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A Comparative Evaluation of Food Preferences and Healthy Food Knowledge in Childhood

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ABSTRACT
Childhood overweight and obesity have been increasing over recent years and are currently considered a genuine world epidemic. In the present research, conducted in two moments, with 1013 children (aged 4-10 years), we've asked children to draw a Preferred Meal and a Healthy Meal, trying to evaluate the child's implicit knowledge of which food items are healthy as well as understanding their food habits. Two thousand and twenty six drawings were collected: 1013 representing a Preferred Meal and 1013 a Healthy one. Drawings were evaluated using a content analysis instrument specifically developed for this study. The results obtained in the study point out to the circumstance that food preferences (Preferred Meal) internalized during childhood are connected to early experiences with food and to pathogenic (family and society) nutritional patterns. They also testify to the children's ability to learn to select and prefer healthy food items at a very early age, despite that preference might fade with time. The analysis of the drawings collected shows important differences between the two types of meals, with implications for childhood obesity prevention. The main conclusion of the present research emphasizes the need for developing health education ludic-pedagogic instruments on children's food preferences.
Keywords: Eating behaviours; Childhood Overweight; Child Obesity; Health Education.

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INTRODUCTION

Despite major efforts to promote weight reduction, overweight and obesity in children grow to epidemic proportions all over the Western World. Mechanisms responsible for the increase of childhood obesity in the last two decades are not completely known (Cole, Bellizzi, Flegal & Dietz, 2000; O`Brien, Holubkov & Reis, 2004; Pinkas-Hamiel & Zeitler, 2000) and are still seen as bordering a certain scientific "obscurantism" (Dias, Julião, Reis, Camolas & Duque, 2006; Dias, Julião, Reis & Duque, 2008; Dias, Reis, Julião & Duque, 2007; James, Thomas, Cavan & Kerr, 2004).

Regardless of its precise cause(s), prevention and treatment should begin at a very early stage.

Attention should thus be focused on the psychosocial determinants, so as to identify the «*toxic environment*» (Ebbeling, Pawlak & Ludwig, 2002) that influence the early formation of children's eating choicesthat seems to involve sociocultural and psychological factors, which calls for a necessarily interventionist and multidisciplinary approach if we are to attempt to improve our understanding of this galloping and massive process (Cavalcanti, Dias & Costa, 2005; Jomori, Proença, & Calvo, 2008; Tonial, 2007).

It is thus necessary that we develop health education programmes aimed at developing or improving parents' and educators' skills when it comes to facilitating children's behavioural changes, namely those

that will foster their adhesion to practice healthy food behaviours and to a more proactive life style (Golan & Crow, 2004; Savage, Fisher & Birch, 2007).
Understanding how children's food preferences are acquired and internalized is thus essential for the development of strategies that may contribute, in the future, to improve health education programs for children (Dias, Reis, Julião & Duque, 2007).

MATERIALS AND METHODS

Our empirical research is aimed at assessing children's cognitively and emotionally internalized mental representation on what constitutes a *Preferred Meal* in relation to a *Healthy Meal*, using the resource drawing as methodological instrument. We have designed a cross-sectional, exploratory and descriptive study using a qualitative methodology – content analysis.A black-and-white pictogram representing the typical containers and utensils used during a meal – plate, fork, knife and glass – was presented, on which the child was to draw their meals. To analyse the content of the drawings, we used an *instrument-grid* of analytical categories, specifically designed for this study. This grid is composed of **five** (5) **basic categories** and **sixteen** (16) additional analytical **subcategories**. The theoretical and practical foundation for instrumentwas based on the conceptualization of the 'Roda dos Alimentos' ['Food Wheel'], created in 1977 for the Food Education Campaign 'Saber comer é saber viver' ['Knowing how to eat is knowing how to live'][1], and on the expert opinions of a nutritionist and a medical doctor.
The information gathered through the drawings was collected in two distinct, albeit consecutive, moments (M1 and M2). The child was first asked to draw their *Preferred Meal* (M1) on the pictogram supplied, and, upon completing that first drawing, asked to draw a second one, this time an illustration of a *Healthy Meal* (M2). In both drawings, the instruction given specified that the meal should represent what the children would eat on a typical family dinner. Once the drawings were finished, all their elements were identified by the researcher(s) according to the children's descriptions, in order to minimize erroneous interpretations.
For purposes of obtaining a descriptive analysis, data were treated using the Statistical Package for the Social Sciences (SPSS) 19.0 for Windows.
The current research involved a total of 377 pre-school children, aged 4-6 years, of both sexes, distributed into three age-groups (4YG =108; 5YG =128; 6YG=137), and a total of 640 school-aged children (6-10 years), of both sexes distributed into five age-groups (6YG2=85; 7YG=140; 8YG=170; 9YG=150; 10YG=95). At the time the data were collected, participant children attended kindergarten/pre-schools/schools located on the Metropolitan Area of Lisbon and were members of medium-low income families. 2026valid drawings were collected (1013 representing a *Preferred Meal* and 1013 representing a *Healthy Meal*).

