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Research report

Exposure to foods' non-taste sensory properties. A nursery intervention to increase children's willingness to try fruit and vegetables ☆

Paul Dazeley [a], Carmel Houston-Price [b,*]

[a] School of Psychology & Clinical Language Sciences, University of Reading, Earley Gate, Whiteknights, Reading, RG6 6AL, UK
[b] School of Psychology & Clinical Language Sciences, University of Reading Malaysia, Menara Kotaraya, Level 7, Jalan Trus, 80000 Johor Bahru, Malaysia

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ABSTRACT

Activities that engage young children with the sensory properties of foods are popular with nursery schools, despite the lack of evidence for their efficacy in increasing children's consumption of healthy foods. This study provides the first empirical exploration of the effectiveness of a non-taste sensory activity program in a nursery school setting. Ninety-two children aged between 12 and 36 months were allocated either to an intervention group, who took part in looking, listening, feeling and smelling activities with unusual fruits and vegetables every day for 4 weeks, or to a non-intervention control group. In a subsequent mealtime taste test, children touched and tasted more of the vegetables to which they had been familiarized in their playtime activities than of a matched set of non-exposed foods. The results demonstrate that hands-on activities with unfamiliar fruits and vegetables can enhance children's willingness to taste these foods, and confirm the potential for such activities to support healthy eating initiatives.

Introduction

Infants' taste preferences are initially determined by innate predispositions such as a liking for sweet tastes (Desor, Maller, & Andrews, 1975; Desor, Maller, & Turner, 1973), which is assumed to provide an evolutionary benefit by identifying calorific foods (Wardle & Cooke, 2008). Additionally, children commonly demonstrate a reluctance to taste unfamiliar foods as they approach the age of 2 years; this 'food neophobia' (Cooke, 2007; Rozin, 1976) is thought to protect the child from ingesting potentially harmful substances as they become able to explore their environment more independently. Both these instinctive behavioral patterns decrease the likelihood that children will develop a liking of a wide variety of healthy foods, particularly vegetables, which often have a bitter taste.

Considerable work has shown that familiarizing young children with the taste of an unfamiliar or disliked food is an effective means of increasing their acceptance of it (Birch, 1999); between 10 and 15 taste exposures are generally found to be required (Birch & Marlin, 1982; Gerrish & Mennella, 2001; Wardle et al., 2003a; Wardle, Herrera, Cooke, & Gibson, 2003b). While it is often assumed that the active component of such exposure interventions is the repeated tasting of the food, and the 'learned safety' that results from this (Kalat & Rozin, 1973; Rozin, 1976), the act of tasting is not an isolated sensory experience as it also provides exposure to the food's non-taste sensory qualities. That is, when a food is offered to a child to eat, the child is exposed to the sight of the food, its smell and its texture as the food is handled; he or she may also hear the name of the food. If they taste it, they additionally experience the texture of the food in the mouth and the sound it makes as it is chewed. Familiarity with these non-taste sensory properties of a food may play some part in the positive effects that result from repeated tasting.

Research suggests that, despite its evidential success, repeatedly offering children foods to taste is not a technique widely used by parents at home; 80% of caregivers are only prepared to offer their child a new food three or four times before they will decide that their child does not like it, on the basis of the child's 'bothersome behavior' (Carruth, Ziegler, Gordon, & Barr, 2004). Parents may find it easier to provide repeated exposure to the non-taste properties of foods, especially if this occurs outside mealtimes in an environment that does not carry the stress associated with ensuring that the child is consuming a healthy diet. There is therefore value in exploring the potential for non-taste familiarization to facilitate the introduction of new foods.

Nursery schools in the UK are increasingly signing up to multisensory activity programs that seek to encourage healthy eating by

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* Corresponding author.
E-mail address: c.houston-price@reading.ac.uk (C. Houston-Price).

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familiarizing toddlers and preschoolers with the sensory qualities of food. Popular programs include *Ella's Explorers* (Ella's Kitchen, 2011) and *Taste for Life* (Organix, 2010), developed from the methods proposed in a range of *Mange Tout* books (Thomas, 2007). While these programs are based on the personal experiences of the authors rather than academic theory or evidence, the activities have proven very popular and several thousand nurseries have adopted them into their daily curriculum. There are therefore good grounds to think that non-taste activities involving fruits and vegetables would be welcomed by parents and caregivers, should the evidence confirm that these activities do indeed support healthy eating.

