Published in final edited form as:
Food Qual Prefer. 2015 March 4; 40 Pt A: 106–109. doi:10.1016/j.foodqual.2014.09.009.

Predictors of children's food selection: The role of children's perceptions of the health and taste of foods

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Abstract

Food selection, decisions about which foods to eat, is a ubiquitous part of our everyday lives. The aim of this research was to investigate the role of taste versus health perceptions in 4- and 6-year-old children's food selection. In this study, children and young adults were asked to rate the health and presumed taste of foods. Participants were also asked to indicate whether they would eat these foods in a food selection task. Overall, the results showed that taste was a strong predictor of individuals' food selection above and beyond the variance associated with age, health ratings, and interactions between age and presumed taste ratings as well as age and health ratings. These results contribute to our understanding of children's food selection, and the relative importance of a food's taste versus health in the development of these decisions.

Keywords

children; taste; health; food selection

1. Introduction

Food selection, deciding what to eat, is a pervasive part of our daily lives. Adults estimate that they make over 200 food and beverage decisions a day (Wansink & Sobal, 2007). There are also frequent opportunities for children to engage in this decision-making process. By communicating to their parents their preferences, children exert great influence on what foods are available in the home and how they are prepared (Holsten, Deatrick, Kumanyika, Pinto-Martin, & Compher, 2012). Understanding children's food-related decision-making is critical given the marked rise in childhood obesity in the United States. Obesity has more than doubled in the last 30 years among children ages 2- to 5 years, and tripled among children ages 6- to 11 years. Presently, one in three children is considered overweight and obese in the United States (Centers for Disease Control, 2013). Children's decision-making is one piece of the complexity of childhood obesity that is examined in the present research.

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Children's food selection is a dynamic process that is undoubtedly influenced by a variety of factors (see Wardle & Cooke, 2008). In the present research, we focus on properties related to food, particularly its taste and nutritional value. These properties of food are of particular interest because they embody distinctive information, and sensitivity towards each kind varies with development, which may differentially impact children's food selection. Although both taste and health share some subjective and objective components, taste is mainly a hedonic assessment, a subjective matter of preference that is already evidenced early on in infancy, whereas health is mainly a cognitive assessment, based on knowledge of objective nutritional facts that emerges during the preschool years (see Nguyen, 2012 for discussion). In particular we are interested in the extent to which children's perceptions of the taste versus the health of foods predict children's food selection. We examine developmental changes by including 4-year-olds, 6-year-olds, and young adults, which allows us to see if and when cognitive appraisals of healthfulness overtake hedonic assessments in driving food selection. This age range was selected to capture any possible developmental changes, especially in light of the independent bodies of research to be described below that document how taste strongly influences children's food selection (Anliker et al., 1991) versus adults (see Drewnowski et al., 2012, for review) and how children's food cognition strengthens between the preschool, school, and adulthood years (e.g., Nguyen, 2008).

In this section, we review the potential influence of different factors on children's food selection including social, physical, and cognitive determinants. While the following review is by no means exhaustive, as such a review would be beyond the scope of this paper, it nevertheless offers a broader context to situate the present research. Much of the past research on children's food selection has focused on the myriad social and environmental factors that contribute to children's food choices such as peers (e.g., Frazier, Gelman, Kaciroti, Russell, & Lumeng, 2012), parents, caregivers, and other adults (e.g., Howard, Mallan, Byrne, Magarey, & Daniels, 2012), all of whom are effective models in shaping children's food choices. The types of foods that are available and acceptable for children to eat are also determined by food advertising and marketing (e.g., McGinnis, Gootman, & Kraak, 2006), as well as the socio-cultural context including the child's family and feeding practices (e.g., Rozin, 1996).

