



Involving children in cooking activities: A potential strategy for directing food choices toward novel foods containing vegetables



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ARTICLE INFO

Article history:

Received 10 November 2015

Received in revised form

20 April 2016

Accepted 24 April 2016

Available online 26 April 2016

Keywords:

Cooking

Food neophobia

Children

Food choices

Vegetables

Appetite

ABSTRACT

Involving children in cooking has been suggested as a strategy to improve dietary habits in childhood. Interventions in schools including cooking, gardening and tasting activities have showed promising results. Several cross-sectional surveys demonstrated associations between frequency of involvement in food preparation and better diet quality. However, experimental studies confirming the beneficial effect of cooking on food choices in children are missing from the literature. The objective of the present study was to assess the effect of involving children in cooking on their willingness to taste novel foods, food intake, liking and hunger. A between-subject experiment was conducted with 137 children between 7 and 11 years old. 69 children (COOK group) participated in the preparation of three unfamiliar foods containing vegetables: apple/beetroot juice, zucchini tortilla sandwich and spinach cookies. 68 children (CONTROL group) participated, instead, in a creative workshop. Afterwards, the children were invited to choose, for an afternoon snack, between three familiar vs. unfamiliar foods: orange vs. apple/beetroot juice, potato vs. zucchini tortilla sandwich and chocolate vs. spinach cookie. The mean number of unfamiliar foods chosen per child was higher in the COOK vs. CONTROL group ($P = 0.037$). The overall willingness to taste the unfamiliar foods was also higher in the COOK group ($P = 0.011$). The liking for the whole afternoon snack ($P = 0.034$), for 2 of 3 unfamiliar foods and for 1 of 3 familiar foods was higher in the COOK group ($P < 0.05$). We did not demonstrate any difference between the two groups in overall food intake and hunger/satiety scores. This study demonstrated that involving children in cooking can increase their willingness to taste novel foods and direct food choices towards foods containing vegetables.

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1. Introduction

In a context of high prevalence of overweight and obesity in children (Wang & Lobstein, 2006), the promotion of healthy eating habits, especially vegetable consumption, in children (Steffen, 2006) is considered of high importance. Food neophobia, that is the reluctance to eat novel foods, is associated with reduced liking of vegetables, lower vegetable intake and overall less healthy diet (Cooke, Wardle, & Gibson, 2003; Falciglia, Couch, Gribble, Pabst, & Frank, 2000; Russell & Worsley, 2013). As a result, one frequently used strategy to enhance diet quality in children is to try to decrease food neophobia.

Promoting exposure to novel foods in order to increase familiarity (Cooke, 2007) and creating positive experiences with novel

foods (Pliner & Salvy, 2006) have been shown to be effective strategies for reducing food neophobia in children. Sensory education that is one means of increasing familiarity and creating positive experiences with foods has been shown to be effective for reducing food neophobia and for increasing the willingness to taste novel foods in children (Dazeley, Houston-Price, & Hill, 2012; Mustonen & Tuorila, 2010; Reverdy, Chesnel, Schlich, Koster, & Lange, 2008; Woo & Lee, 2013). Involving children in cooking activities also increases familiarity and creates positive experiences with novel foods. However, the effects of involving children in cooking activities on food neophobia (considered as a long-term child behaviour) and on their willingness to taste novel foods (considered as an immediate child behaviour) have not been studied yet.

Few studies have assessed the effect of cooking activities on diet quality and health parameters. Involvement in cooking at home has been positively associated with fruit and vegetable intake and overall diet quality in children (Chu, Storey, & Veugelers, 2014; Leech et al., 2014), adolescents (Larson, Story, Eisenberg, &

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Neumark-Sztainer, 2006), young adults (Larson, Perry, Story, & Neumark-Sztainer, 2006) and adults whether or not trying to lose weight (Monsivais, Aggarwal, & Drewnowski, 2014; Wolfson & Bleich, 2015). A 10-year cohort study with older persons in Taiwan showed an inverse association between cooking frequency and later mortality and that women benefited more from cooking more frequently than did men (R. C. Chen, Lee, Chang, & Wahlqvist, 2012). The importance of cooking skills has also been highlighted in recent papers. Hartmann, Dohle, and Siegrist (2013) showed a positive association between cooking skills and balanced food choices in adults. The recent decline of cooking skills transmission in families (Condrasky, Williams, Catalano, & Griffin, 2011; Lang & Caraher, 2001) has led to the implementation of a variety of cooking programs in schools in order to increase children's cooking skills (Caraher, Seeley, Wu, & Lloyd, 2013; Chen et al., 2014; Cunningham-Sabo & Lohse, 2013). A recent literature review (Hersch, Perdue, Ambroz, & Boucher, 2014) suggested that cooking programs may positively influence children's food-related preferences, attitudes, and behaviours. However, differences in the designs and evaluation methods of those programs, as well as the combination of activities during those programs make it impossible to determine whether benefits are occurring as a result of cooking interventions.

