



## Is it better at home with my family? The effects of people and place on children's eating behavior



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### ABSTRACT

The people and places children eat with can influence food consumption. This study investigates the people and places Swiss school-aged children ate with over a 7-day period and analyses the effects of eating at home with family on food consumption. Children completed a 7-day food diary documenting the foods they consumed, the people with whom they ate, and the place where they ate. Analyses were conducted for all meals and included 9911 meal occasions. Most meals (80.5%) were consumed at home with family. Generalized estimating equations were used to model the effects of the home-family dyad on the child's chance of consuming a certain food while controlling for age, gender and BMI of the child, education, nationality and BMI of the parent. Compared to eating in other dyads (e.g. school-peers or restaurant-family), eating in the home-family dyad was associated with higher consumption of vegetables (+66% and +142% at weekday lunch and dinner and +180% and +67% at weekend lunch and dinner), lower consumption of sweets (−45% and −49% at weekday lunch and dinner; −43% and −49% at weekend lunch and dinner), and fewer soft drinks (−37% and −61% at weekday lunch and dinner; −66% and −78% at weekend lunch and dinner). This study shows the positive influence of eating at home with the family on food consumption in a sample of Swiss children. Interventions and policies that encourage children and parents to eat together at home could serve as effective prevention against a poor diet.

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### 1. Introduction

A variety of social, psychological, environmental and interpersonal factors determine eating behaviors in children and adolescents (de Vet, de Ridder, & de Wit, 2011; Herman, Roth, & Polivy, 2003; Pearson, Biddle, & Gorely, 2009; Wang, Beydoun, Li, Liu, & Moreno, 2011). Two key aspects that influence children's food choice are the presence of other people and the place where the food is consumed (Patrick & Nicklas, 2005). The social and physical attributes of mealtimes taken together constitute the social setting where children eat, and can play an important role on children's food choice. Hence, with the term “social setting” we refer to the presence of people (parents, peers, extended family, others) and the

place where children eat (home, restaurants, school, other). Dyads are defined as combinations of people and places (i.e. home-family, school-peers, etc.).

Research studying the effects of people on children's food consumption behavior has mainly focused on the role of parents and, more recently, of grandparents and peers. Parents typically determine the availability and accessibility of food by purchasing and preparing it and can affect children's diet through modeling, monitoring, attitudes and feeding styles (Bürgi et al., 2010; Campbell et al., 2007; Salvy, Elmo, Nitecki, Kluczynski, & Roemmich, 2011; Savage, Fisher, & Birch, 2007). Parental “healthy eating guidance” (i.e. parental teaching, modeling and encouragement) has been shown to be associated with a lower intake of sweetened beverages and unhealthy snacks and a higher consumption of fruit and vegetables in overweight children (Haszard, Skidmore, Williams, & Taylor, 2015). Parent food choice behaviors are correlated with their child's consumption of fruit and vegetables (Hall et al., 2011; Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005), snacks (Campbell et al., 2007; Hall et al., 2011), dairy

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products (Hanson et al., 2005), and sugary drinks (Campbell et al., 2007). Yet, some parental behaviors, like excessive parental control and pressure to eat, can have unintended negative effects and have been associated with a lower intake of fruit and vegetables and a higher intake of fats (Savage et al., 2007).

Several studies suggest that grandparents tend to provide grandchildren with unhealthy food, generally because they use food as a gift or lack knowledge about the health consequences of poor nutrition (Geoffroy et al., 2013; Li, Adab, & Cheng, 2015; Roberts & Pettigrew, 2010). Finally, peers can exert their influence through three different mechanisms (social facilitation, modeling and impression management) and depending on the specific mechanism at place and the identity of peers (familiar or unfamiliar) their effect on a child's food choice varies (Salvy, de la Haye, Bowker, & Hermans, 2012). Thus, peers have been shown to have both positive and negative influences on children's and adolescent's food choice (Bevelander, Anschutz, & Engels, 2012; Larson et al., 2008; Nørgaard, Nørgaard Hansen, & Grunert, 2013; Salvy et al., 2012). For instance, whereas the consumption of healthy snacks by unfamiliar peers were found to increase the consumption of healthy food among 9–11 years old children, the consumption of healthy food can be seen as “non-cool” and avoided when it conflicts with the image a child wishes to portray among peers (Salvy et al., 2012; Stead, McDermott, Mackintosh, & Adamson, 2011; de la Haye, Robins, Mohr, & Wilson, 2010).