RESULTS

Regarding the ***Preferred Meal*** *representations, we found* pre-schoolers in the three age-groups considered selected *Meat* (4YG: 49%; 5YG: 51%; 6YG: 53%) and *Potatoes* (4YG: 40%; 5YG: 45%; 6YG: 50%), followed by *Pasta* (4YG: 27%; 5YG: 30%; 6YG: 27%), as their favourite foods. Whereas the school-aged group also selected*Meat* (6YG: 48%; 7YG: 46%; 8YG: 54%; 9YG: 54%; 10YG: 46%), *Potatoes* (6YG: 45%; 7YG: 56%; 8YG: 50%; 9YG: 55%; 10YG: 56%) and Vegetablesas the preferred items in their individual dietary choices.
When looking at the subcategory *Fast Food*, we see that this dietary choice becomes more popular as the children get older (4YG: 16%; 5YG: 30%; 6YG: 34%; 6YG2: 36%; 7YG: 44%; 8YG: 37%; 9YG: 38%; 10YG: 39%), drawing *Pizza* (4YG: 35%; 5YG: 34%; 6YG: 23%; 6YG2: 14%; 7YG: 14%; 8YG: 10%; 9YG: 15%; 10YG: 13%), *Sausages* (4YG: 29%; 5YG: 34%; 6YG: 31%; 6YG2: 7%; 7YG: 7%; 8YG: 9%; 9YG: 3%; 10YG: 1%) and *Hamburgers* (4YG: 24%; 5YG: 18%; 6YG: 28%; 6YG2: 9%; 7YG: 10%; 8YG: 6%; 9YG: 9%; 10YG: 16%).However, if we shift our attention to the subcategory Vegetables, we see that, already in their preferred meals, children do include one, or more than one, item from that subcategory (4YG: 18%; 5YG: 24%; 6YG: 18%; 6YG2: 8%; 7YG: 9%; 8YG: 21%; 9YG: 17%; 10YG: 8%).

[1]The object behind the development of the 'Food Wheel' was converting complex nutritional information into simple concepts, easy to understand and easy to follow by the general population. The circle groups' food items according to their nutritional properties, featuring a total of five large clusters, each occupying a differentiated area of the circle, thus pictorially indicating the relative weight with which each group should contribute so as to obtain a daily balanced diet (FCNAUP & Instituto do Consumidor, 2004; Peres, 1994). Since its introduction, changes in the Portuguese population's dietary patterns and incoming new information, led to a necessary updating of the 'Food Wheel'. Its original format was maintained, for it preserves the notion of not ranking food items in a hierarchy and it associates the daily dietary intake to the object plate – sign of a food culture that happens around a table. When restructuring the 'Food Wheel', learning objectives concerning nutrition were not the only aspect considered; the promotion of cultural and social values pertaining to the Portuguese society was also taken into account. The 'New Food Wheel' displays seven food groups with varying dimensions, once more indicating the proportion allotted to each group in a daily balance regime. Given that water is a constituent part of almost every food item, and indispensable to life, it is now given representation in the core of the wheel (DGS, 2005; FCNAUP & Instituto do Consumidor, 2009; Franchini, Rodrigues, Graça & Almeida, 2004).

