MODEL. 95% CLS.



6.3 Gender differences in food literacy in Serbia

The second part of the analysis concerns food literacy, understood as knowledge about food. Table 2 shows the correlates of the index with correct information, namely the gender of the pupils, age, and area. The index ranges from 0 to 1 and shows the correct answers of the pupils regarding healthy and unhealthy food items taken together (Appendix 2, Q6). The main model shows that girls seem to be more food literate by 0.027 points ($p<0.05$), and that the cohort of 8-year-olds displays the lowest overall literacy (-0.049 points, $p<0.05$) in comparison to 10-year-olds. We did not observe differences between urban and rural areas. The second model includes the interaction between gender and age, but it shows no significant difference between boys and girls in various cohorts regarding their knowledge about food. The interaction between gender and urban areas does not show significant differences between boys and girls either.

TABLE 2. GENERAL FOOD LITERACY NORMALIZED INDEX CONCERNING BOTH HEALTHY AND UNHEALTHY FOOD. OLS REGRESSION, MAIN MODEL AND MODEL WITH INTERACTIONS

VARIABLES	(1) Main model	(2) Gender and age	(3) Gender and area
Girls	0.027**	0.028	0.029
	(0.012)	(0.018)	(0.023)
9-year-olds	-0.009	-0.006	-0.009
	(0.015)	(0.024)	(0.015)
8-year-olds	-0.049**	-0.024	-0.049**
	(0.020)	(0.029)	(0.020)
6- or 7-year-olds	0.019	0.001	0.019
	(0.018)	(0.026)	(0.018)
Girls#9-year-olds		-0.004	
		(0.031)	
Girls#8-year-olds		-0.049	
		(0.040)	
Girls#6- to 7-year-olds		0.034	
		(0.035)	
Urban	-0.016	-0.017	-0.014
	(0.013)	(0.014)	(0.021)
Girls#Urban			-0.004
			(0.027)
Observations	406	406	406
R-squared	0.037	0.044	0.037

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 decomposes the index into answers relating to children's correct recognition of healthy and unhealthy foods separately. Regarding healthy food, there is no difference between girls and boys. However, girls show higher literacy on unhealthy food (0.042, $p<0.05$). No significant differences were found either between boys and girls for each age cohort or in relation to area (urban vs rural). Therefore, gender differences in food literacy are mostly due to girls being more correctly identifying than boys which foods are unhealthy, rather than healthy. Regarding age, children of 6-7 years tend to recognize better healthy food, while 8-year-olds are less likely to recognize unhealthy food, compared to ten years old.

TABLE 3. FOOD LITERACY NORMALIZED INDEXES RELATING TO HEALTHY AND UNHEALTHY FOOD SEPARATELY. OLS REGRESSION, MAIN MODEL AND MODEL WITH INTERACTIONS

	Correct recognition of healthy food			Correct recognition of unhealthy food		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Main model	Gender and age	Gender and area	Main model	Gender and age	Gender and area
Girls	0.009	0.020	0.017	0.042**	0.035	0.040
	(0.012)	(0.017)	(0.022)	(0.020)	(0.029)	(0.036)
9-year-olds	-0.006	0.010	-0.006	-0.011	-0.020	-0.011
	(0.015)	(0.023)	(0.015)	(0.024)	(0.038)	(0.024)
8-year-olds	0.009	0.031	0.008	-0.100***	-0.072	-0.099***
	(0.019)	(0.028)	(0.019)	(0.032)	(0.047)	(0.032)
6- or 7-year-olds	0.052***	0.052**	0.052***	-0.009	-0.042	-0.009
	(0.017)	(0.025)	(0.017)	(0.029)	(0.042)	(0.029)
Girls#9 years		-0.026			0.015	
		(0.030)			(0.050)	
Girls#8 years		-0.042			-0.054	
		(0.038)			(0.064)	
Girls#6/7 years		0.001			0.062	
		(0.034)			(0.057)	
Urban	-0.001	-0.002	0.006	-0.029	-0.031	-0.030
	(0.013)	(0.013)	(0.020)	(0.022)	(0.022)	(0.033)
Girls#Urban			-0.012			0.003
			(0.026)			(0.043)
Observations	406	406	406	406	406	406
R-squared	0.028	0.032	0.028	0.041	0.047	0.041