Research studying the effects of place on children's food consumption behavior has mainly examined three settings; restaurants/fast food, schools, and homes. Eating out at a restaurant or a fast food place has been associated with less healthy food choice compared to eating at home (e.g. higher consumption of sugar-sweetened beverages, sweets and savory snacks) (Hagger, Chatzisarantis, & Biddle, 2001; Lachat et al., 2012; Nestle, 2002; Swinburn, Caterson, Seidell, & James, 2004; Woodruff, Hanning, & McGoldrick, 2010). Some evidence suggests that eating at school is associated with a better diet and lower energy intake compared to eating out at restaurant or fast food (Woodruff et al., 2010). However, the association between eating at school and a child's diet quality is still debated and the quality and success of school based lunch programs vary (Clark & Fox, 2009; Gordon et al., 2009; Patrick & Nicklas, 2005). Eating at the home of relatives, neighbors and friends at least once per week has been associated with a poorer quality diet and with being overweight (Ayala et al., 2008).

Several studies have focused on the effect of “family meals” considering the simultaneous effect of people and place. Eating at home with the family appears to be associated with higher intake of fruit, vegetables and dairy and a lower consumption of soft drinks than eating in other social settings (Fulkerson, Larson, Horning, & Neumark-Sztainer, 2014; Hammons & Fiese, 2011; Lee et al., 2014; Scaglioni, Arizza, Vecchi, & Tedeschi, 2011; Woodruff & Hanning, 2008). This social setting dyad shows additional positive outcomes, including a lower prevalence of overweight and of eating disorders and better academic results (Christian, Evans, Hancock, Nykjaer, & Cade, 2013; Fulkerson et al., 2014; Hammons & Fiese, 2011; Skeer & Ballard, 2013). However, when a TV is within view of the child, the quality of diet is reduced (Avery, Bostock, & McCullough, 2015).

In Switzerland, there is a lack of knowledge regarding the effects of people and place on children's eating behaviors. Studies show that 20% of children are overweight or obese in Switzerland (Bochud, Chatelan, Blanco, & Beer-Borst, 2017; Federal Office of Public Health (FOPH), 2014a), and that most children do not meet the recommendations for healthy eating (for example, less than 50% of girls and less than 40% of boys eat fruit and vegetables daily, and meat consumption is higher than recommended) (Federal Food

Safety and Veterinary Office (FFSVO), 2017; Federal Office of Public Health (FOPH), 2014b; Lamprecht & Stamm, 2012). A study of children ages 6–12 in Canton Ticino Switzerland showed that adherence to healthy eating guidelines is very low, with no children adhering to the recommendations for vegetable consumption, and a minority adhering to recommendations for meat (26.9%), fruit (10.4%), and sweet, snacks and soft drinks (9.5%) (Suggs, Della Bella, & Marques-Vidal, 2016). The diet in Canton Ticino is influenced by the geographically close Mediterranean diet, which actually represents a lifestyle, rather than a mere dietary guideline (Bach-Faig et al., 2011). Family meals are culturally important and recommended (Bach-Faig et al., 2011), although no data on their frequency was found. Thus, this study aimed to investigate the place and people children eat with and to analyze the effect of eating at home with the family on children's food consumption in Switzerland. We aimed to know how frequent they were and what effects they had on food consumption of children. This knowledge should help guide decisions about where to emphasize healthy nutrition promotion for children.

## 2. Methodology

### 2.1. Participants and design

Data for this study come from the project FAN (Famiglia, Attività fisica, Nutrizione), which was a social marketing program, offered free of charge, designed to promote a healthy food consumption and regular physical activity among families living in Ticino and having a child attending primary school, or first two grades of secondary school (Rangelov & Suggs, 2015). Study procedures were reviewed by the Canton Ticino Ethics Committee and deemed exempt in accordance with Swiss law. Parents were invited to take part in the program through a brochure and information letter distributed to children in the elementary and middle schools of Canton Ticino between May and September 2010. Parents could then register through the FAN Website and provide informed consent to participate in the study. Then, the baseline (BL) survey was sent to all those registered. Among those registered, 735 children were eligible and among them 610 completed the BL survey (for more details about the project, see (Rangelov & Suggs, 2015)). The final sample for this study included 608 children, as two children were excluded because they completed the BL food diary only one day.