As to representations of ***Healthy Meal***, the most significant result concerns the predominance of *Vegetables* (4YG: 44%; 5YG: 48%; 6YG: 51%; 6YG2: 59%; 7YG: 72%; 8YG: 76%; 9YG: 79%; 10YG: 82%), followed by the inclusion of *Fish* in some groups (6YG: 39%; 6YG2: 48%; 7YG: 63%; 8YG: 76%; 9YG: 76%; 10YG: 75%) and the reduction of *Meat* (4YG: 33%; 5YG: 31%), accompanied by an increasing number of references to *Fruit* (4YG: 13%; 5YG: 19%; 6YG: 20%) and *Soup* (4YG: 7%; 5YG: 18%; 6YG: 17%), which had but a meagre expression in school-aged children's Healthy Meal pictorial representations, being present in less than 10% of the drawings.

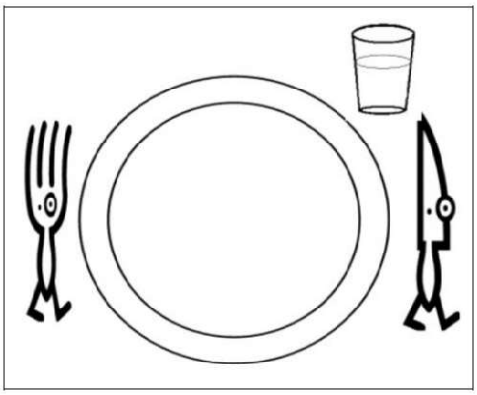
DISCUSSION AND CONCLUSION

The analysis of the drawings shows relevant dissimilarities between the two types of 'meal profile', with significant implications for child excess weight and obesity prevention, and indicating the need to develop play-based learning tools, specifically tailored to dietary health education, and based on the identified food preferences in childhood.

One salient conclusion to be drawn from our study is that children aged 4 to 10 years (*i.e.*, all age-groups considered in our analysis) possess, to a greater or lesser extent, correct information on health-promoting foods, or, in other words, an overall sound representation of what constitutes a *Healthy Meal*. Our findings are also relevant in that they show that children are apt and able to learn to choose and to favour healthy foods since very early ages. To name but one corroborating example, a significant percentage of children aged 4-10 years does include *vegetables* in their representation of *Preferred* Meal, which stands as a positive sign, and an encouraging one, in terms of dietary healthy preferences in very early ages. Further evidence in favour of early (4-6 years) internalization of the notion of *Healthy* meal comes from decreasing representations of *Fast Food* items and increasing representations of food items pertaining to the category *Dietary Fibbers, Vitamins and Minerals*, namely *Soup* and *Fruit*. That said, when examining the results from the older group, we see that, although *Vegetables* are still included as constituent elements of a meal, even in children's *Preferred Meal*, there is a slight tendency to deviate from healthy nutritional choices, with a marked decrease in representations of the items *Soup* and *Fruit* in the drawings of school-aged children (6-10 years).

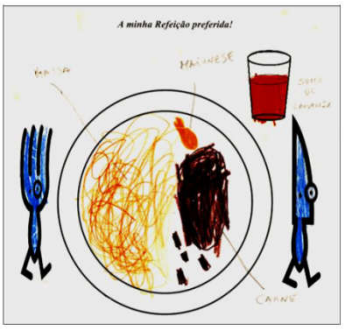
So, we seem to have found an age-increasing unhealthy choices, with school-aged children (6-10 Years) tending to choose as preferred meals, hipercaloric ones, namely, fast food, and to erase from healthy meals, soups and fruits.Parallel to that, we see a conspicuous and substantial increase in *Fast Food* representativeness as the preferential food choice in school-aged children. While children aged 4-6 showed a growing appetence for *Fast Food*, that tendency is confirmed in the 6-10 years age-group, and also a 'diversification of consumption' and 'McDonaldisation' of foods classed under the category *Fast Food*, with *Pizza* and *Hamburger* feature prominently in those children's drawings.