To date, little research has investigated the role played by the individual non-taste senses in children's food acceptance (see Dazeley, Houston-Price, & Hill, 2012 for a review). There is encouraging evidence to suggest that visual and olfactory exposure can promote consumption (Bronstein & Crockett, 1976; Fedoroff, Polivy, & Herman, 1997; Heath, Houston-Price, & Kennedy, 2014; Hennessy, Smotherman, & Levine, 1977; Houston-Price, Butler, & Shiba, 2009), although olfactory exposure is yet to be explored as a means of increasing fruit and vegetable intake in young children. The effects of familiarization with the texture and/or sound qualities of fruit and vegetables have not, as yet, been investigated.

A small body of work has looked into the effects of holistic sense-based interventions with school-aged children aged between 6 and 11 years. For example, *Le goût de l'enfant* classes educate children to use their senses when eating and drinking (Puisais & Pierre, 1987); a 'taste' lesson might teach children to discriminate between drinks with or without added sugar, for example. The popularity of the program has led to its translation from French to Swedish (Hagman & Algotson, 2000), and there is some evidence of effectiveness. In one study, parents reported that children's eating behavior was less neophobic after they participated in the *Le goût de l'enfant* classes and that they had tried a wider variety of foods than a control group (Mustonen & Tuorila, 2010). However, a study that followed children up 10 months later found that children's neophobia levels and willingness to taste novel foods had returned to baseline levels by this point (Reverdy, Chesnel, Schlich, Köster, & Lange, 2008).

It is difficult, however, to build hypotheses about the likely success of sense-based activities with nursery-school-aged children on the basis of this work. While Mustonen, Rantanen, and Tuorila (2009) reported that it was the children at the younger end of the 6- to 11-year-old age range targeted by the *Le goût de l'enfant* classes who benefited most from participation, there has, to date, been no investigation into the effectiveness of sensory activities designed for pre-schoolers. Yet, the first few years of life are critical for developing life-long food preferences (Harris, 2008), and sensory interactions with foods at an early age may have a profound and lasting impact on eating habits.

Second, the *Le goût de l'enfant* program does not specifically target healthy foods, and so may or may not increase consumption of the food groups promoted in healthy eating guidelines, such as fruits and vegetables. Additionally, the lack of appropriate control groups in many studies of the *Le goût de l'enfant* program complicates interpretation of their findings. Given the known impact of socio-economic and demographic factors on children's diets (Whichelow & Prevost, 1996), it is vital that studies recruit experimental and control participants from the same pool.

In sum, there is a sparse but encouraging body of evidence to support exposure to the sensory qualities of fruits and vegetables as a means of encouraging consumption. We hypothesized that encouraging children to engage in sense-based playtime activities with unfamiliar fruit and vegetables would increase their willingness to consume the foods at a later mealtime setting. Exposure activities were similar to those already adopted by nurseries, and included looking at and drawing pictures of a food, feeling its external and internal texture, smelling it, listening to the sound it makes when squashed or snapped, and hearing its name. Given how challenging caregivers find it to encourage young children to taste foods (Carruth et al., 2004), taste exposure was not included in this study. The aim was not to tease apart the individual effects of familiarization with a food in the different sense modalities, but to test the effects of a holistic, sense-based approach to food familiarization with children under the age of 3 years, as it might be applied in a day-care or home setting.

Method

Participants

Twelve nursery classes were selected for the intervention, two from each of six privately-owned day care nurseries in Berkshire. Six classes included 12- to 24-month-old children, while six classes included 24- to 36-month-old children. Three classes from each age group were randomly assigned to form the experimental group; the remaining three classes comprised the control group. A total of 121 children were recruited, of whom 92 completed the test session, 55 in the experimental condition (mean age = 2; 0, range = 1; 1–2; 11) and 37 in the control group (mean age = 2; 0, range = 1; 0–2; 9). The remaining 29 children were absent on the day of testing, largely due to family holidays. Informed consent was provided by the parents of all participants.

Materials

Exposure activities

Each nursery was provided with four activity sheets, each explaining three games specific to one sense: sight, smell, touch or sound (see Appendix for a list of activities). Activities were devised in collaboration with a childcare professional to ensure that they were suitable for toddlers and complemented the national curriculum. Additional resources to support the delivery of the activities included a story and nursery rhyme about each food and a laminated A4 colored photo of each food.

