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Research report

Involving children in meal preparation. Effects on food intake ☆

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ABSTRACT

The question of how to promote healthy eating habits in children is relevant because most children do not meet the recommended vegetable intake. Involving children in food preparation could be an opportunity to develop healthy eating behaviors and to increase vegetable consumption. The purpose of this study was to examine the effect of children's involvement in meal preparation on their food and vegetable intake. A between-subject experiment was conducted with 47 children aged 6 to 10 years. In condition 1 (n = 25), children prepared a lunch meal (pasta, breaded chicken, cauliflower, and salad) with the assistance of a parent. In condition 2 (n = 22), the meal was prepared by the parent alone. Independent samples t-tests were conducted to compare intake in the "child cooks" and "parent cooks" conditions. Children in the child cooks condition ate significantly more salad 41.7 g (76.1%), more chicken 21.8 g (27.0%), and more calories 84.6 kcal (24.4%) than children in the parent cooks condition. Between before cooking and directly after cooking the meal, children in the child cooks condition reported significantly increased feelings of valence (feeling positive) and dominance (feeling in control). This study confirms that involving children in meal preparation can increase vegetable intake. Because of the potential effect on energy intake, parents need to be made aware of appropriate portion sizes for their children. Taking this into account, encouraging parents to involve their children in the preparation of healthy and balanced meals could be a valuable intervention strategy to improve the diets and vegetable intake of children.

Introduction

The promotion of healthy eating habits and especially vegetable consumption in children is considered of high importance as many children fail to meet the recommendations in Europe and the USA. Several review studies on the evaluation of factors that might impact children's fruit and vegetable consumption have consistently reported that parents play a crucial role in establishing good eating behaviors through behavioral modeling and making fruit and vegetables available and accessible for their children (Krolner et al., 2011; Pearson, Biddle, & Gorely, 2009; Rasmussen et al., 2006; van der Horst et al., 2007). Alongside more direct parental influence, existing school-based interventions moderately improve fruit consumption but have a minimal impact on vegetable intake (Evans, Christian, Cleghorn, Greenwood, & Cade, 2012). According to Evans et al. (2012), cooking, school gardening, and tasting were identified as potential areas to explore in the future (Evans et al., 2012) and the first evidence appears promising (Caraher, Seeley, Wu, & Lloyd, 2013; Gatto, Ventura, Cook, Gyllenhammer, & Davis, 2012; Gibbs et al., 2013; Marshall, Golley, & Hendrie, 2011; Mustonen & Tuorila, 2010; Robinson-O'Brien, Story, & Heim, 2009). These programs are highly appreciated by children; they enjoy the hands-on activities, which give them a feeling of ownership and pride (Heim, Stang, & Ireland, 2009).

Benefits of involving children in cooking activities

The idea of allowing children to participate in food preparation as a means to increase a liking for food is not new. For instance, in a study conducted in 1989, Casey and Rozin found that parents chose "help with food preparation" as a method that could very likely create vegetable liking in children (Casey & Rozin, 1989). Anliker, Laus, Samonds, and Beal (1992) used US data from the early 1980s to examine 3.5 year old children's involvement in food related activities (Anliker et al., 1992). They showed that more than 75% of the children helped with food related activities such as setting the table, helping to prepare baked goods, and serving spreading butter or peanut butter. Children who were more involved in food related activities were found to score higher on various aspects of nutrition awareness, such as the origin of foods, food values, and the role of foods in the energy balance. Children's involvement in food related

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activities was also found to significantly correlate with intakes of protein (r = .18) and vitamin C (r = .26) (Anliker et al., 1992). Also, more recently, there have been published studies addressing the beneficial effects of cooking. A cross-sectional survey among 305 Swiss parents of 6–12-year-old children showed clear positive associations between the children's cooking enjoyment (e.g., "my child loves to cook", "my child likes to try new recipes") and eating enjoyment; the survey also revealed an inverse association with picky eating behaviors (van der Horst, 2012). The frequency of helping with food preparation in the home was also found to be associated with higher fruit and vegetable preferences and higher self-efficacy for selecting and eating healthy foods in Canadian children (Chu et al., 2013). Cross-sectional findings from project EAT (Eating Among Teens and Young Adults) in the US showed that being engaged in home food preparation activities was associated with healthier intake (Larson, Perry, Story, & Neumark-Sztainer, 2006; Larson, Story, Eisenberg, & Neumark-Sztainer, 2006).