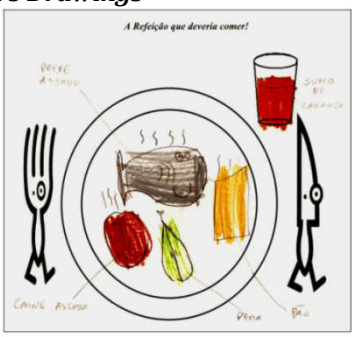
Pictogram before Children's Drawings



Picture 1: *Pictogram representing the various utensils used during a meal, simulating a 'set table' (plate, fork, knife and glass).*

Pictogram after Children's Drawings

a) 

b) 

Pictures 2a and 2b: *Examples of pictograms illustrating a Preferred Meal (a) and a Healthy Meal (b). Captions read: 'This is my favourite meal!' (a) [Pasta, mayonnaise, meat + orange juice] and 'This is the meal I should have!' (b) [Roasted meat, baked fish, bread, pear + orange juice]. Food items are shown as drawn by the child. Upon completing the drawing, each child would orally indicate to the researcher which food items s/he had represented, and the researcher would accordingly write down the verbal information provided.*

Table 1: *Instrument-grid* of analytical categories composed of **five** (5) **basic categories** and **sixteen** (16) additional analytical **subcategories**.

Content Analysis Instrument

Category	Subcategories
1. Carbohydrates	Cereal grains and respective derivatives and Tubers
	Vegetables
	Sweets and deserts
	Cooking methods
2: Proteins	Meats
	fishes and eggs
	Milk and Dairy products
	Cooking methods
3: Dietary fibre, Vitamins and Minerals	Vegetables
	Soups
	Fruits
4: Fats	Sauces
	Fast-food
5: Drinks	Water
	Soft drinks
	Fresh fruit/vegetable juices
	Wine

Note: To these, a further **eighty nine** (89) sub-subcategories are to be added, so as to represent the myriad of food and drink items drawn by the children.

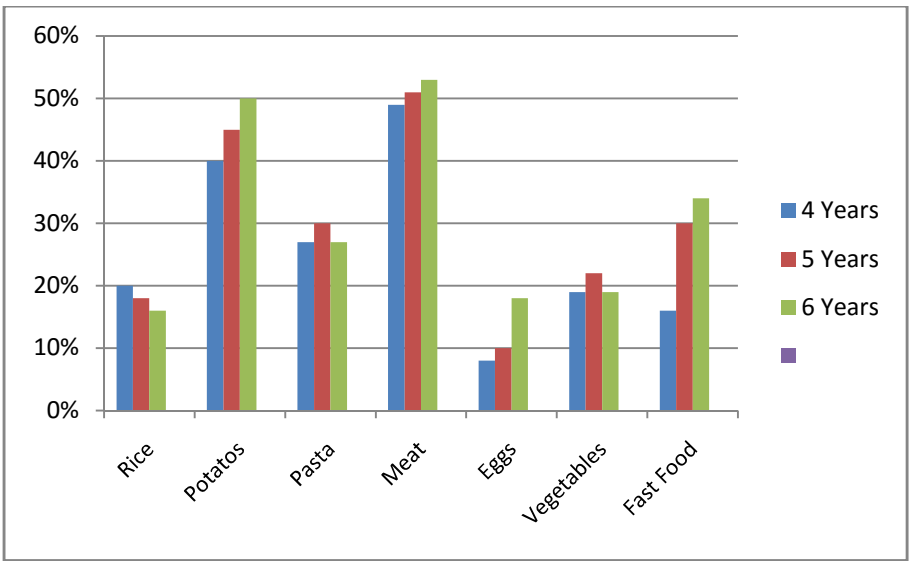


Figure 1: *Preferred Meal: representations by preschool-aged children (4-6 years).*

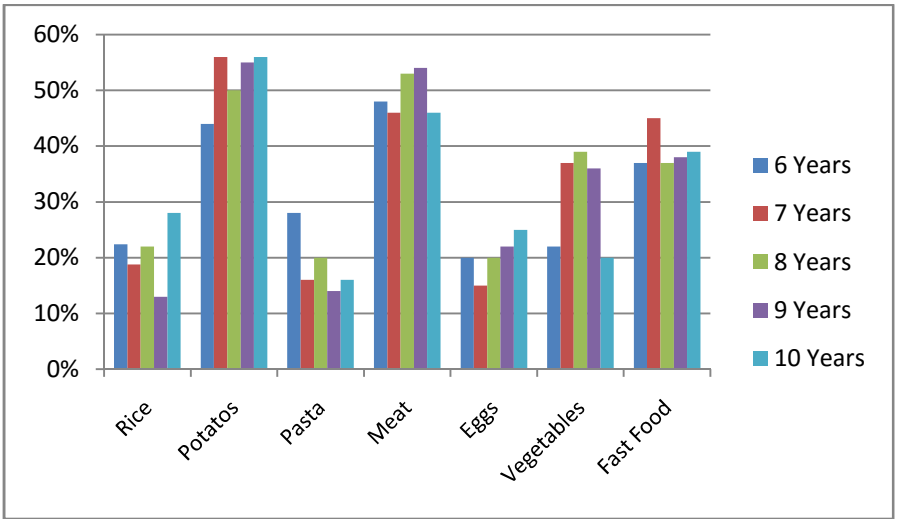


Figure 2: *Preferred Meal: representations by school-aged children (6-10 years).*