### 2.2. Procedures

Data for this study were collected at BL (September 2010), prior to intervention activities. Parents completed a questionnaire providing sociodemographic data for themselves and their children and information on their own dietary and physical activity attitudes and behaviors. Children completed a paper based open-ended 7-day food diary (Rangelov, Suggs, & Marques-Vidal, 2016), where they reported foods and beverages consumed, who they ate with and where at all meals over one week. Two versions of the 7-day food diary were used. Children in elementary school received the food diary in form of a booklet, with each day on a separate page (the page was divided in meals, with blank space to write the foods consumed, with whom and where). Children in middle school reported their food consumption on a one-page diary for the full week. The information that was asked to children was the same; the only difference was the font used and the space allowed for completion. Children were asked to complete the food diary by themselves, at home daily. The 7-day food diary used for this study is a reliable instrument to collect data from children in this age group (Rangelov et al., 2016).

### 2.3. Measures

#### 2.3.1. Sociodemographic data

In the baseline survey parents reported their children's gender, age, height and weight as well as their own height and weight, education and nationality. Self-reported height and weight were then used to calculate children's Body Mass Index (BMI). Age and gender-specific cutoffs from the U.S. Centers for Disease Control and Prevention, validated for Swiss children (Zimmermann, Gübeli, Püntener, & Molinari, 2004), were applied.

#### 2.3.2. Dietary data

A registered dietician helped code the food log according to the principles of the Swiss Society for Nutrition (SSN). Food was categorized as: fruit (including 100% fruit juice); vegetable (including 100% juiced); milk and dairy; sweets; soft drinks; farinaceous (refined and unrefined cereals and potatoes); egg; and fish and meat (including white meat, red meat, and cold cuts). Mixed dishes were categorized according to the main ingredients. For example, couscous with vegetables was coded as farinaceous and vegetables, and meat lasagna as farinaceous, meat, and dairy. The food diaries were double checked to verify consistency across coders. More details about data collection and food coding procedures can be found in previous publications (Rangelov & Suggs, 2015; Rangelov et al., 2016; Suggs et al., 2016).

#### 2.3.3. Social setting data

The people whom children ate with were categorized into: family (a category comprising both the immediate family composed of parents with/without siblings and the extended family, when parents were together with grandparents, aunts/uncles or other people); relatives and peers (grandparents and/or aunts/uncles and/or other people and/or classmates or siblings); alone. The residual category "other people" included meal companions that were the least frequently reported, such as babysitter and neighbor. Places where children ate were recoded into the most commonly reported categories: home; restaurant or fast food; others house (i.e. the house of relatives such as grandparents or aunt/uncle or house of classmates and neighbors); school (cafeteria or classrooms, corridors, recreational spaces); other places (park, car, sport center, etc.). Combining both people and place, social setting dyads were created for each meal occasion (e.g. home-family; home-relatives/peers; restaurant-family; school-peers; etc.). For the home-family social setting dyad, family is defined as a combination of the "family" and the "family plus others" categories.

### 2.4. Statistical analysis

Statistical analyses were performed using Stata 14.0 (Stata Corp, College Station, TX, USA). Analyses for breakfast, lunch and dinner and for weekdays and weekends were conducted separately. Weekday lunch is comprised of 4 days because children do not have school on Wednesday afternoons in this Canton, and are thus not able to eat in the school cafeteria that day. Whether a child ate or did not eat a certain food during a particular meal occasion was modeled as a function of the home-family dyad on that meal occasion, plus a set of control variables (age, gender and BMI of the child, education, nationality and BMI of the parent). The multivariable analyses (Hidalgo & Goodman, 2013) were estimated applying the *xtgee* command that fits population-averaged panel-data models by using generalizing estimating equations (GEE). Robust standard errors were used to take into account the clustering of observations within individuals.

Results are reported as odds ratios (95% confidence interval) and average marginal effects (AMEs) with 95% CI for the home-family

dyad. AMEs represent the multivariable adjusted average change in the probability of eating a certain food within the home-family dyad. For example, consider that children who did not have dinner in the home-family dyad during the week had a 37% probability of eating vegetables, whereas children with the same characteristics (i.e., age, gender and BMI of the child, education, nationality and BMI of the parent) but who had dinner in the home-family dyad during the week had a 58% probability of eating vegetables. In this case the AME for vegetable intake at dinner during the week would be equal to 0.20, indicating a 20 percentage points higher probability of having eaten vegetables for children who had dinner in the home-family dyad. Finally, a comparison on included versus excluded children was conducted to test for differences between those who completed the food diary and those who did not provide food diary data for at least 6 days by meal.