Past research has also found that food selection is a function of the properties of the food itself. There are potentially many characteristics of food that guide children's choices including its familiarity (e.g., Aldridge, Dovey, & Halford, 2009), energy density (e.g., Gibson & Wardle, 2003), as well as its sensory attributes, such as visual, olfactory, and tactile (Rose, Laing, Oram, & Hutchinson, 2004). It is well documented that taste, in particular, is a prominent force in guiding food selection; children like intensely sweet tastes and dislike bitter tastes, and prefer to eat more foods that they like the best, namely sweets (Anliker, Bartoshuk, Ferris, & Hooks, 1991). This pattern contrasts with adults, who show more variability in their taste preferences and food intake (see Drewnowski, Mennella, Johnson, & Bellisle, 2012, for review).

Currently, there is limited research on the role that children's cognition plays in children's food selection. Most studies have focused primarily on documenting children's ability to

categorize food based on their nutritional value, as opposed to understanding its implications for food selection. This body of research has found that by age 4 years, children are capable of categorizing foods as healthy or unhealthy and that this ability improves significantly with development during the school age years and adulthood (e.g., Nguyen, 2008).

Whether children's cognitive assessment of health has an impact on children's food selection remains an open question. This is a central issue given the staggering rate of overweight and obesity among preschool-aged children in the United States (Centers for Disease Control [CDC], 2013).

A key way to begin promoting children's healthful food consumption is by investigating potential factors that influence children's food selection including taste and health. By understanding the relative influence of these factors, we can predict children's food choices, which can provide a basis for tailoring interventions with these factors in mind. Investigating these potential factors during the preschool years is especially important given that this is a time of rapid development in children's learning and experience within the domain of food (e.g., Birch & Fisher, 1998).

In the present investigation, we examine the relative importance of children's perceptions of the taste and health of foods in determining children's food choices. We had two main competing hypotheses. On the one hand, taste may be a more powerful determinant of food selection than health and the age of the participant, in which case participants' hedonic assessments of taste should drive food selection. On the other hand, health may be a more powerful determinant of food selection than taste and the age of the participant, in which case participants' cognitive assessments of health should drive food selection. The former hypothesis is more consistent with prior research documenting the major influence of taste in children's food selection (Anliker et al., 1991) whereas the latter hypothesis is more consistent with prior research documenting children's increasing ability for food cognition.

2. Material and methods

2.1 Participants

There were 72 participants total (M_{age} = 10.03, *range* = 4.13 - 24.47, 35 females, 37 males). Specifically, there were twenty-four 4-year-olds (M_{age} = 4.51, *range* = 4.13 – 4.93, 12 females and 12 males), twenty-four 6-year-olds (M_{age} = 6.14, *range* = 5.46 – 6.94, 11 females and 13 males) and 24 young adults (M_{age} = 19.45, *range* = 18.05 – 24.47, 12 females and 12 males). All of the participants were recruited from preschools and a university in a predominately middle class, European-American city located in the Southeastern United States.

2.2 Materials

The materials included 21 color photographs of food that were selected based on pre-testing of children's familiarity with these foods. Each photograph was printed separately on a piece of 8.5 × 11 inch white paper. To minimize concerns regarding the potential influence of packaging on participants' responses, the photographs included images of only the target foods or these foods placed in nondistinctive containers (e.g., milk in a glass). There were

three foods from each of the following seven food groups inspired by the USDA food pyramid: dairy (cheese, milk, yogurt); fats (French fries, nachos, potato chips); fruits (apples, bananas, oranges); grains (bread, cereal, noodles); meats (beef, chicken, fish); sugars (candy bar, cake, cookies); and, vegetable (broccoli, peas, spinach).

2.3 Procedure

Participants completed three tasks: health, presumed taste, and food selection. For the health task, participants were presented with 21 foods, one at a time, and asked to rate their health (i.e., “How healthy is this broccoli?”) using a scale ranging from 1 to 3 (1 = not at all healthy, 2 = kind of healthy, 3 = very healthy). For the presumed taste task, participants were asked to rate the same foods based on their taste (e.g., “How yummy is this broccoli?”) using a scale also ranging from 1 to 3 (1 = not at all yummy, 2 = kind of yummy, 3 = very yummy). For the food selection task, participants were asked if they would eat the foods from the seven food groups presented in the health/presumed taste tasks (e.g.., “Would you eat this broccoli?”).