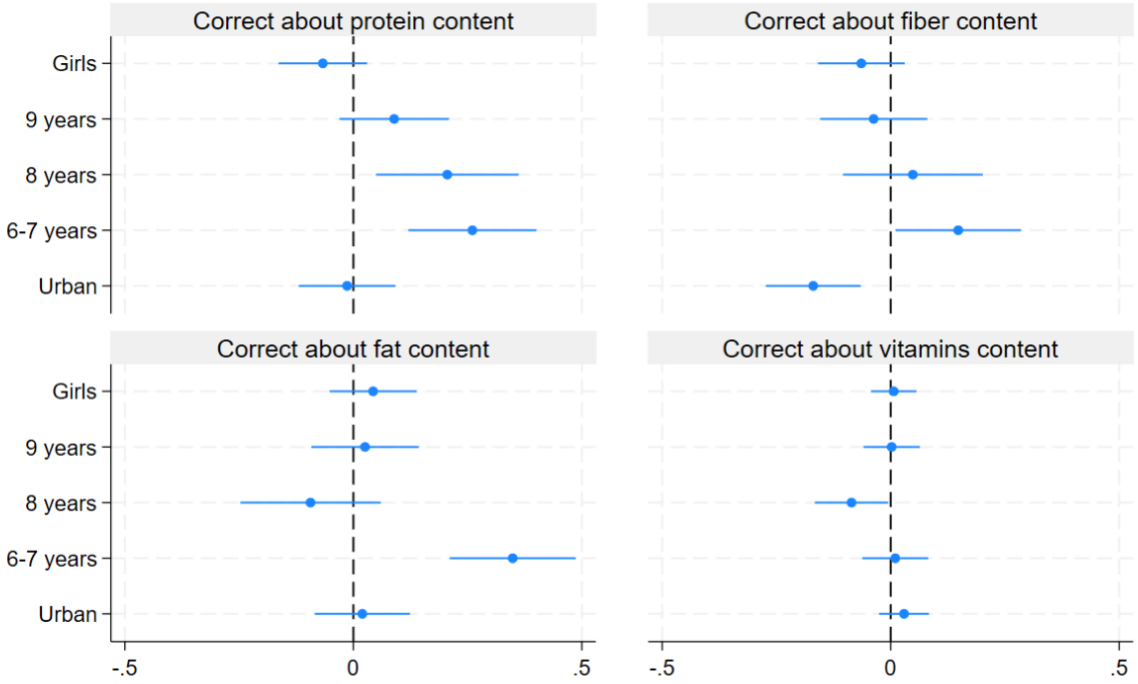
Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Finally, Figure 4 details whether there is a difference between boys and girls in being correct about the nutritional content (protein, fiber, fat, and vitamins) of certain foods. While girls know less about protein and fiber, no statistically significant differences were found in what concerns gender. No difference between boys and girls is found regarding fat and vitamins either. When it comes to the control variables, younger children know more about protein, fat, and sometimes about fiber,

while the difference in urban areas is found only for fiber: pupils from rural areas know less about fiber. No interactions were found between gender and these dimensions.

FIGURE 4. GENDER DIFFERENCES IN FOOD LITERACY IN SERBIA: BEING CORRECT ABOUT PROTEIN, FIBERS, FAT, AND VITAMINS IN FOODS. COEFFICIENTS FROM LINEAR PROBABILITY MODEL (LPM). 95% CLS.