## 3. Results

### 3.1. Participant characteristics

Of the 774 children who enrolled in the project, 735 children completed the baseline survey and were eligible to participate. 608 of the children completed the food diary for at least 6 days. 50.7% were females and the mean age was 8.5 (SD 1.9). Of the 588 children for whom BMI was available, 10.4% were under-weight, 72.1% were of healthy-weight, 17.5% were overweight or obese. Considering the 600 children whose parents provide information on nationality, 87.5% of them had parents with a Swiss nationality. The majority of children had parents with a primary level of education (58.4% out of 587 children whose parents report their own educational level). Of the 595 children, whose parents report their own BMI, 65% had parents of a healthy weight and 29.1% with parents who are overweight or obese (see Table 1).

The comparison between children included and excluded from the analyses showed that they were similar in terms of age, gender and BMI. One exception was that the sample of children excluded from the analysis of the home-family dyad and food consumption at breakfast were slightly older than those included (mean age 8.8 versus 8.4).

### 3.2. Dietary data: descriptive analysis

Analyses were conducted for all meals and included 9911 meal occasions. On both weekdays and weekends, few children consumed vegetables, meat, fish or eggs for breakfast. However, sweets were most commonly consumed at this meal compared to all other meal occasions (84.5% weekday / 79.1% weekend). Soft drinks were consumed by between 18.3% and 26% of the sample across all meal occasions, with 24.3% and 18.3% of the sample consuming soft drinks at weekday breakfast and weekend breakfast, respectively. The largest percentage of children eating fruit took place during weekday lunches (55.2%) followed by weekday dinner (39.6%) and weekend lunch (33.8%). (See Table 2).

### 3.3. Social setting dyad and meal distribution: descriptive analysis

Combining both people and place, social setting dyads were created for each meal occasion. The majority of meals during the weekday and weekend were consumed in the home-family dyad (see Table 3). Nearly all breakfasts consumed on weekdays and weekends were consumed in the home-family or in the home-peer dyads (see Table 3). During weekdays, two-thirds of lunches were consumed in the home-family dyad and one sixth in the cafeteria-peer dyad. During weekends, the home-family dyad remained the most frequent, followed by the other places-family dyad and by the

**Table 1**  
Sample description.

<i>Children's characteristics</i>	
Gender	(N = 608)
Girls (%)	50.7
Age mean (SD)	8.5 (1.9)
<i>Parent's characteristics</i>	
Education	(N = 587)
Primary (%)	58.4
Secondary (%)	15.0
Tertiary (%)	26.6
Nationality	(N = 600)
Swiss (%)	87.5
BMI	(N = 595)
Underweight (%)	5.9
Healthy-weight (%)	65.0
Overweight or obese (%)	29.1

other's house-family dyad. The vast majority of dinners on weekdays and weekends were consumed in the home-family dyad.

### 3.4. The association between eating in the home-family dyad and children's food consumption: multivariable analysis

#### 3.4.1. Weekdays

No significant association existed between the consumption of any food category and eating breakfast in the home-family dyad on weekdays (see [Table 5](#)).

Compared to eating in any other dyad, eating lunch in the home-family dyad was significantly associated with a decreased

likelihood of consuming meat (−34%), sweets (−45%), and soft drinks (−37%) and with an increased likelihood of consuming vegetables (+66%), dairy (+42%) and eggs (+51%). No significant association was found for fruit, fish or farinaceous (see [Table 5](#)). AMEs showed that the stronger effects of eating in the home-family dyad were on the probability of eating vegetables, which increased by +11.4 percentage points (henceforth “pp”) and on the probability of eating meat and sweets, which decreased by 9.4 pp and 10.0 pp, respectively. Weaker effects were seen for the probability of eating dairy (+6.8 pp), eggs (+2.5 pp) and soft drinks (−4.1 pp) (see [Table 6](#)).

For dinner on weekdays, eating in the home-family dyad rather than in any other dyad was significantly associated with a reduced likelihood of consuming sweets (−49%) and soft drinks (−61%) (see [Table 5](#)). Marginal effects show that eating in the home-family dyad decreased the probability of eating sweets by 9.0 pp and the probability of consuming soft drinks by 11.0 pp. Having dinner in this dyad was also associated with a higher likelihood of consuming vegetables (+142%) and fish (+192%) than in other dyads. The marginal effects indicate that a child who ate in the home-family dyad had a higher probability of eating vegetables (+21.4 pp) compared to a child who ate in another setting. Similarly, having dinner in the home-family dyad increased the probability of consuming fish (+5.2 pp) (see [Table 6](#)).

