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Adolescents' perception of the healthiness of snacks

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ABSTRACT

Changes in snacking habits in developed countries are a growing cause for concern, since foods and beverages commonly consumed as snacks, tend to be both energy dense and nutrient poor. Adolescents are characterised by frequent snack consumption. Therefore, promoting more healthful snack choices to adolescents is important for optimising nutrient intake and lowering the risk of chronic disease.

The ability to evaluate the healthiness of snacks is essential to making healthy choices. Previous research has shown that health claims can influence consumers' perceptions of food products. However, little is yet known about consumers' perceptions of how nutritious or healthy specific foods or beverages are. This knowledge is important for planning successful interventions and designing healthy snacks that will also appeal to population groups with a higher dietary risk, including adolescents.

The aim was to investigate how adolescents evaluate the healthiness of snacks currently available for consumption in school environments. Seventy-five adolescents participated in a sorting task and evaluated the healthiness of 37 representative snacks.

The data were analysed using hierarchical multiple regression and cluster analysis. The sugar ($\beta = -.51$, $P < .001$), fruit ($\beta = .49$, $P < .001$), total fat ($\beta = -.41$, $P = .002$) and nut content ($\beta = .35$, $P = .002$) were significant predictors of snacks' perceived healthiness.

The findings of this study are important for tailoring future interventions to promote healthy eating and setting priorities for nutrition education.

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1. Introduction

Overweight and obesity are directly responsible for at least 2.8 million deaths worldwide each year (WHO, 2014), while the health care costs stemming from poor dietary patterns account for more than 3.6% of the gross national product in developed countries (Popkin, Kim, Rusev, Du, & Zizza, 2006). In Switzerland, more than 40% of all adults and about 20% of children are overweight (Federal Statistical Office, 2012). Increases in the portion sizes of products (Young & Nestle, 2007) and changes in eating patterns, including more frequent snacking, have been identified as contributing to the obesity epidemic (Hill & Peters, 1998; Young & Nestle, 2002). Several studies show that portions sizes, especially those of energy-dense, nutrient-poor (EDNP) foods and snacks, have become larger in recent decades (Nielsen & Popkin, 2003; Steenhuis, Leeuwis, & Vermeer, 2010; Young & Nestle, 2003). Further, larger portions consistently lead to an increased intake (Rolls, 2014; Rolls, Morris, & Roe, 2002; Steenhuis & Vermeer, 2009). Snacks are often sold in pre-determined portion sizes, which unconsciously suggests a norm for how much should be consumed (Wansink & van Ittersum, 2007, 2013). Portion sizes likely affect intake because individuals consistently consume the vast majority of what they serve themselves (Wansink & Johnson, 2015). Being mindful of consuming healthy portion sizes is therefore essential.

Besides larger portion sizes, the increased frequency of snacking in Western societies is a significant cause of concern (Piernas & Popkin, 2010). While eating in the kitchen or dining room at home is associated with a lower BMI in children and adults (Wansink & van Kleef, 2014), adolescents are thought to be particularly prone to making poor choices in terms of nutrition, as they frequently snack and eat outside of the home (Larson et al., 2008; Rangan, Kwan, Flood, Louie, & Gill, 2011; Zizza, Siega-Riz, & Popkin, 2001).

Currently, it is unclear whether a higher frequency of snacking promotes weight gain (Hampl, Heaton, & Taylor, 2003; Hartmann, Siegrist, & van der Horst, 2013; Johnson & Anderson, 2010). Adolescents have high energy and nutrition requirements due to the adolescent growth spurt, especially during puberty (EUFIC, 2006),

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and on average they engage in higher levels of physical activity (EUFIC, 2006). Eating snacks between main meals can help to satisfy these energy and nutrient requirements (EUFIC, 2006). Snacking per se does not have a negative impact on dietary quality. Rather, it can offer an opportunity for making healthy, lower energy density food choices, which result in a wider variety of foods being included in the diet (Whybrow & Kirk, 1997). A recent study conducted by Hartmann et al. found that in Switzerland, snacking was positively associated with intake of sweets and savouries, but also of fruit (Hartmann et al., 2013). Cluster analysis revealed that high-frequency snack consumption occurs in the context of healthy, as well as unhealthy, dietary behaviours and lifestyle patterns (Hartmann et al., 2013). Therefore, public health interventions should promote nutritious snack consumption among groups at particular risk of poor dietary habits.

Environmental exposure, motivation, and ability have been suggested as the three key determinants of healthy versus unhealthy food choices (Brug, 2008). Along with motivation, the ability to evaluate the healthiness of snacks when faced with choosing from a range of options is important for adolescents. To date, very little evidence is available concerning why particular foods or beverages are perceived as nutritious or healthy. Lessons about food and nutrition in school could help young people to gain the knowledge necessary to make informed choices about the meals and snacks they regularly consume (EUFIC, 2006). Nutrition education for school-aged children is important because dietary habits, which affect food preferences, energy consumption and nutrient intake, develop in childhood and particularly during adolescence (EUFIC, 2006).