7. DISCUSSION AND CONCLUSIONS

This study analyses the extent to which food awareness and literacy varies among primary school children in Serbia depending on gender. In our theoretical framework, we draw on social learning theory (Bandura, 1969) to explain children's understanding of food. In doing so we distinguish between food awareness, which is often socially driven, and food literacy, which depends on education. Due to the importance of looks and appearance for women, and social pressures to conform to the standards of beauty in each society, we expected gender to have a significant impact on children's early food awareness and literacy (Drummond and Drummond, 2015; LeBlanc et al., 2022). The research focused on primary-school aged children in Serbia.

Due to the social pressure to be slim experienced more by girls, we expected that schoolgirls will be more likely to be concerned about foods that contain sugar and fat compared to boys (H1a). We

also expected that boys will be more likely to be concerned about foods that have a negative impact on strength compared to girls (H1b), also due to societal expectations that boys should be and feel strong. Our results show mixed confirmation of these hypotheses. We found evidence that girls are indeed more aware about sugar but not fat, and we find no evidence that Serbian girls are more aware than boys regarding any other dimension, neither did we find that boys are more aware of protein. The second set of indicators adds further nuance to these results. Interestingly, girls were more aware about the negative consequences of not eating sufficiently, but not so much about the negative consequences of overeating. However, our hypothesis that girls are concerned more about sugar finds support where girls are more likely to recognize the presence of sugar, and the reason why somebody is skinny. This leads to partial confirmation of our expectations, as it is mostly the awareness about sugar that makes the difference. Overall, a simple and consistent gender gap in food awareness does not appear evident.

Regarding children's food literacy, we again tested whether girls are more knowledgeable about what foods are healthy or not, as well as having better recognition of the nutritional components of certain foods (H2). The results revealed, again, however, only partial proof of these expectations. We found that, overall, girls know more than boys, but this is mostly due to girls' superior knowledge of what foods are unhealthy. Following social learning theory, this may relate to the greater salience of what should not be eaten in terms of negative body image consequences, and not so much in terms of preoccupation with being healthy. Indeed, when we compare girls and boys regarding how correct they are in discerning the nutritional properties of foods, there are no differences (i.e., in identifying protein or fiber). However, it should be noted that both girls and boys showed very high competence in the healthiness of different foods, thus limiting possible discrepancy between them.

We tested whether the gap between schoolgirls and schoolboys is larger in cities in comparison to rural areas (H3), if the gender gap is larger among younger pupils (H4), and whether younger schoolgirls living in urban areas are more aware and food literate. Overall, we did not find that the effect of gender differed systematically by area or age of children, with the exception of urban girls who are decisively more aware about being fat. Thus, the hypotheses relating to the interaction effects are mostly not supported.

Comparing the results with previous studies, our findings challenge those of Jovičić (2015), who identified significant gender differences regarding food knowledge, attitudes, and practices. Her

study found that girls generally had better knowledge of healthy eating than boys, attributed to cultural norms that encourage girls to be more concerned about their body image and diet. Our study expands on this by showing that while there is a difference between knowledge and awareness, gendered effects are found mostly in relation to one specific dimension, which is often discussed—the association of sugar with being overweight. While this awareness can be seen as positive, it also reflects the early emergence of body image concerns shaped through social learning. Our research may therefore capture the initial stages of gender differences in food awareness. However, there does not appear to be a consistent gender gap amongst primary school aged children regarding food literacy. Consequently, we cannot talk about large differences in nutritional knowledge between genders but mostly about some specific aspects of it such as knowing what is unhealthy. Furthermore, our findings contrast with conclusions of Šumonja and Jevtić (2017, 2021) who found that girls demonstrate slightly better knowledge regarding the importance of fruits, vegetables, and balanced diets compared to boys. We do not find evidence that primary school aged girls are more knowledgeable in these specific aspects throughout their lower grades.