#### 3.4.2. Weekends

No significant association existed between the consumption of any food categories and eating breakfast in the home-family dyad on the weekend (see [Table 5](#)).

Consuming lunch in this dyad on the weekend was associated with a higher likelihood of consuming fruit (+71%), vegetables (+180%), fish (+98%) and farinaceous (+47%) and with a lower likelihood of consuming sweets (−43%) and soft drinks (−66%) than eating in other dyads (see [Table 5](#)). Marginal effects show that a child who had lunch in the home-family dyad on the weekend had a higher probability of eating fruit (+6.7 pp), vegetables (+24.50 pp) fish (+4.1 pp) and farinaceous (+5.5. pp) compared to a child who ate in another setting ([Table 6](#)). Eating in this social setting also

**Table 2**  
Food intake: number (%) of children who ate a certain food, over the weekday/weekend at that meal occasion.

	<i>Weekday</i>			<i>Weekend</i>		
	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner
N	2450 meals (n = 490)	1856 meals (n = 464)	2170 meals (n = 434)	1050 meals (n = 525)	1395 meals (n = 465)	990 meals (n = 495)
Fruit	80 (16.3)	256 (55.2)	172 (39.6)	63 (12)	157 (33.8)	92 (18.6)
Vegetables	2 (0.4)	428 (92.2)	402 (92.6)	3 (0.06)	405 (87.1)	331 (66.9)
Meat	13 (1.7)	378 (81.5)	383 (88.3)	13 (2.5)	364 (78.3)	258 (52.1)
Fish	0 (0.0)	173 (37.3)	132 (30.4)	1 (0.2)	95 (20.4)	72 (14.6)
Dairy	430 (87.8)	325 (70.0)	389 (89.6)	431 (82.1)	297 (63.9)	335 (67.7)
Farinaceous	423 (86.3)	455 (98.1)	433 (99.8)	413 (78.7)	461 (99.1)	467 (94.3)
Eggs	8 (1.6)	120 (25.9)	157 (36.2)	13 (2.5)	53 (11.4)	66 (13.3)
Sweets	414 (84.5)	224 (48.3)	184 (42.4)	415 (79.1)	199 (42.8)	146 (29.5)
Soft drinks	119 (24.3)	101 (21.8)	113 (26.0)	96 (18.3)	121 (26.0)	107 (21.6)

**Table 3**  
Distribution of meals by people and place (N = 9911). Results presented as number of meals and total percentages in brackets.

	Home	Restaurant	Other's house	School cafeteria (and school)	Other places
Family (alone or plus others)	7979 (80.5)	166 (1.7)	189 (1.9)	5 (0.01)	232 (2.2)
Relatives and peers	400 (4.0)	33 (0.3)	295 (2.9)	272 (2.7)	132 (1.3)
Alone	145 (1.5)	–	1 (0.01)	–	4 (0.04)
Other people	15 (0.2)	6 (0.1)	8 (0.1)	–	29 (0.3)

Note: empty cells indicate that no children ate in that dyad.

reduced the probability of consuming sweets (−8.9 pp) and soft drinks (−12.9 pp) (see [Table 6](#)).

Having dinner at home with the family rather than eating in any other dyad was associated with a higher likelihood of consuming fruit (+134%), vegetable (+67%), fish (+341%) and dairy (+52%) and a lower likelihood of consuming sweets (−49%), and soft drinks (−78%) (see [Table 5](#)). Marginal effects indicate that compared to a child who ate in another setting, a child who had dinner in the home-family dyad on the weekend had a higher probability of eating fruit (+6.9 pp), vegetables (+12.0 pp), fish (+6.9 pp) and dairy (+10.0 pp). Having dinner in this dyad, rather than in any other one, strongly reduced a child's probability of consuming soft drinks (−22.9 pp) and, to a lesser extent, it also reduced the child's probability of eating sweets (−10.6 pp) and meat (−4.8pp) (see [Table 6](#)).

