



## Research report

# Perceived recollection of frequent exposure to foods in childhood is associated with adulthood liking



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## ABSTRACT

Food preferences and habits learned at a young age can influence adulthood dietary patterns and weight, but the mechanism remains to be elucidated. We investigated the effect of perceived recollections of early food experiences on current liking for those foods by 670 college students. We showed that the perceived recollection of frequent consumption of foods in childhood was significantly related to current liking for the vast majority of the foods, including nutritious foods such as vegetables. Similarly, parental encouragement and modeling was positively related with current liking, even for foods that were disliked in childhood. Additionally, perceived recollections of parental restriction or forced consumption were significantly negatively related with current liking. Lastly, we demonstrated that perceived recollections by college students of childhood eating practices were in moderate agreement with those of their parents, lending credibility to the retrospective survey methodology in determining long-term effects of exposure on current food habits. These findings show that the perceived recalled frequency of consumption of foods is one determinant of the food preferences of adults, demonstrating a long-term effect of frequency of exposure, a finding consistent with experimentally controlled short-term studies. Frequent exposure to foods in childhood could be a simple and effective way for parents and caregivers to instill healthy eating habits in children.

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## Introduction

Childhood eating practices can contribute to the development of adult food preferences and dietary habits. College students who recalled being rewarded with food, given desserts, and allowed to stop eating when satiated were more likely to report these eating habits in adulthood (Branen & Fletcher, 1999). Some eating patterns developed in childhood can lead to problematic eating behaviors and weight concerns later. For example, subjects who were forced to clean their plates or when rewarded or punished with food were more likely to be overweight and display binge-eating behaviors (Branen & Fletcher, 1999; Brunstrom, Mitchell, & Baguley, 2005; Galloway, Farrow, & Martz, 2010; Puhl & Schwartz, 2003). Similarly, when forced to consume a food in childhood, a majority of subjects reported a current disliking for the food and were unwilling to eat it (Batsell, Brown, Ansfield, & Paschall, 2002; Branen & Fletcher, 1999).

Just as aversive childhood experiences can lead to unhealthy eating patterns and food aversions, favorable food experiences may lead to healthy eating patterns since learning plays an important role in establishing eating habits. One influence known to

increase food preferences in children in the short-term is repeated exposure. Children show a preference for a novel food when exposed to that food eight to ten times (Bertino, Beauchamp, & Engelman, 1986; Birch & Marlin, 1982; Lakkakula, Geaghan, Zanevec, Pierce, & Tuuri, 2010; Mattes, 1994). However, studies on the long-term effects of childhood exposure to foods on adult food preferences are limited.

Here, we examined the long-term effects of childhood exposure to foods on current liking by college students using retrospective reporting (Branen & Fletcher, 1999). Although determination of exact experiences cannot be determined with retrospective reporting, what an adult remembers as occurring in childhood will be influenced by salience (Sheingold & Tenney, 1979) and repetition. We use the vocabulary *perceived recollections* to account for the fact that our subjects' answers are influenced both by their subjective perspectives and by the passage of time since childhood. Due to the extensive utilization of retrospective reporting in other studies (Batsell et al., 2002; Branen & Fletcher, 1999; Brunstrom et al., 2005; Chavarro et al., 2009; Galloway et al., 2010; Maruti et al., 2005; Puhl & Schwartz, 2003), and the validity and reliability of this method (Chavarro et al., 2009; Maruti et al., 2005), we believe that retrospective reporting can be used to accurately determine the long-term effects of exposure to foods in childhood on adulthood food preferences.

With the exception of a few studies (Puhl & Schwartz, 2003), retrospective reporting of childhood food experiences have been limited

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to aversive experiences and situations associated with those events (Logue, Ophir, & Strauss, 1981). Few studies have considered using retrospective reporting to examine the effects of normative childhood eating experiences and their influence on current food preferences. If recalled aversive eating episodes can determine current dislikes for those foods, we hypothesized here that perceived recalled positive eating experiences in childhood may influence current liking for those foods.

Here, we measured the effects of perceived recollections of exposure to foods in childhood by asking college students (subjects) and their parents to retrospectively report subjects' perceived frequency of consumption of foods in childhood. As mentioned previously, repeated exposure involves presenting a novel food several times (Birch & Marlin, 1982). The term "exposure" therefore, simply refers to repeated consumption. In the laboratory, repeated consumption leads to greater current liking than infrequent consumption or no exposure (Bertino et al., 1986; Birch & Marlin, 1982; Lakkakula et al., 2010; Mattes, 1994). We assumed these laboratory findings would translate to actual experience so that foods consumed more frequently in childhood would be liked more than those eaten less frequently. To investigate this notion, we determined the effects of perceived recalled frequency of consumption of foods in childhood on current food preferences, by asking subjects to indicate their current liking for the same foods. Assuming liking is either long lasting, and/or leads to continued greater consumption we expected that a subjects' salient memory of frequently consuming a food in childhood would be associated with a current liking for the food and that rarely consuming the food in childhood would be associated with a decreased liking for it.