Target foods

Participants were exposed to one of two sets of four foods, two fruits and two vegetables. Set A foods were sweet potato, green pepper, rhubarb and dried figs; Set B foods were butternut squash, broad beans, dried prunes and pomegranates. These foods were selected as likely to be unfamiliar to most children, based on the reports of the nursery staff about the foods served at lunchtime, and on the responses of parents of similarly-aged children to a Fruit and Vegetable Preference and Familiarity Questionnaire in a previous study (Heath, 2013). The two classes at each nursery were randomly allocated to one of the two sets of foods for the exposure phase, to control for the possible greater familiarity of one set of foods at one school. Foods were chosen for their diverse sensory qualities (shape, color, smell and texture) and the two sets of foods were approximately matched for calorie content and colorfulness. Foods were delivered to each nursery once a week by the school's regular supplier.

For the exposure phase, foods were prepared on site (raw or cooked, as required by the activity) by qualified kitchen staff, who were instructed to dice raw foods into 2 cm^3 portions and to prepare cooked foods as if they were to be served as part of a nursery meal. For the test phase, foods were prepared in the same way and were offered raw (green pepper, dried figs, dried prunes, pomegranates) or cooked (sweet potato, rhubarb, butternut squash, broad beans), as appropriate, on the plates usually used at mealtimes. A very small amount of sugar was added when rhubarb was prepared (1 tsp per lb of fruit), in order to make it palatable.

Recording

A video camera was used to record all test sessions for later coding.

Procedure

Exposure phase

The exposure phase lasted 4 weeks, with each week following the same schedule. On 4 days of the week (either Monday to Thursday or Tuesday to Friday), children in the experimental groups spent 5–10 minutes as a group completing three food-related activities focused on one of the senses (Sight, Sound, Smell or Touch; see Appendix). The day on which each of the senses was targeted was randomly determined for each nursery but was the same each week. As children did not all attend nursery every day, the specific activities each child experienced depended on the days they attended nursery. Half of the experimental groups completed the activities with Set A foods; the remaining children completed the activities with Set B foods.

Activities were delivered by key workers at each nursery. Sessions typically involved six children and three staff, one of whom led the session while the others ensured that children were engaged. Larger nurseries ran two or more groups simultaneously. Activities took place in site-appropriate locations within the nursery, including: inside the nursery around a table; in the story-time area; in the soft-play area; or in the garden, as appropriate for the activity. Activities were deliberately never conducted in a mealtime context.

To ensure consistency of the delivery of activities, staff were trained the day before the exposure phase started and were assisted by a researcher on the first day of the intervention. Staff were instructed to frame each day's activities around the specific sense targeted that day (e.g. "Today, we're going to have fun using our ears!") and to ensure that all discussion about the foods and their sensory properties was positive, regardless of any personal views they might hold about a food. During activities that gave children direct access to a food, tasting was discouraged, although staff were instructed to avoid saying anything negative if a child ate a food. Nursery workers were encouraged to engage the children with each of the activities for up to 10 minutes but to end the activities if the children lost interest. While the youngest children were often unable to participate fully in the activities, nursery staff ensured they were involved as much as possible (e.g. they were provided with crayons and paper, even if unable to draw a coherent representation of the food).

Children in the control group did not take part in any exposure activities.

Test phase

During the week immediately following the final week of the exposure phase, children in the experimental and control groups were tested on their willingness to consume the Set A and Set B foods, using a two-alternative forced choice procedure. Children were tested individually at the dining table where they usually had their meals; testing took place throughout the day, but not during or immediately before or after lunch.

Participants were presented with four plates of food, one at a time. Each plate contained two pieces of two different foods, one from Set A and one from Set B, cut to a suitable size for participants to eat. Foods were paired as follows: butternut squash and sweet potato; green beans and green peppers; prunes and figs; rhubarb and pomegranate. For children in the experimental groups, the target food on each trial depended on the set of foods to which they had been exposed. The two foods on each plate were named as they were presented to the child, who was asked which food he or she would like to taste. If they ate a piece of food they were asked if they would like any more, before being asked if they would like to try the other food. The plate was removed when all the food was eaten, or after 2 minutes if the food was refused. This procedure was repeated for the remaining three plates until all eight foods had been offered.