#### 4. Discussion

This study investigated where, and with whom, children ate their breakfasts, lunches, and dinners over a full week. Furthermore, it investigated the association between eating at home with the family on children's dietary intake in comparison to eating away from home and with other people. Unlike the United States where the frequency of family meals seems to be declining over time ([Neumark-Sztainer, Larson, Fulkerson, Eisenberg, & Story, 2010; Walton et al., 2016](#)), family meals are common in Ticino, where more than 3 out of 5 lunches and 4 out of 5 dinners each week were consumed at home with the family. The results of this study showed that, irrespective of the BMI and education of the parent, and of the BMI, age and gender of the child, there was a significant association between meals consumed in the home-family dyad and an increased likelihood of consuming fruit, vegetables, fish, farinaceous, dairy and eggs and a decreased likelihood of consuming meat, sweets, and soft drinks during the weekday and/or weekend lunches and dinners.

Overall, our findings are consistent with previous studies showing that eating at home with the family leads to a more frequent intake of healthy foods such as fruits, vegetables and dairy, and less frequent intake of soft drinks and sweets ([Fulkerson et al., 2014; Lee et al., 2014; Woodruff & Hanning, 2008; Woodruff et al., 2010](#)). However, our results do deviate from several other relevant studies. Whereas [Lee et al. \(2014\)](#) found that the frequency of family dinners was only associated with more healthy food (including proteins, dairy products, grains, vegetables, seaweeds and fruit) and not associated with the intake of unhealthy foods (e.g., fatty foods, salty foods, sweets, etc.) ([Lee et al., 2014](#)), our study found that eating at home with the family positively affects the intake of both healthy and unhealthy food. Contrary to results of the EAT project ([Neumark-Sztainer et al., 2010](#)), we did not find any associations with the consumption of grains (in this paper “farinaceous”). Our results also show that the benefits of eating at home with the family were limited to lunch and dinner, while others found benefits of that social setting dyad at breakfast ([N. Larson et al., 2013](#)). Moreover, while [Neumark-Sztainer et al. \(2014\)](#) found out that the healthiness level of family dinners was lower when parents had low level of education, the positive effect of eating at home with the parents in our sample appeared to be independent of individual heterogeneity factors (such as BMI and education of the parent, and BMI, age and gender of the child) that we included as controls in the model.

The benefits of eating at home with the parents can be explained by several underlying mechanisms. It is likely, for instance, that during family meals parents can naturally teach nutrition education by being a good role model and by talking with children about the food that is been eaten ([Lee et al., 2014](#)). Moreover, at home,

parents can better control the food that is served during meals and monitor their children's food choices, recognizing early signs of eating disorders or bad habits and intervene ([Hammons & Fiese, 2011](#)). Further, since children rarely eat outside of home and without their parents, it may be that eating somewhere else or with someone else is an occasion for a treat, and thus also the occasion to eat unhealthy food (such as fries, hamburgers or ice-cream).

The lack of non-significant findings for farinaceous consumption could be due to the fact that farinaceous are an essential part of the Canton Ticino food culture (taking influence from the Mediterranean diet), where pasta, rice and bread are consumed at every meal ([Bach-Faig et al., 2011](#)), and are hence consumed regardless of the place or people children eat with. The non-significant findings for breakfast meals might be partially explained by the fact that in this sample the foods consumed at breakfast did not vary much. In comparison to lunch and dinner, a limited range of foods were consumed, making this meal more of a “standard or habitual meal”. As other papers have suggested ([Hermans, Herman, Larsen, & Engels, 2010; Salvy et al., 2011](#)), the influence of eating context (i.e., social setting) might be weaker when there are strong routines or habits that guide an individual's eating behavior in terms of typical food or typical amount of food consumed.

As this is the first study examining the influence of people and place on children's eating behaviors in Switzerland, it is promising to see that in Ticino, where family meals are culturally important and frequent ([Bach-Faig et al., 2011](#)); see ([Table 4](#)), the home-family social setting is associated with healthy food choice. However, further research using a longitudinal design is warranted. It is also worth replicating the study in other Swiss regions where the cuisine and culture are different than in the Canton of Ticino.

##### 4.1. Strengths and limitations

This study offers a complete picture of a week of food consumption, showing all places and people children ate with for 7 days. Further, it is the first study of the effects of social settings on children's eating behaviors in Switzerland. It also includes a large sample of children representing the normal distribution of BMI in the Canton. Finally, there were a large number of children who ate breakfast and this allowed the examination of the effect of social setting on breakfast, too.