The study of cooking poses significant methodological challenges (Engler-Stringer, 2010) and, to date, experimental methodologies have not been used often in this area. Only three studies: one in children (van der Horst, Ferrage, & Rytz, 2014) and two in adults (Dohle, Rall, & Siegrist, 2014; Dohle, Rall, & Siegrist, 2015) showed that cooking involvement could increase liking and food intake of self-prepared foods. The objective of the present study was to assess, in an experimental setting, the effects of involving children in cooking activities on their willingness to taste novel foods. Specifically, we examined the short-term effect of a 1-h cooking workshop on children's willingness to select and to taste unfamiliar food items containing vegetables for an afternoon snack. We also explored the short-term effects of a cooking workshop on hunger, intake and liking parameters.

2. Methods

2.1. Participants

We recruited children between 7 and 11 years old in four conveniently selected primary schools located in two provinces of the north of Spain: Gipuzkoa and Alava. School principals informed parents of children in the schools, in writing, about the opportunity to participate in the study. School principals then sent the contact details of all parents who expressed their willingness to participate in the study to the research team. We informed the parents of the children willing to participate, by telephone, about the study and sent an online questionnaire about their child's cooking involvement, eating habits, and food allergies. Cooking involvement was based on one item, "how often does your child help you to prepare a meal?" on a 4-point scale (1 = once monthly or less; 4 = more than once a week) (van der Horst et al., 2014). Questions about eating habits assessed the following: frequency of eating in the school restaurant (5-point scale: 0 = never; 4 = every school day); frequency of fruit intake (5-point scale: 0 = less than once a week; 4 = more than once a day); frequency of vegetable intake (5-point scale: 0 = less than once a week; 4 = more than once a day); the liking of the vegetables that would be later used in the experimental sessions: "does your child like zucchini/spinach/beetroot?" (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). The online questionnaire also included seven items from the Food Neophobia Scale (Pliner & Hobden, 1992): 1-

my child is constantly sampling new and different foods; 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; 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. The parents were instructed to indicate on a 7-point Likert rating scale the extent of their agreement with each item (endpoints: strongly disagree, strongly agree). A food neophobia score was created by summing across the seven items. Scores could range from seven (low child's trait neophobia score) to forty-nine (high child's trait neophobia score). The online questionnaire also included a question on the children's food allergies. Children were not included in the study if they had any allergy to at least one of the ingredients comprising any one of the food items proposed during the study.

Based on a previous study (Correia, O'Connell, Irwin, & Henderson, 2014), we calculated that a minimum sample size of one hundred twenty six (126) subjects was necessary to observe a significant difference in willingness to taste vegetables in two different conditions (with or without appealing presentation in the plate in the case of the Correia et al. study) with a significance level of 0.05 and power of 80%. One hundred forty five (145) parents of children willing to participate were contacted by phone and sent the online questionnaire. Among those 145, 141 filled in the online questionnaire and one child was not included because of food allergy. One hundred forty (140) children aged between 7 and 11 years old were enrolled in the study, which was conducted between June 2014 and June 2015. Written informed consent was obtained from all parents. The study complied with the Second Declaration of Helsinki and received 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 followed a between-subject design. Each child participated in only one experimental session in BCC. Children were invited to come to BCC in groups of 5 (28 groups). Each of the 28 groups was randomly assigned to one condition: COOK or CONTROL. Among the 140 children included, 3 did not participate. Thus, one hundred thirty seven (137) children (25 groups of 5 children and 3 groups of 4 children, with a maximum of one group per day) participated in the study. The groups of children arrived at BCC in the afternoon between 4:30 p.m. and 5:00 p.m. Children were requested to refrain from eating for 3 h prior to the beginning of the experimental session. The experimental sessions were divided in two parts. The first part consisted of a 1-h cooking workshop (in the COOK condition) or a 1-h creative workshop (in the CONTROL condition). The second part was similar for both conditions and consisted of the consumption of an afternoon snack (the usual hour for afternoon snack consumption in Spain is between 5 p.m. and 6:30 p.m.).

2.3. Cooking workshop (COOK condition)

Sixty nine (69) children participated in the COOK condition (cooking workshop). The cooking workshop consisted of preparing three food items containing vegetables: zucchini tortilla sandwich, spinach cookies and apple/beetroot juice. The workshop was done under the supervision of two researchers from BCC in the experimental kitchen of BCC. The recipes for these food items and the details of the tasks in which the children were involved are described in Table 1. The children of a same group were positioned around a table and they were all given the same set of ingredients. They all participated individually in exactly the same sequence of

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