The results yield pedagogical insights. Some authors (e.g., Hart et al., 2002) advocate gender specific dietary guidelines and education for children. The results of this study do not provide support for this recommendation – in our results few gender differences in food awareness and literacy are apparent. Of greater concern are specific gaps in both boys' and girls' food literacy – for instance regarding the identification of foods which are high in protein and fat, as well as rich in fiber. A second concern relates to the uneven progress in children's food awareness and literacy as they progress through primary schooling. Refreshing teaching materials and piloting new approaches to raising children's food literacy, for instance through experiential learning (Kelly and Nash, 2021), are needed.

While this study generates interesting insights, limitations remain which can guide future research. Specifically, we did not measure body image within this study. Concerns with body image during early childhood, acquired through social learning, may lead to dysfunctional associations with foods, and further researching such relationships and how they can be countered is warranted. Secondly, we study children before the onset of adolescence, when some gender differences may become more pronounced. Future research could further investigate therefore gender differences in food awareness among adolescents, particularly in relation to their eating habits. Third, we rely

on a limited set of control variables and therefore study a rather heterogeneous sample in terms of social background and other characteristics. Finally, in our study, all test characters were depicted as boys, which might limit the potential of girls to identify with them and therefore impact their answers. Future studies should further develop the methodology to distinguish between different genders, especially in terms of quantitative techniques.

Data availability statement

The manuscript data will not be deposited

Conflict of interest statement

The authors declare that they have no known competing interests that could have appeared to influence the work reported in this paper.

8. REFERENCES

Aljassim, N. and Ostini, R. (2020), "Health literacy in rural and urban populations: A systematic review", *Patient Education and Counseling,* Vol. 103 No. 10, pp. 2142-2154.

Andersen, S. S., Vassard, D., Havn, L. N., Damsgaard, C. T., Biltoft-Jensen, A. and Holm, L. (2016), "Measuring the impact of classmates on children's liking of school meals", *Food Quality and Preference,* Vol. 52, pp. 87-95.

Arganini, C., Saba, A., Comitato, R., Virgili, F. and Turrini, A. (2012), "Gender Differences in Food Choice and Dietary Intake in Modern Western Societies", in Maddock, J. (Ed.) *Public health: Social and behavioral health*, InTech, Rijeka, Croatia, pp. 83-102.

Bailey, C. J., Drummond, M. J. and Ward, P. R. (2019), "Food literacy programmes in secondary schools: a systematic literature review and narrative synthesis of quantitative and qualitative evidence", *Public Health Nutrition,* Vol. 22 No. 15, pp. 2891-2913.

Bandura, A. (1969), "Social-learning theory of identificatory processes", in Goslin, D. A. (Ed.) *Handbook of socialization theory and research*, Rand McNally & Company, Chicago, IL, pp. 213-262.

Bjelanovic, J., Velicki, R., Popovic, M., Bjelica, A. and Jevtic, M. (2017), "Prevalence and some risk factors of childhood obesity", *Progress in Nutrition,* Vol. 19 No. 2, pp. 138-145.

Bogue, J., Coleman, T. and Sorenson, D. (2005), "Determinants of consumers' dietary behaviour for health-enhancing foods", *British Food Journal,* Vol. 107 No. 1, pp. 4-16.

Bozic, P., Djordjic, V., Markovic, L., Cvejic, D., Trajkovic, N., Halasi, S. and Ostojic, S. (2021), "Dietary Patterns and Weight Status of Primary School Children in Serbia", *Frontiers in Public Health,* Vol. 9.

Brody, G. H. and Stoneman, Z. (1981), "Selective Imitation of Same-Age, Older, and Younger Peer Models", *Child Development,* Vol. 52 No. 2, pp. 717-720.

Caine-Bish, N. L. and Scheule, B. (2009), "Gender Differences in Food Preferences of School-Aged Children and Adolescents", *Journal of School Health,* Vol. 79 No. 11, pp. 532-540.