Data for this study were collected using a 7-day food diary, a dietary assessment method that was shown to be reliable in this population ([Rangelov et al., 2016](#)). There are several advantages of the 7-day diary completed by children directly, compared to other instruments such as food frequency questionnaires and 24 h-recall. Children can complete them with their own words and on an ongoing basis so that they do not need to rely on memory or to be able to select only from a list of items. A food diary also allows to overcome the issue of day to day variability in eating behaviors ([Bingham et al., 1994; Collins, Watson, & Burrows, 2010; Livingstone & Robson, 2000](#)). However, researchers had no control on the completion of the diary: it is not known whether children were helped by parents and whether they completed the diary on an ongoing basis, daily. Thus, it is possible that children forgot to note some foods consumed. More objective methods, such as direct or video observation, were not feasible with the project budget. This point could be addressed in future studies.

The limitations of this study include the cross-sectional design and that we could not control for the place in the home where the child ate (e.g., kitchen table, in front of the TV) or which parent (mother, father, or both) or grandparent (grandmother, grandfather, or both) was present at meals. Also, because of the number of children in dyads different than the family-home one (only 6%), analyses testing which dyad leads to better food consumption was

**Table 4**

Dyads distribution over weekday and weekend (N = 9911). Results are presented as number of meals and column percentage in brackets.

	Weekday			Weekend		
	Breakfast	Lunch <sup>b</sup>	Dinner	Breakfast	Lunch	Dinner
N	2450	1856	2170	1050	1395	990
Home-family	2131 (87.0)	1262 (67.9)	1914 (88.2)	887 (84.5)	971 (69.6)	814 (82.2)
Home-relatives/peers	142 (5.8)	59 (3.2)	–	48 (4.6)	–	–
Other's house-family	–	–	–	–	83 (5.9)	30 (3.0)
Other's house-relatives/peers	–	104 (5.60)	–	25 (2.4)	40 (2.9)	–
Home-alone	102 (4.2)	–	–	22 (2.1)	–	–
Cafeteria-peers	–	251 (13.5)	–	–	–	–
Restaurant-family	–	–	–	–	73 (5.2)	48 (4.9)
Else <sup>a</sup>	75 (3.1)	180 (9.7)	268 (11.8)	68 (6.4)	228 (16.4)	98 (9.9)

Note: empty cells indicate that no children ate in that dyad.

<sup>a</sup> Else is a residual, mixed category comprising other places peers and other places family plus all the dyads that were the least frequent in the sample (<2%).<sup>b</sup> Weekday lunch is comprised of 4 days because children do not have school on Wednesday afternoons, and are thus not able to eat in the school cafeteria that day.**Table 5**

Multivariable analysis: Home-family social setting dyad.

	Fruit	Vegetables	Meat	Fish	Dairy	Farinaceous	Eggs	Sweets	Soft drinks
<i>Weekday</i>									
Breakfast <sup>a</sup>	0.889 (0.523; 1.511)	–	–	–	1.411 (0.993; 2.006)	1.421 (1.019; 1.982)	–	1.003 (0.747; 1.348)	1.328 (0.867; 2.035)
Lunch	0.912 (0.740; 1.180)	<b>1.661</b> <b>(1.320; 2.090)</b>	<b>0.665</b> <b>(0.544; 0.813)</b>	1.280 (0.929; 1.763)	<b>1.416</b> <b>(1.124; 1.783)</b>	1.243 (0.908; 1.702)	<b>1.507</b> <b>(1.026; 2.216)</b>	<b>0.546</b> <b>(0.417; 0.714)</b>	<b>0.634</b> <b>(0.423; 0.951)</b>
Dinner	1.344 (0.889; 2.031)	<b>2.424</b> <b>(1.860; 3.160)</b>	0.954 (0.710; 1.281)	<b>2.921</b> <b>(1.414; 6.034)</b>	1.138 (0.885; 1.464)	0.957 (0.688; 1.332)	1.775 (0.964; 3.264)	<b>0.513</b> <b>(0.363; 0.725)</b>	<b>0.393</b> <b>(0.265; 0.583)</b>
<i>Weekend</i>									
Breakfast <sup>a</sup>	1.493 (0.642; 3.474)	–	–	–	1.049 (0.687; 1.604)	1.246 (0.852; 1.820)	–	0.993 (0.692; 1.425)	0.795 (0.490; 1.291)
Lunch	<b>1.709</b> <b>(1.235; 2.366)</b>	<b>2.808</b> <b>(2.202; 3.580)</b>	1.074 (0.850; 1.358)	<b>1.976</b> <b>(1.131; 3.454)</b>	1.040 (0.807; 1.341)	<b>1.469</b> <b>(1.081; 1.996)</b>	1.214 (0.680; 2.165)	<b>0.567</b> <b>(0.424; 0.759)</b>	<b>0.339</b> <b>(0.241; 0.478)</b>
Dinner	<b>2.344</b> <b>(1.196; 4.587)</b>	<b>1.671</b> <b>(1.170; 2.385)</b>	0.799 (0.553; 1.155)	<b>4.414</b> <b>(1.677; 11.621)</b>	<b>1.522</b> <b>(1.081; 2.142)</b>	0.976 (0.632; 1.506)	0.784 (0.419; 1.469)	<b>0.507</b> <b>(0.339; 0.758)</b>	<b>0.216</b> <b>(0.145; 0.321)</b>