The order of presentation of the four plates was counterbalanced between participants using a Latin Square. The location of the target food on the left or right side of the plate was counterbalanced within participants.

The testing procedure was led by a member of the nursery staff to emulate the natural mealtime environment and to encourage children to feel comfortable about eating the foods offered. The staff member had not been involved in the exposure activities and was blind to the set of foods to which children in the experimental groups had been exposed. Staff were again trained in advance of the test phase, to ensure consistency of the procedure. If a child refused to eat anything, staff were instructed to offer gentle encouragement as they would normally at mealtimes, but to not put pressure on the child to try either food. The researcher prepared the foods for the test phase and observed and recorded all sessions. Prior to testing, participants in the control condition met the researcher during a play session in their classroom to ensure that they were not intimidated by his presence during testing.

Coding

The researcher recorded the foods the participants touched and tasted and in what order. 'Tasting' was defined as touching the food with the tongue; chewing or swallowing was not required. Video recordings of test sessions were reviewed to double check that no behaviors had been missed during the online coding.

Results

Mean numbers of Set A and Set B foods touched and tasted by the children in the experimental and control groups are presented in Table 1. Pairwise comparisons were employed to establish whether the children in each group were more willing to touch or taste Set A or Set B foods. Parametric analyses (related t-tests) were employed for tests of children's behavior toward fruit and vegetables combined, but non-parametric (Wilcoxon) tests were used for tests of children's behavior toward fruits and vegetables separately, due to the small numbers of foods included in these analyses.

Children in the control group showed no preference for Set A or Set B foods in the numbers of foods they touched or tasted (all $ps > .05$). In contrast, the children who were exposed to Set A foods touched significantly more Set A than Set B vegetables, while children who were exposed to Set B foods touched and tasted significantly more of the Set B vegetables. The most meaningful results are those from the two exposure groups combined, which control for any differences in the natural appeal of the two sets of foods. This overall analysis confirmed that children in the experimental groups touched significantly more of the exposed than non-exposed foods, $t(53) = 2.05$, $p = .046$, indicating that the exposure activities had increased children's willingness to handle the targeted foods. This effect was driven by children's greater willingness to touch exposed than non-exposed vegetables ($Z = 2.87$, $p = .004$); no significant effect was seen for fruit ($Z = 0.22$, $p = .83$). A similar, but weaker, pattern was seen in children's tasting behavior. While children did not taste significantly more of the exposed foods overall, $t(53) = 1.65$, $p = .11$, they tasted more of the exposed vegetables than of the non-exposed vegetables ($Z = 2.24$, $p = .025$); again, no effect was found for fruit ($p = 1$).

Children's greater willingness to touch and taste exposed foods was also reflected in the order in which they interacted with the foods on each plate. Table 2 presents the mean numbers of Set A and Set B foods that children touched or tasted before they

Table 1
Numbers of foods in each set touched and tasted by the experimental and control groups.

		Experimental group A ($N = 24$) (Exposed to Set A)		Experimental group B ($N = 31$) (Exposed to Set B)		Control group ($N = 37$) (No exposure)		**Experimental groups combined ($N = 55$)**	
	No. of foods	Set A	Set B	Set A	Set B	Set A	Set B	**Exposed**	**Non-exposed**
Mean foods touched	4	2.67	2.42	1.97	2.33	2.08	2.22	**2.48**	**2.17***
SD		1.24	1.35	1.45	1.47	1.80	1.73	**1.37**	**1.41**
Mean veg. touched	2	1.42	1.04*	.93	1.23*	1.05	1.08	**1.31**	**0.98****
SD		0.78	0.81	0.83	0.86	0.97	0.89	**0.82**	**0.81**
Mean fruit touched	2	1.25	1.38	1.03	1.10	1.03	1.14	**1.17**	**1.19**
SD		0.68	0.71	0.85	0.80	0.93	0.95	**0.75**	**0.80**
Mean foods tasted	4	1.46	1.38	1.20	1.42	1.59	1.81	**1.44**	**1.28**
SD		1.28	1.38	1.40	1.48	1.80	1.73	**1.38**	**1.40**
Mean veg. tasted	2	0.71	0.58	0.57	0.78*	0.76	0.86	**0.75**	**0.57***
SD		0.75	0.72	0.78	0.80	0.95	0.89	**0.78**	**0.74**
Mean fruit tasted	2	0.75	0.79	0.61	0.65	0.84	0.95	**0.69**	**0.69**
SD		0.74	0.78	0.76	0.84	0.93	0.91	**0.79**	**0.77**

