



# Shopping for food with children: A strategy for directing their choices toward novel foods containing vegetables



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## ABSTRACT

Involving children in the different steps of meal preparation has been suggested as a strategy for enhancing dietary habits in childhood. It has previously been shown that involving children in cooking can increase their willingness to taste novel foods and direct their food choices towards foods containing vegetables. The objective of the present study was to assess the effect of involving children in food purchasing on food choices, intake, liking and appetite. A between-subject experiment was conducted with 86 children (from 8 to 10 years old). Forty-three children (PURCHASE group) participated in a workshop dedicated to purchasing the necessary ingredients online for the preparation of three unfamiliar foods containing vegetables: apple and beetroot juice, zucchini tortilla sandwich and spinach cookies. Forty-three children (CONTROL group) participated instead in a creativity workshop. Afterwards, all the children were invited to choose, for an afternoon snack, between three familiar vs. unfamiliar foods: orange vs. apple and beetroot juice, potatoes vs. zucchini tortilla sandwich and chocolate vs. spinach cookie. The mean number of unfamiliar foods chosen per child was higher in the PURCHASE ( $0.70 \pm 0.14$ ) vs. CONTROL ( $0.19 \pm 0.07$ ) group ( $P = 0.003$ ). The liking for 1 of the 3 unfamiliar foods was higher in the PURCHASE group ( $P < 0.05$ ). We did not find any difference between the two groups in food intake estimation and in the levels of subjective appetite. This study demonstrates that involving children in purchasing food can help in directing their food choices towards unfamiliar foods containing vegetables. It highlights the importance of involving children in the different steps of meal preparation for decreasing food neophobia.

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## 1. Introduction

Great attention is currently being paid to children's eating behaviour and how to change it to be healthier (DeCosta, Moller, Frost, & Olsen, 2017). In particular, increasing vegetable intakes in children is a key objective for both parents and health professionals (Jaime & Lock, 2009; Russell, Worsley, & Campbell, 2015). As low intakes of fruit and vegetables in childhood track into adolescence and adulthood, many campaigns are trying to increase the intake of these healthy foods in children (Bucher, Siegrist, & van der Horst, 2014). The reluctance to eat novel foods, called food neophobia, is associated with a lower vegetable liking and intake and with an overall less healthy diet (Cooke, Wardle, & Gibson, 2003; Falciglia, Couch, Gribble, Pabst, & Frank, 2000; Russell & Worsley, 2013). As a result, trying to decrease food neophobia is a frequently used

strategy for enhancing diet quality in children.

Involving children in the different steps of meal preparation has been suggested as a strategy for enhancing dietary habits in childhood (Nelson, Corbin, & Nickols-Richardson, 2013) and particularly for reducing food neophobia (Alliot, da Quinta, Chokupermal, & Urdaneta, 2016). Involvement in meal preparation at home has been shown to be associated with overall better diet quality (Chu, Storey, & Veugelers, 2014), more eating enjoyment and lower levels of picky eating (van der Horst, 2012). Involving children in cooking can increase their willingness to taste novel foods and direct their food choices towards foods containing vegetables (Alliot et al., 2016). The importance of children's involvement is also recognized by parents (Casey & Rozin, 1989) and by food experts (Fordyce-Voorham, 2011).

Studies assessing the links between child involvement in meal preparation and diet quality has mostly focused on one step of meal preparation: cooking (Chu et al., 2014; Leech et al., 2014; van der Horst, Ferrage, & Rytz, 2014). Little information is available on

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involvement in other steps. In particular, little is known about the links between children's involvement in food shopping and diet quality. One study (Nozue et al., 2016) showed that children (10–11y) involved in food-related activities (including cooking and shopping) showed more favourable food intake and cooking skills than children who are not involved in food preparation activities. On the contrary, in another study with female adolescents (11–18y), food shopping frequency was related to greater consumption of fried foods (Larson, Story, Eisenberg, & Neumark-Sztainer, 2006). Other studies investigating food shopping behaviours in childhood have focused on the children's influences on in-store purchases (O'Dougherty, Story, & Stang, 2006), without assessing the links with food purchasing and the quality of foods consumed by children. Even if little evidence exists, shopping skills are considered by some authors as essential food skills to be included in healthy eating programs (Fordyce-Voorham, 2009). To the best of our knowledge, the effects of involving children in shopping activities as a strategy for enhancing their eating behaviours have not been studied yet.

The objective of the present study was to assess, in an experimental setting, the effects of involving children in food purchasing on their food choices, food intake, food liking and appetite. Specifically, we examined the short-term effect of a 1-h food shopping workshop on children's willingness to select and to taste unfamiliar food items containing vegetables for an afternoon snack. We hypothesized that involving children in purchasing foods could help in directing their choices towards unfamiliar foods containing vegetables. As exactly the same study design was used in the present study and in a previous one assessing the effects of involving children in cooking (Allirot et al., 2016), we also compared the effects of food purchasing involvement with cooking involvement on children's willingness to select and to taste unfamiliar food items.