Cairns, K., Johnston, J. and Baumann, S. (2010), "Caring About Food:Doing Gender in the Foodie Kitchen", *Gender & Society,* Vol. 24 No. 5, pp. 591-615.

Castronuovo, L., Guarnieri, L., Tiscornia, M. V. and Allemandi, L. (2021), "Food marketing and gender among children and adolescents: a scoping review", *Nutrition Journal,* Vol. 20 No. 1, p. 52.

Chaudhary, A., Sudzina, F. and Mikkelsen, B. E. (2020), "Promoting Healthy Eating among Young People—A Review of the Evidence of the Impact of School-Based Interventions", *Nutrients,* Vol. 12 No. 9, p. 2894.

Cline, A. D., Allen, H. R., Patrick, K. and Hunt, A. E. (1998), "Gender Differences in Food Preferences of Young Men and Women in the Armed Forces", *Journal of the American Dietetic Association,* Vol. 98 No. 9, Supplement, p. A104.

Cooke, L. J. and Wardle, J. (2005), "Age and gender differences in children's food preferences", *British Journal of Nutrition,* Vol. 93 No. 5, pp. 741-746.

Cvetković, B., Cvetković, M., Petrušič, T., Đorđić, V., Bubanj, S., Popović, B., Andrašić, S., Buišić, S. and Bogataj, Š. (2021), "Nutrition and Physical Activity Behavior in 11–14-Year-Old Schoolchildren in Serbia", *Children,* Vol. 8 No. 8, p. 625.

Dixey, R., Sahota, P., Atwal, S. and Turner, A. (2001), "Children talking about healthy eating: data from focus groups with 300 9–11-year-olds", *Nutrition Bulletin,* Vol. 26 No. 1, pp. 71-79.

Djordjic, V., Radisavljevic, S., Milanovic, I., Bozic, P., Grbic, M., Jorga, J. and Ostojic, S. M. (2016), "WHO European Childhood Obesity Surveillance Initiative in Serbia: a prevalence of overweight and obesity among 6–9-year-old school children", *Journal of Pediatric Endocrinology and Metabolism,* Vol. 29 No. 9, pp. 1025-1030.

Drummond, M. and and Drummond, C. (2010), "Interviews with boys on physical activity, nutrition and health: Implications for health literacy", *Health Sociology Review,* Vol. 19 No. 4, pp. 491-504.

Drummond, M. and Drummond, C. (2015), "My dad's a 'barbie' man and my mum's the cooking girl:Boys and the social construction of food and nutrition", *Journal of Child Health Care,* Vol. 19 No. 3, pp. 279-292.

Edwards, J. S. A. and Hartwell, H. H. (2002), "Fruit and vegetables – attitudes and knowledge of primary school children", *Journal of Human Nutrition and Dietetics,* Vol. 15 No. 5, pp. 365-374.

Farrell, P. (2021), "Conceptualizing Food Literacy: A Literature Review", *Canadian Journal for New Scholars in Education,* Vol. 12 No. 2, pp. 126-134.

Feraco, A., Armani, A., Amoah, I., Guseva, E., Camajani, E., Gorini, S., Strollo, R., Padua, E., Caprio, M. and Lombardo, M. (2024), "Assessing gender differences in food preferences and physical activity: a population-based survey", *Frontiers in Nutrition,* Vol. 11.

Filipovic, J. (2023). "Television food ads aimed at children in South-Eastern Europe: Cultural outlook and implications". *Journal of Retailing and Consumer Services*, Vol. 75, 103472.

Filipović, J. (2011). "Methodological Aspects of Children's Consumer Behaviour Research". *Marketing*, Vol. 42 No. 2, pp. 97-105.

Ganson, K. T., Nguyen, L., Ali, A. R. H., Nagata, J. M., Rodgers, R. F., Murray, S. B. and Alaggia, R. (2023), "'"Eat more protein, build more muscle": A grounded theory study of muscle-building behaviors among Canadian adolescents and young adults", *Body Image,* Vol. 47, p. 101635.