Significant pairwise comparisons between Set A and Set B (or Exposed and Non-exposed) foods are indicated by asterisks (*$p < .05$, **$p < .005$).

approached the alternative food on each plate. Children who had been exposed to Set A foods systematically touched these before they touched the non-exposed foods, $t(16) = 2.50$, $p = .023$; they also tasted the Set A fruits before they tasted the non-exposed fruits ($Z = 2.12$, $p = .034$). In contrast, children who had been exposed to Set B foods tasted the Set B foods first $t(13) = 2.19$, $p = .047$. The exposure effect for this group was most strongly seen in children's behavior toward vegetables; the exposed vegetables were both touched ($Z = 2.84$, $p = .005$) and tasted ($Z = 2.58$, $p = .010$) before the non-exposed vegetables.

It is important to note that children in the control group also touched ($Z = 3.29$, $p = .001$) and tasted ($Z = 3.08$, $p = .002$) the Set B foods before the Set A foods, despite their lack of exposure to these, suggesting that foods in Set B were more naturally appealing. The crucial comparisons control for these differences between the two sets of foods by comparing the behavior of the two experimental groups combined toward exposed and non-exposed foods. As can be seen in Table 2, children as a group touched the foods to which they had been exposed before those to which they had not been exposed, $t(36) = 2.13$, $p = .040$; this pattern was driven by their behavior toward vegetables ($Z = 2.04$, p = .042), rather than fruits ($Z = 0.36$, p = .72). Importantly, children also tasted the exposed foods before the non-exposed foods, $t(23) = 2.29$, $p = .032$, and in this case, children's behavior was driven by their reactions toward fruits ($Z = 2.56$, $p = .011$), rather than vegetables ($Z = 1.42$, $p = .16$).

Discussion

This study provides the first investigation into the effects of introducing new fruits and vegetables in playtime activities on toddlers' subsequent acceptance of the foods at a mealtime setting. Results suggest that familiarizing children with the non-taste sensory qualities of foods increases children's willingness to touch and taste them when they are later offered these to eat. Specifically, when the total numbers of exposed and non-exposed foods that children were willing to touch or taste were compared, the intervention was seen to impact strongly on children's behavior toward vegetables. Toddlers both touched and tasted more of the exposed than non-exposed vegetables; they also touched more of the exposed foods than non-exposed foods overall.

The order in which children approached the foods on each plate also demonstrated their greater confidence in engaging with the previously exposed foods; children touched and tasted the exposed foods before they touched and tasted the non-exposed foods. Children's greater willingness to engage with the exposed foods was evident toward both fruits and vegetables on this measure; children touched the vegetable to which they had been exposed before the non-exposed vegetable on each plate, and they tasted the exposed fruit on each plate before the non-exposed fruit.

Overall, the results demonstrate a very clear impact of the intervention on children's willingness to try the targeted foods, and

Table 2
Numbers of foods in each set that were touched or tasted before the other food on each plate.

		Experimental group A ($N = 24$) (Exposed to Set A)		Experimental group B ($N = 31$) (Exposed to Set B)		Control group ($N = 37$) (No exposure)		**Experimental groups combined ($N = 55$)**	
	No. of foods	Set A	Set B	Set A	Set B	Set A	Set B	**Exposed**	**Non-exposed**
Mean foods touched first	4	1.59	.71*	1.15	1.35	1.14	2.00	**1.46**	**0.95***
SD		0.80	0.85	0.88	1.04	0.89	1.27	**0.93**	**0.88**
Mean veg. touched first	2	0.29	0.36	0.18	1.00***	0.29	1.32****	**0.70**	**0.27***
SD		0.47	0.63	0.39	0.71	0.47	0.58	**0.70**	**0.52**
Mean fruit touched first	2	1.06	0.44	1.07	0.71	0.90	0.90	**0.90**	**0.73**
SD		0.68	0.81	0.62	0.73	0.83	0.83	**0.71**	**0.78**
Mean foods tasted first	4	1.30	1.00	0.50	1.50*	1.06	2.06*	**1.42**	**0.71***
SD		0.67	0.82	0.65	1.34	0.77	1.18	**1.10**	**0.75**
Mean veg. tasted first	2	0.40	1.00	0.21	1.50**	0.31	2.06***	**1.08**	**0.57**
SD		0.52	0.82	0.43	1.34	0.48	1.18	**1.20**	**0.73**
Mean fruit tasted first	2	0.90	0.30*	0.40	1.00	0.75	0.88	**0.95**	**0.35***
SD		0.32	0.48	0.52	0.67	0.58	0.72	**0.51**	**0.49**