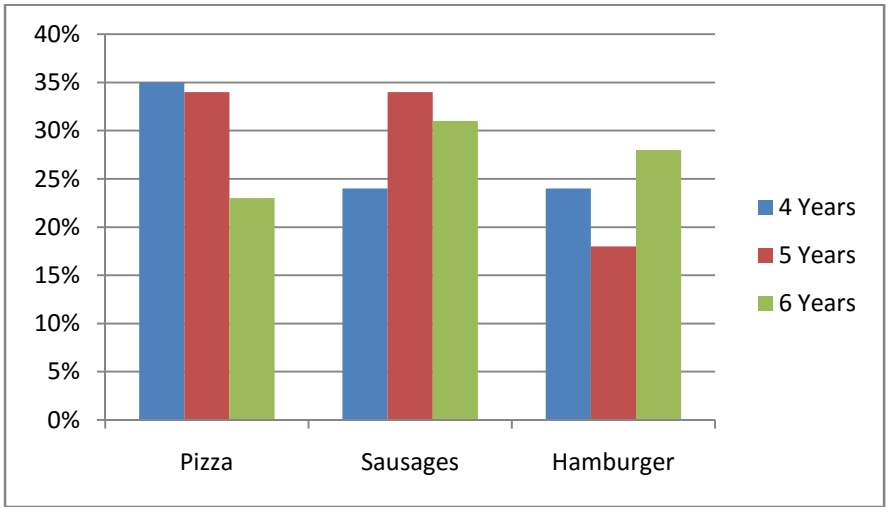


Figure 3: *Preferred Meal – Fast Food: representations by preschool-aged children (4-6 years).*

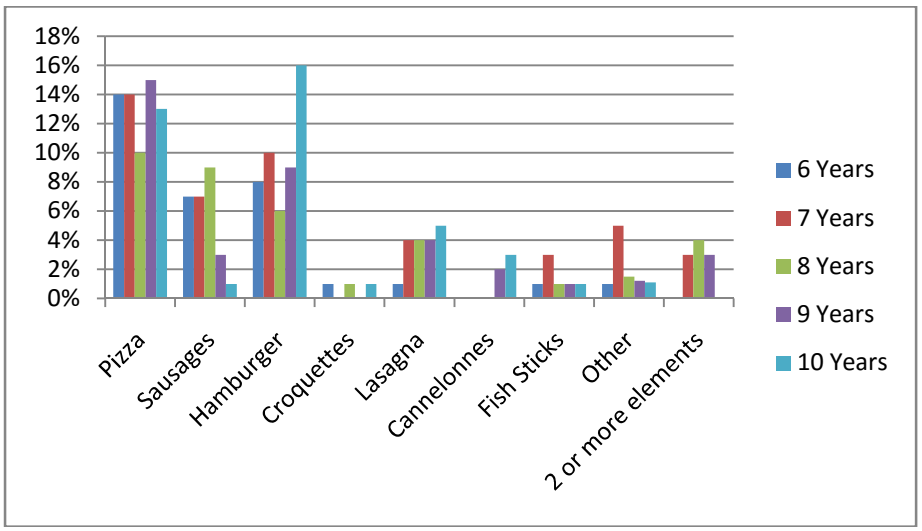


Figure 4: *Preferred Meal – Fast Food: representations by school-aged children (6-10 years).*