Gambaro, A. (2018). "Projective techniques to study consumer perception of food", *Current Opinion in Food Science*, 21, pp. 46-50.

Gaspar, T., de Matos, M. G., Luszczynska, A., Baban, A. and Wit, J. (2014), "The impact of a rural or urban context in eating awareness and self-regulation strategies in children and adolescents from eight European countries", *International Journal of Psychology,* Vol. 49 No. 3, pp. 158-166.

Germov, J. and Williams, L. (1996), "The Epidemic of Dieting Women: The Need for a Sociological Approach to Food and Nutrition", *Appetite,* Vol. 27 No. 2, pp. 97-108.

Hart, K. H., Bishop, J. A. and Truby, H. (2002), "An investigation into school children's knowledge and awareness of food and nutrition", *Journal of Human Nutrition and Dietetics,* Vol. 15 No. 2, pp. 129-140.

Hill, A. J., Draper, E. and Stack, J. (1994), "A weight on children's minds: body shape dissatisfactions at 9-years old", *International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity,* Vol. 18 No. 6, pp. 383-389.

Holmes, R. M. (2011), "'"Do you like Doritos?": preschoolers' table talk during lunchtime", *Early Child Development and Care,* Vol. 181 No. 3, pp. 413-424.

Janićijević, N. and Marinković, I. (2015), "Empirical testing of Hofstede's measures of national culture and their impact on leadership in four countries", *Ekonomika Preduzeća,* Vol. 63 No. 5-6, pp. 264-278.

Jovičić, A. (2015), "Healthy eating habits among the population of Serbia: gender and age differences", *Journal of Health, Population, and Nutrition,* Vol. 33 No. 1, pp. 76-84.

Kelly, R. K. and Nash, R. (2021), "Food Literacy Interventions in Elementary Schools: A Systematic Scoping Review", *Journal of School Health,* Vol. 91 No. 8, pp. 660-669.

Kostecka, M., Kostecka-Jarecka, J., Kowal, M. and Jackowska, I. (2021), "Dietary Habits and Choices of 4-to-6-Year-Olds: Do Children Have a Preference for Sweet Taste?", *Children,* Vol. 8 No. 9, p. 774.

Larson, N. I., Story, M., Eisenberg, M. E. and Neumark-Sztainer, D. (2006), "Food Preparation and Purchasing Roles among Adolescents: Associations with Sociodemographic Characteristics and Diet Quality", *Journal of the American Dietetic Association,* Vol. 106 No. 2, pp. 211-218.

LeBlanc, J., Ward, S. and LeBlanc, C. P. (2022), "The Association Between Adolescents' Food Literacy, Vegetable and Fruit Consumption, and Other Eating Behaviors", *Health Education & Behavior,* Vol. 49 No. 4, pp. 603-612.

Lehmann, D. R., Keller, K. L. and Farley, J. U. (2008), "The Structure of Survey-Based Brand Metrics", *Journal of International Marketing,* Vol. 16 No. 4, pp. 29-56.

Marecek, J. and Arcuri, L. (1995), "Talking Food, Doing Gender: The Social Construction of Femininity among Sixth-Grade Girls", *103rd Annual Meeting of the American Psychological Association*, New York, NY.

Marković, L., Đorđić, V., Trajković, N., Božić, P., Halaši, S., Cvejić, D. and Ostojić, S. M. (2021), "Childhood Obesity in Serbia on the Rise", *Children,* Vol. 8 No. 5, p. 409.

Nakagawa, S. and Hart, C. (2019), "Where's the Beef? How Masculinity Exacerbates Gender Disparities in Health Behaviors", *Socius,* Vol. 5, p. 2378023119831801.