## 2. Methods

### 2.1. Participants

The study sample comprised 86 children aged between 8 and 10 years. They were recruited from three conveniently selected schools in Gipuzkoa (northern Spain). Parents or legal guardians of children were sent a letter inviting their son/daughter to take part in the study. School principals then sent the research team the contact details of all parents or legal guardians who expressed an interest in being involved in the study. Afterwards, we called the parents or legal guardians in order to explain the study and to request that they complete an online questionnaire about food purchasing, cooking involvement, eating habits, and food allergies of their children. Questions on food purchasing, children's eating habits and food allergies, were developed by the researchers. Other questions on cooking involvement and Food Neophobia were extracted from other papers (Fernández-Ruiz, Claret, & Chaya, 2013). Based on two items: "how often do you purchase food?" and "how often does your child go with you for purchasing food?", weekly food purchasing frequency of the child was calculated. The item to assess cooking involvement (i.e. "how often does your child help you to prepare a meal?") was rated on a 4-point Likert scale with options ranging from *once monthly or less* (1) to *more than once a week* (4) (van der Horst et al., 2014). Several items were also included in the questionnaire in order to evaluate children's eating habits: (a) the frequency of eating in the canteen (5-point scale: from *never to every school day*), (b) the frequency of fruit intake (5-point scale: from *less than once a week to more than once a day*), (c) the frequency of vegetable intake (5-point scale: from *less than once a week to more than once a day*), and (d) the liking of the vegetables that will be later used in the experiment was assessed with the

following questions: "does your child like beetroot/zucchini/spinach?" (6-point scale: 1 = he/she hates it; 2 = he/she don't like it; 3 = he/she likes it; 4 = he/she likes it very much; 5 = he/she never tasted it; 6 = I don't know).

Seven items from the Food Neophobia Scale (Fernández-Ruiz et al., 2013; Pliner & Hobden, 1992): were also used to measure children's food neophobia: 1- my child is constantly sampling new and different foods (reverse item); 2- my child does not trust new foods; 3- if my child does not know what is in a food, he/she won't try it; 4- at dinner parties, he/she will try a new food (reverse item); 5- he/she is afraid to eat things he/she has never had before; 6- he/she is very particular about the foods he/she will eat; 7- he/she will eat almost anything (reverse item). Based on the judgment of various authors (Cooke, Carnell, & Wardle, 2006), some items were eliminated from the original version, due to lack of suitability for the child population. Parents answered the items depending on their degree of agreement with them on a 7-point Likert scale, with options ranging from *strongly disagree* to *strongly agree*. Scores were obtained by summing the values for each of the items. Scores could range from seven (low child's trait neophobia score) to forty-nine (high child's trait neophobia score). A question about children's food allergies was also included in the questionnaire. Children presenting allergies to any of the foods included in the experiment were excluded.

Based on a pilot study held in our laboratory, we calculated that a minimum sample size of eighty four (84) subjects was necessary to observe a significant difference in willingness to taste vegetables in two different conditions with a significance level of 0.05 and power of 80%. The online questionnaire was sent to 99 parents of children who wanted to take part in the study. From them, 93 completed the online questionnaire and three children were rejected due to food allergy. Finally, 90 children aged between 8 and 10 years were included in the experiment that was carried out between March and May 2016. In all cases, parents or legal guardians explicitly authorized the child's participation in the study by a written informed consent. The study complied with the Second Declaration of Helsinki and it also obtained the approval of the Ethical Commission of Basque Culinary Center- Mondragon Unibertsitatea (005/2014).

### 2.2. Study design

Experimental sessions were conducted at Basque Culinary Center (BCC) in San Sebastian (Spain). The study was conducted using a between-subject design. Sessions were organized in group format (five children each; 18 groups altogether) and children came only once to the BCC to take part in the experiment. The 18 groups were randomly allocated to one of the two possible conditions (i.e. PURCHASE or CONTROL). Due to absence on the day of session, four children did not participate. Hence, 86 children (16 groups of 5 children and 2 groups of 4 children; one group per day) participated in the study. Those children showed up at the BCC between 4:30pm and 5:00pm. Children were asked to refrain from eating until after the meal. The experimental sessions included two different parts: (a) a 1-h purchasing food workshop (in the PURCHASE condition) or a 1-h creative workshop (in the CONTROL condition), and (b) the consumption of an afternoon snack (both conditions).

#### 2.2.1. Purchasing workshop (PURCHASE condition)

Forty three children participated in the PURCHASE condition (purchasing workshop). The purchasing workshop consisted of purchasing online the necessary ingredients for the preparation of three unfamiliar food items containing vegetables: apple/beetroot juice, zucchini tortilla sandwich and spinach cookies. Those

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