In order to provide sustainable nutrition education and to promote healthy snack choices, it is important to understand how adolescents perceive these foods and to determine which criteria shape their perceptions when deciding whether or not a snack is 'healthy'.

Research has shown that health claims can influence consumers' perceptions of food products (Lahteenmaki, 2013), although little is known about why particular foods are perceived as healthy or unhealthy (Bucher, Müller, & Siegrist, 2015). A study involving adults found a preference for reduced fat products compared to the full fat versions, even though products with zero fat were not preferred to the low fat varieties (Visschers & Siegrist, 2010). Therefore, fat content may also be relevant to health perception. Indeed, recent studies have found that when judging the healthiness of food, women predominantly relied on fat and fibre content (Rizk & Treat, 2014, 2015).

Others have found that being 'natural' is an important criterion for food choice, with food additives being considered unnatural, unhealthy, or even a health risk (Bearth, Cousin, & Siegrist, 2014). In a study of high school students, moderation, balance, and variety were important criteria for health (Croll, Neumark-Sztainer, & Story, 2001), with the term 'healthy food' being associated with high consumption of specific food groups such as 'fruit and vegetables' or low consumption of energy-dense, nutrient-poor 'junk' food (Croll et al., 2001). Adolescents associated healthy eating with fruit, vegetables, carbohydrates and vitamins in a focus group study conducted with children aged 9- to 18-years-old (Fitzgerald, Heary, Nixon, & Kelly, 2010).

A recent study found that sugar content (−), fruit content (+), caffeine content (−) and sweetener content (−) were important criteria for both parents and children when evaluating the healthiness of soft drinks (Bucher & Siegrist, 2015). However, it is currently not known whether similar criteria are important for evaluating snack foods.

It seems likely that for these foods, other criteria such as energy from fat or protein and portion size may be relevant, although it remains unclear whether consumers actually consider portion size when evaluating the healthiness of products, since the volumes were kept constant in the previous study of soft drinks (Bucher & Siegrist, 2015).

To date, there is no universal definition of the 'healthfulness' of a food. This is likely due to the numerous factors that need to be considered, including nutrient content, cooking method, and portion size. Lobstein and Davies (2009) attempted to develop a means to define the healthiness of foods using a nutrient profile method. They included key nutrients that have a negative impact on perceived healthiness (i.e. energy, saturated fat, sugars and sodium), as well as others that have a positive impact (i.e. fruit, vegetable, nut, fibre and protein content), and used this information to calculate an overall score (Lobstein & Davies, 2009). This method allows the direct comparison of the healthiness of different foods across categories. However, portion size is not considered within this approach.

Therefore, the aim of the current study was to examine the criteria that adolescents aged between 12- and 16-years-old use to judge the healthiness of a variety of snacks available in their school environment and to compare their evaluations with nutrient profile scores.

2. Methods

2.1. Sample characteristics and recruitment

Seventy-five adolescents were recruited via flyers distributed at schools in the city of Zurich and surrounding areas. Written informed consent was obtained from all participants. The participants performed the snack-sorting task individually.

Two subjects were excluded, one for not following the instructions and another due to incomplete data. Hence, the final analysis included 73 adolescents aged between 12- and 16-years-old (42 girls, mean age 14.2 ± 1.2 years, mean BMI 20.2 ± 2.3 kg/m^2). There were no significant differences in BMI by gender. Three participants (4.1%) were in primary school, while the others (n = 70, 95.6%) attended secondary school, which in Switzerland is split into three levels or sections. More specifically, 60 adolescents (82.2%) attended the 'Sekundarschule' (medium level), one (1.4%) attended the 'Realschule' (lower level), and nine (12.3%) attended the gymnasium (higher level). Some 60 participants (82.2%) were Swiss, nine (12.3%) had another nationality, and four did not answer the relevant question (5.5% missing). All participants lived in the city or the surrounding suburbs of Zurich.

2.2. Selection of snacks

Previous studies have shown that healthy children aged seven-years-old and above are able to complete sorting tasks involving various beverages (Bucher & Siegrist, 2015), and that they can discriminate between healthy and unhealthy foods to some extent (Strachan & Pavie-Latour, 2008). We therefore expected that adolescents aged 12- to 16-years-old would be able to perform a similar task with snack foods. To select snacks regularly consumed by that age group, the snack supply of several schools was analysed. To this end, two cafeterias and two canteens in Zurich were visited and the manager of one school cafeteria was interviewed via telephone about their snack supply. In addition, students, teachers and staff were asked to list their schools' available snacks or to provide photographs of vending machines and cafeterias. A list of snacks available at seven schools was collected, and a wide range of different healthy and unhealthy snack foods were selected for this study.

For some snacks of a similar composition, a range of portion sizes were added to the selection in order to determine the influence of portion size on healthiness evaluations. For example, two

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