Parents also play an important role in exposure and availability of foods at home (Baranowski et al., 1993; Gibson, Wardle, & Watts, 1998) and in the development of children's eating habits. Since parental restriction of foods can negatively impact liking for those foods in childhood, we hypothesized that college students will currently dislike foods that they recall as not being allowed or restricted to eat in childhood. In addition, since parental encouragement and modeling has been positively related to children and adolescents' food intake (Pearson, Biddle, & Gorely, 2009), we hypothesized that encouragement and modeling will be positively related to current liking.

## Method

### Subjects

Subjects were recruited from an introductory psychology pool at Arizona State University in three waves from 2009 to 2011, administered four months apart. All subjects were given course credit for their participation. Only those who primarily spoke English and were at least 18 years of age were included in the analysis. Wave 2 included a greater variety of questions regarding parental behavior with respect to food, as did wave 3. There were two additional goals of wave 3: one was to assess repeatability, so some foods were asked twice, and the second was to assess subjects' concurrence with parental recollection. To this end, subjects in wave 3 provided their own name and the name and email address of their primary caregiver who was subsequently emailed a link to a web-based survey. This allowed us to match parents' survey responses with their children's. Waves 1 and 3 were administered online and wave 2 was given on paper in a laboratory setting. Subjects in all waves were given one opportunity to complete the survey and no reminders were given. Gender, age, height, and weight were collected from all subjects, from which body mass index (BMI) was calculated.

The Arizona State University Human Subjects IRB approved all studies, and experimental procedures were performed in accordance

with the ethical standards laid down in the 1964 Declaration of Helsinki.

### Selection of foods

Foods utilized in the present study were intended to be commonly preferred or rejected by children. Foods high in added fats and sugars were included because some parents restrict their children's consumption of these foods or use them as reward or punishment for their children's behavior (Birch & Fisher, 1998). Restricting access or punishing and rewarding children with foods has been shown to result in a greater preference for and overconsumption of these foods by children and this may result in long-lasting effects on later food preferences.

Likewise, vegetables were included because children are often forced to consume these foods in childhood and consequently, dislike them because of the negative experiences associated with the forced consumption episodes (Batsell et al., 2002; Branen & Fletcher, 1999).

Meats were also included because younger children often display neophobic behaviors that limit their dietary repertoire, particularly the consumption of meats and vegetables (Cooke, Carnell, & Wardle, 2006; Falciglia, Couch, Gribble, Pabst, & Frank, 2000) and the perceived recollection of attitudes toward these foods may determine their current liking for these foods.

### Categorization of foods

The foods were grouped in a manner consistent with the grouping system of the US Department of Agriculture Dietary Guidelines: vegetables, fruits, and dairy (US Department of Health & Human Services, 2010). Four additional groups were created for foods containing multiple ingredients. These foods were categorized based on their proportional macronutrients. Foods with >50% carbohydrate, fat, or protein were placed in high-carbohydrate, high-fat, and protein categories respectively, whereas foods with >40% of both carbohydrates and fats were placed in the high fat/high carbohydrate group. There were 15 dairy, 23 fruits, 22 vegetables, 15 protein, 16 high carbohydrate, 14 high fat, and 27 high fat/high carbohydrate foods that were used in this study. The order of the 122 foods in the survey instruments was random.

### Perceived recollections

Subjects were asked their perceived recollections of how frequently they consumed a food (frequency of consumption) and their parents' attitudes and practices toward that food during their childhood. Subjects were instructed to think back to when they were in elementary school (up to the age of 10 years) and mark how frequently they ate the food and how the food was treated in their household by their parents. This age range has been used regularly in other retrospective reporting studies since it is believed family food rules are clearly enforced by age 10 (Batsell et al., 2002; Brunstrom et al., 2005; De Bourdeaudhuij, 1997; Galloway et al., 2010).

For each food, subjects selected one from three options concerning frequency of consumption: "I ate this frequently" (frequently eaten), "I ate this rarely" (rarely eaten), or "I never tried this" (never). In wave 1, they selected one from three options concerning their parents' attitudes and practices: "parents made me eat" (forced), "parents did not let me eat" (not allowed) or "parents didn't care if I ate" (indifferent). Wave 2 included two additional options of "parents allowed me to eat in moderation" (moderation) and "parents did not make this available to me" (unavailable) to capture other aspects of a subject's childhood food experiences. In wave 3, "unavailable" and "indifferent" were not asked but one more option was

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