Results are expressed as odds ratio at 95% CI. Statistically significant values are indicated in bold.

<sup>a</sup> Multivariable analysis was applied only to the foods that were consumed by more than 5% of children.**Table 6**

Average Marginal Effects (and 95% CI) of the Home-family dyad on children's food consumption.

	Fruit	Vegetables	Meat	Fish	Dairy	Farinaceous	Eggs	Sweets	Soft drinks
<i>Weekday</i>									
Breakfast	–0.008 (–0.047; 0.030)	–	–	–	0.067 (–0.005; 0.138)	0.079 (–0.002; 0.156)	–	–0.001 (–0.069; 0.070)	0.034 (–0.014; 0.081)
Lunch	–0.017 (–0.066; 0.031)	0.114 (0.062; 0.167)	–0.094 (–0.141; –0.047)	0.024 (–0.006; 0.053)	0.068 (0.024; 0.112)	0.022 (–0.001; 0.054)	0.025 (0.003; 0.046)	–0.100 (–0.146; 0.054)	0.041 (–0.079; –0.003)
Dinner	0.035 (–0.010; 0.080)	0.214 (0.153; 0.275)	–0.011 (–0.078; 0.056)	0.052 (0.029; 0.075)	0.031 (–0.029; 0.091)	–0.007 (–0.059; 0.045)	0.037 (0.005; 0.069)	–0.090 (–0.144; –0.036)	–0.110 (–0.165; –0.055)
<i>Weekend</i>									
Breakfast	0.025 (–0.021; 0.070)	–	–	–	0.009 (–0.073; 0.093)	0.048 (0.037; 0.134)	–	–0.001 (–0.081; –0.078)	–0.027 (–0.087; 0.033)
Lunch	0.067 (0.029; 0.104)	0.245 (0.189; 0.302)	0.017 (–0.039; 0.073)	0.041 (0.012; 0.070)	0.008 (–0.044; 0.060)	0.055 (0.009; 0.101)	0.067 (–0.013; 0.027)	–0.089 (–0.137; –0.041)	–0.129 (–0.174; –0.085)
Dinner	0.069 (0.026; 0.112)	0.120 (0.040; 0.200)	–0.048 (–0.129; –0.033)	0.069 (0.041; 0.098)	0.100 (0.021; 0.179)	–0.004 (–0.069; 0.062)	–0.017 (–0.063; 0.029)	–0.106 (–0.175; –0.037)	–0.229 (–0.299; –0.158)

not possible. Pending sufficiently big dyads, future studies should examine this aspect. The data also represent only one of the four linguistic/cultural regions in Switzerland and may not be extrapolated to the other regions.

Children were excluded from the meal analysis if in the food diary they reported less than 6 days for that specific meal. It is possible that those who completed the log for at least 6 days per meal occasion were different in some characteristics (motivation, eating behaviors, parental support, etc.) than those who did not complete it for at least 6 days. However, as described previously, excluded children were generally comparable to included children. It is likely that children who did not participate at all, or those who

only provided data for a few meals were different than those included. However, this is a common dilemma in studies with voluntary participation.

## 5. Conclusion

The results of this study confirm the importance of social setting on children's eating behavior. Irrespective of the BMI and education of the parent, and of the BMI, age and gender of the child, children consumed a healthier diet when they ate at home with their family. While further research is needed to understand if the findings hold true across time and with other populations, this study suggests

that interventions and policies that encourage children and parents to eat together at home could result in children consuming a healthier diet and thus serve as effective prevention for many ill-effects associated with a poor diet.

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## Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.appet.2017.11.002>.

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