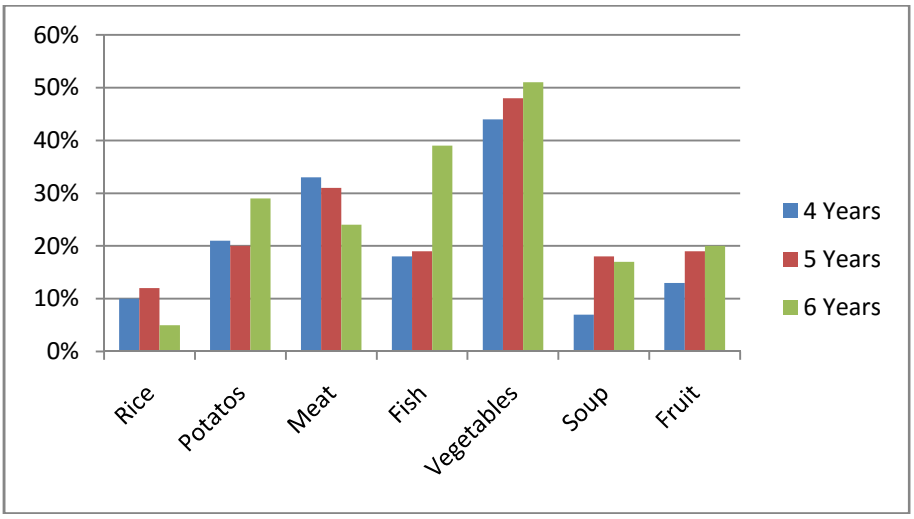


Figure 5: *Healthy meal: representations by preschool-aged children (4-6 years).*

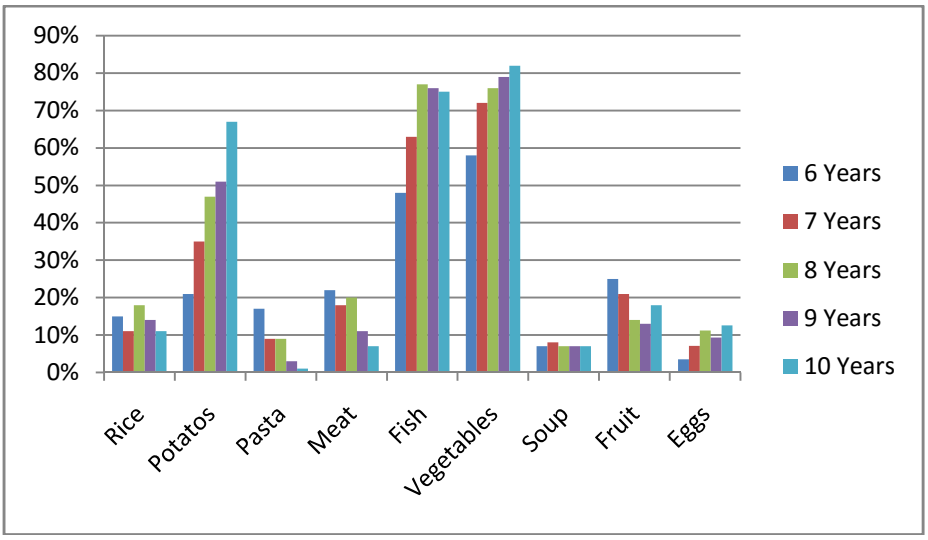


Figure 6: *Healthy Meal: representations by school-aged children (6-10 years).*

In addition, results seems to indicate that children's food preferences (*Preferred Meal*) are shaped by their early food contacts and early eating experiences, which brings us back, once again, to the issues of children being influenced by 'obesogenic environment', media exposure and peer pressure, and to the need to develop dietary health education programs specifically tailored for them. Child health education programs require an integrated and multidisciplinary approach and should include dietary changes, nutritional education, changes in physical activity patterns, behavioural modification and the involvement of parents and teachers.

It has been established that the internalization of healthy eating behaviours acquired in early childhood will condition one's eating behaviours in subsequent development stages. As such, in order to foster a child's healthy development, it is necessary to promote, teach and cultivate a balanced and attractive nutritional regime. Children should learn how to eat, just as they learn how to speak and read, for one's eating behaviour is a relational, social and cultural act.

When it comes to implementing dietary health programs, parents, educators and teachers emerge in this study as the children's "first-line social partners"as well as "behavioural models" for, in the child's early stages of development, they are the "direct mediators" of the child's choices and access to food.

It is, in fact, common sense experience that allows us to say that knowing how to be with other people, as well as knowing how to eat, is a difficult task at any age, really.

That said, 'As the twig is bent, so is the tree inclined'…

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