3. Results

Participants’ responses were summed and averaged into a mean score for the health (M = 47.34 out of 63, SD = 4.21), presumed taste (M = 51.61 out of 63, SD = 5.07), and food selection (M = 16.87 out of 21, SD = 3.36) tasks.

We first calculated Pearson correlation coefficients to examine the relationship between participant's food selection and the three variables of participant's age (calculated in years and months), presumed taste ratings, and health ratings. Results indicate that food selection is strongly correlated with both age and presumed taste ratings, such that as participants’ age or presumed taste ratings increases, participants’ tendency to say that they would be willing to eat a food also increases, $r's(70) = 0.34, 0.53$, $p's < .05$. However, there was no correlation between food selection and health ratings, $r(70)$ -.04, $p > .05$.

Next, we conducted a simultaneous multiple regression analysis that included participants’ age (calculated in year and months), health ratings, presumed taste ratings, the interaction between age and health ratings, and the interaction between age and presumed taste ratings as the predictor variables with food selection as the outcome variable. The results indicate that presumed taste ratings ($p < .05$) predict food selection above and beyond the variance associated with age, health ratings, and the interaction terms. Together, these variables accounted for 42% of the variance in food selection (See Table 1).

4. Discussion

Overall, the present investigation suggests that taste trumps health in children's and young adults’ food selection. The results revealed that there is a positive association between the participant's age and presumed taste ratings and food selection. However, the association between presumed taste and food selection exists uniquely above and beyond the variance accounted for by the participants’ age, health ratings, the interaction between age and health ratings, and the interaction between age and presumed taste ratings. Thus, these results

confirm the hypothesis that the taste is a more powerful determinant of food selection than its healthfulness and the age of the child and young adult. These results are in accord with previous research documenting the major influence of taste in food selection in children as well as adults (Anliker et al., 1991). Although the results of the present investigation might not be surprising in light of this previous research on taste, it is nevertheless striking given the paucity of research looking at the potential influence of cognitive appraisals on food selection. A major contribution of the present investigation is that it bridges and fills the gap between research on children's taste and health assessments, and their relative influence on food selection. In the present investigation, we found that for both children and young adults, cognitive appraisals of healthfulness do not overtake hedonic assessments in driving food selection. Future research will be necessary to ascertain whether these results can be generalized to older adults who may have competing health goals that determine their food-related decision-making.

These findings raise the interesting question of why and how taste trumps health in food selection. One possibility is that taste may be considered a richer source of information about foods than health. Specifically, it is possible that children and young adults use taste as cue for not only a food's palatability but also its nutritional content, recognizing that taste may actually embody both kinds of information. This possibility would be consistent with the argument that early taste preferences provide an evolutionary advantage in humans. For example, sweetness may signal a source of energy and calories that are vital for survival. In contrast, bitterness or sourness may signal the presence of toxins or bacteria that endanger health (Reed, Bachmanov, Beauchamp, Tordoff, & Price, 1997).

An alternative possibility is that taste is not necessarily favored more than health. Rather, taste is merely a default in situations where there is not a compelling reason or motivation to use any other basis for food selection. After all, taste is extremely salient, especially its hedonic reward. Indeed past research has found that children pay attention to the sensory attributes of food (Rose et al., 2004) and will readily select a food that is identified as hedonically positive by adults (Lumeng, Cardinal, Jankowski, Kaciroti, & Gelman, 2008). In the present research, children and young adults were asked whether they would eat a particular food (i.e., “Would you eat (target food)?”) without being given a purpose for their selection (e.g., health promotion). Without a context for the test question, it may be that taste was used as the default selection criterion. Interestingly, past research has found that when the concept of health is made salient or relevant, children and adults, will use it to guide their food selection. For example, children were more likely to select nutritious food options after participating in a teaching intervention focusing on health (Nguyen, McCullough, & Noble, 2011). While the results of the present research cannot rule out either of these possibilities, future research could shed light on this issue by asking participants to explain or justify their food choices.