Cooking as a component of nutrition education programs

Until now, research on cooking with children has been surprisingly limited, and no existing experimental research confirms the association between cooking and fruit and vegetable intake. Most research focuses on school-based nutrition education programs in which food preparation is one part of a set of activities, such as tasting lessons, gardening, and classroom education (Robinson-O'Brien et al., 2009; Seeley, Wu, & Caraher, 2010). Research suggests that these educational programs are an engaging and effective strategy to teach healthy eating behaviors in children (Liquori, Koch, Contento, & Castle, 1998), adolescents (Wang et al., 2010), and young adults (Levy & Auld, 2004). Two systematic reviews were conducted to evaluate these multi-component interventions. The first focused solely on the impact of practical cooking initiatives in schools, and only included four papers on children between 5 and 12 years old (Seeley et al., 2010). Cooking lessons were part of an intervention package, which included activities like computer games, adapted school lunches, and nutrition education. Two out of three studies demonstrated an increase in fruit and vegetable intake (Cullen, Watson, Zakeri, Baranowski, & Baranowski, 2007; Perez-Rodrigo & Aranceta, 1997). The third study reported higher food preference scores and lower plate waste of targeted foods (Liquori et al., 1998).

The second review evaluated the effect of interventions in the United States that used gardening as a hands-on activity on fruit and/or vegetable intake, willingness to taste fruits and vegetables, preferences for fruits and vegetables, or other nutrition-related outcomes (Robinson-O'Brien et al., 2009). In many of these garden projects, fruit and vegetable preparation activities and/or taste sessions were included. Eleven studies were reviewed. Studies included youth ranging between 5 and 15 years old. Of these eleven studies, four evaluated changes in fruit and vegetable intake while the others focused on changes in preferences and willingness to taste. One of the four studies on intake did not find an effect on fruit and vegetable intake, but preferences for vegetables increased (Lineberger & Zajicek, 2000). The other three studies found significant increases in fruit and/or vegetable consumption, with increases of 2.5 servings per day (Hermann et al., 2006; Lautenschlager & Smith, 2007a; McAleese & Rankin, 2007). Seven studies included fruit/vegetable preference or willingness to taste as an outcome, and three studies reported a significant increase in preference or willingness to taste scores (Robinson-O'Brien et al., 2009). One of the main limitations in the quality of these intervention studies is that as they did not always include a control group, and sometimes had major limitations in the assessment of fruit and vegetable intake. Therefore, it is difficult to draw conclusions on the effect of these gardening programs on intake. Moreover, the combination of activities makes it impossible to evaluate the separate effects of the different components on outcomes, such as the effect of the preparation lessons on food intake (Wang et al., 2010). On the other hand, these interventions indicate that comprehensive fruit and vegetable exposure programs might have positive effects on vegetable preferences and intake.

Cooking and meal preparation programs could have other positive effects, as indicated in some qualitative studies. For instance, it evokes feelings of independence and pride (Bowen & Devine, 2011); children seem to enjoy cooking programs; they or their teachers report high levels of enjoyment; they like to eat what they cook; and want to help their parents and teach them what they learned (Dougherty & Silver, 2007; Lautenschlager & Smith, 2007b).

Objective

The research presented above indicates that involving children in cooking at home or at school could be an opportunity to teach healthy eating behaviors and to increase vegetable consumption. Until now, evidence has been based on overall evaluations of multi-component interventions or cross-sectional surveys. Therefore, the purpose of this study was to examine the effect of children's involvement in meal preparation on their food intake, especially vegetable intake, in an experimental setting. Furthermore, we also wanted to explore the role of emotions, such as positive feelings and pride, because based on the evaluations of cooking programs, this appears to be an important consideration.

Methods

To investigate the influence of children's involvement in meal preparation on subsequent food intake, 47 parent-child pairs were invited to come to the Research Center in Lausanne, Switzerland, one pair at a time, to prepare and consume a lunch meal.

Meal and recipe selection

Three criteria were applied to develop the recipe that was used in the experiment: 1) it should present a lunch meal consisting of a vegetable, meat and starch component, and a salad as side dish; 2) the vegetables should not be too easily accepted by children (no carrots or tomatoes) and they should be available during the summer and autumn at the time of the experiment; 3) the recipe should include sufficient hands-on activities/exposure for the child.

The vegetable selection was also based on the results of an additional screener questionnaire that included liking questions for 10 vegetables (see following section for further description). The entire cooking process and potential safety hazards for three meal combinations were evaluated, and decisions were made on tasks the child was allowed to perform. In nine feasibility tests with parent-child pairs, various recipes were tested on the level of child involvement in the cooking process. Based on the outcomes of the feasibility tests and the additional screener survey including vegetable liking, a meal of cooked cauliflower, pasta, breaded chicken strips and a salad as side dish was selected.

Participants

A market research company recruited the parent-child pairs, and children were between 6 and 10 years old. Parent-child pairs were excluded from participation if they followed a medically prescribed diet, if they followed a vegetarian diet, were prone to allergies or had food-related diseases, if the parent worked in psychology, marketing, or food-related jobs, and when they had previously participated in other food related studies. All eligible parent-child pairs (n = 171) received a questionnaire that was used as an