Nguyen, S. P. (2007), "An apple a day keeps the doctor away: Children's evaluative categories of food", *Appetite,* Vol. 48 No. 1, pp. 114-118.

Otsuka, Y., Kaneita, Y., Itani, O., Jike, M., Osaki, Y., Higuchi, S. and Kanda, H. (2020), "Gender differences in dietary behaviors among Japanese adolescents", *Preventive Medicine Reports,* Vol. 20, p. 101203.

Pirouznia, M. (2001), "The association between nutrition knowledge and eating behavior in male and female adolescents in the US", *International Journal of Food Sciences and Nutrition,* Vol. 52 No. 2, pp. 127-132.

Puškaš, V., Pavlica, T. and Rakić, R. (2022), "Influence of socioeconomic and demographic parameters on obesity in children aged 7 to 11 in North Bačka region", *Glasnik Antropološkog društva Srbije,* Vol. 55, pp. 35-42.

Rakić, R., Pavlica, T. and Jovičić, D. (2016), "Overweight and obesity in children and adolescents from Serbia in the period 2001–2004 and 2011–2014", *Anthropologischer Anzeiger,* Vol. 73 No. 2, pp. 109-116.

Rozin, P., Riklis, J. and Margolis, L. (2004), "Mutual exposure or close peer relationships do not seem to foster increased similarity in food, music or television program preferences", *Appetite,* Vol. 42 No. 1, pp. 41-48.

Rubin, K. H., Bukowski, W. M. and Bowker, J. C. (2015), "Children in Peer Groups", in Lerner, R. M. (Ed.) *Handbook of Child Psychology and Developmental Science*, John Wiley & Sons, Chichester, pp. 1-48.

Salvy, S.-J., de la Haye, K., Bowker, J. C. and Hermans, R. C. J. (2012), "Influence of peers and friends on children's and adolescents' eating and activity behaviors", *Physiology & Behavior,* Vol. 106 No. 3, pp. 369-378.

Scaglioni, S., Arrizza, C., Vecchi, F. and Tedeschi, S. (2011), "Determinants of children's eating behavior123", *The American Journal of Clinical Nutrition,* Vol. 94, pp. S2006-S2011.

Skinner, J. D., Carruth, B. R., Bounds, W. and Ziegler, P. J. (2002), "Children's food preferences: a longitudinal analysis", *Journal of the American Dietetic Association,* Vol. 102 No. 11, pp. 1638-1647.

Suliburska, J., Bogdanski, P., Pupek-Musialik, D., Glod-Nawrocka, M., Krauss, H. and Piatek, J. (2012), "Analysis of lifestyle of young adults in the rural and urban areas", *Annals of Agricultural and Environmental Medicine,* Vol. 19 No. 1, pp. 135-139.

Šumonja, S. and Jevtić, M. (2017), "Cross-curricular program and children`s knowledge about nutrition and physical activity in Serbia: Sanja Šumonja", *European Journal of Public Health,* Vol. 27 No. suppl_3.

Šumonja, S. and Jevtić, M. (2021), "Impact of the Cross-Curricular Education Program on Food Intake, Physical Activity, and Body Mass Index of School Children in a Local Community in Northern Serbia", *Children,* Vol. 8 No. 11, p. 947.

Truman, E., Lane, D. and Elliott, C. (2017), "Defining food literacy: A scoping review", *Appetite,* Vol. 116, pp. 365-371.

Vidgen, H. A. and Gallegos, D. (2014), "Defining food literacy and its components", *Appetite,* Vol. 76, pp. 50-59.

Walseth, K. and Tidslevold, T. (2020), "Young women's constructions of valued bodies: Healthy, athletic, beautiful and dieting bodies", *International Review for the Sociology of Sport,* Vol. 55 No. 6, pp. 703-725.

WHO Regional Office for Europe (2024), "Nutrition, physical activity and obesity in Serbia: from data to policy action", Copenhagen, WHO Regional Office for Europe.