4.1 Study limitations

We recognize that there are limitations of the current investigation that will need to also be addressed in future research. One limitation is that we only looked at simple yes or no decisions in the food selection task, which may not be reflective of children's everyday

interactions with food. Children frequently make or contribute to food-related decisions (e.g., Holsten et al., 2012), and it is likely that many of these decisions involve more complicated situations than the one presented in the current research. Children's daily food selection may also often require them to select between two or more foods (e.g., apple or crackers for snack) or between a multitude of foods (e.g., at a buffet or food bar offering an array of dinner options). In some cases, children may even be able to choose more than one food simultaneously (e.g., pancakes and eggs for breakfast) or in close sequence (e.g., a bite of a sandwich first and then a bite of a cookie for lunch). In future research it will be important to explore children's decision making in these different kinds of situations to capture the nuances of children's food decisions.

Another limitation of the present research is that we did not take into account children's personal attributes that may influence their perceptions of health and taste. For example, children may vary in their resistance against eating new foods (e.g., neophobic children, picky or fussy eaters). In addition, children may vary in their sensitivity towards different types of foods with some children having food intolerances, allergies, or dietary restrictions. In future studies, it will be important gather this information as well as children's and parents' weight status, infant feeding history, and maternal feeding practices. Together, such information would be beneficial in understanding unique individual differences in children's food selection.

Overall, the present findings have major implications for the development of health and nutrition intervention programs. The results of this research suggest that children and young adults are generally "taste-oriented". Knowledge that individuals' food selection is based on taste can be informative in terms of developing ways to foster their healthy eating habits. The "delicious" taste of healthy foods could be used to encourage their consumption, especially those that children routinely dislike (e.g., vegetables). Indeed it is essential that intervention programs do not undermine hedonics given that research has shown that preschoolers are less likely to consume a food if they hear messages that try to convince them of the food's instrumental benefits (e.g., "this food will make you strong") (Maimaran & Fishbach, 2014). Research has also shown that children's liking of a beverage decreases considerably when a beverage is explicitly labeled as healthy because children associate health with poor taste (Wardle & Huon, 2000).

Conclusions

The present findings reveal that taste matters more than health in children's and young adults' food selection. With that said, it is essential to note that we acknowledge that food selection is a complex decision-making process, that there is a long list of other factors that influence children's food selection (see Birch et al., 1999; Wardle & Cooke, 2008). A large task in the coming years will be to identify the relative contribution of these factors in an effort to build a unified theoretical model of children's food selection that can facilitate the development of empirically based health and nutrition education interventions.

Acknowledgements

This research was supported by NICHD grant R03 HD055222-02. We thank Cameron Gordon and Ricky Pond for discussions regarding this research. Many special thanks also go to the schools and families that participated in this research.

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- We investigated children's food selection.
- By 4 years, a food's taste is a strong predictor of food selection.
- Taste is a stronger predictor beyond a participant's age and a food's health.
- These results contribute to our understanding of the importance of taste in food selection.

Table 1

Predictors of Participants' Food Selection

Predictor	Variable				
	B	**SE**	**β**	**t**	**P**
Food Selection (R^2 = .419)					
Participants' age	−.721	.905	−1.45	−.797	.428
Health ratings	−.273	.156	−.341	−1.75	.085
Presumed taste ratings	.410	.123	.618	3.32	.001*
P. age x health ratings	.019	.018	1.72	1.08	.282
P. age x p. taste ratings	−.001	.011	−.068	−.060	.952