Significant pairwise comparisons between Set A and Set B (or Exposed and Non-exposed) foods are indicated by asterisks (*$p < .05$, **$p < .01$, ***$p < .005$, ****$p < .001$).

support the potential for sensory activities to facilitate the introduction of healthy foods into children's diets.

The results of this study suggest several key avenues for further research. First, questions remain about the impact of the intervention beyond the taste test conducted. We can say nothing about the changes that might have occurred in children's eating behavior outside the nursery environment. Future studies might explore the program's impact beyond the confines of the nursery setting by asking parents about children's eating behavior before and after an intervention at the children's nursery. Toddlers are likely to have more influence over what they eat in the home environment than at nursery and parents may notice if children ask for certain foods at home or in the supermarket or are more willing to consume these during family mealtimes. The effects of the intervention might also be specific to the foods targeted by the program, or they might generalize to other similar foods (Birch, Gunder, Grimm-Thomas, & Laing, 1998) or bring about positive changes in children's attitudes toward new foods in general. Parents should therefore be asked to report on children's food neophobia and/or food fussiness (Pliner, 1994; Wardle, Guthrie, Sanderson, & Rapoport, 2001), as well as on their consumption of specific exposed and non-exposed foods, before and after a nursery intervention is conducted.

The longevity of the effects seen in our 'willingness to taste' test also remains to be established. Previous work has questioned whether a sense-based program for school-aged children can have a long-term impact on children's eating behavior (Reverdy et al., 2008). In order to justify any recommendation to nurseries to implement a program similar to that used in our study, we would need to know that the intervention is likely to cause lasting changes in children's willingness to consume the target foods. Alternatively, if effects were found to last for only 6 months or a year, for example, one might recommend repeating the program on a biannual or annual basis to keep children's interest in the targeted foods 'topped up'.

Other outstanding questions concern the locus of the positive effects of the intervention and how these might be optimized. Would the sense-based activities we employed have the same impact if they were conducted in the home environment, for example? If parents engaged in food-related activities with their child, parents' own interest in and willingness to consume the fruits and vegetables concerned might be enhanced along with the child's, resulting in positive changes to the parent's food purchasing and eating behavior, and hence an even greater impact on children's willingness to consume the targeted foods (Busick, Brooks, Pernecky, Dawson, & Petzoldt, 2008; Worobey, Ostapkovich, Yudin, & Worobey, 2010).

It would similarly be beneficial to establish the optimal length of the program, and whether a program that runs for fewer than 4 weeks is just as effective, or whether a prolonged but less intense program leads to longer-term changes in food liking. Informal feedback from the staff who participated in the activities suggests that targeting the sensory activities around a single food each day, rather than a single sense, would result in less food waste and therefore reduce the cost of running the intervention.

Finally, it would be of both practical and theoretical interest to establish the contribution of the activities' involvement of different sensory modalities to the positive effects we have reported. While the current study has demonstrated the potential for a multisensory intervention to impact on children's willingness to taste new foods at mealtimes, it cannot speak to the effect of each type of activity in isolation. The participants in our study engaged in different combinations of sensory games, depending on the days on which they attended nursery, such that some children took part in games involving only two of the senses, while others experienced activities engaging all four targeted senses. However, the study was not powered to investigate whether such differences affected the outcome for individual children. Nor do we know whether, within each sensory modality, some activities exerted a greater influence on children's willingness to touch and taste the foods than others. A much larger study, in which sub-groups of children were assigned to different combinations of sensory activities, would be required to tease apart the relative impact of the different senses in increasing children's willingness to taste new foods, and to design the most efficient intervention with the greatest potential to enhance healthy eating.

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Appendix: List of activities used to explore foods' sensory properties

Sight
1. Compare the difference between the outside of the whole food and the inside of the food after it has been cut open.
2. Find items around the nursery that match the color of each food.
3. Draw a picture of each food.

Sound
1. Sing a nursery rhyme about fruit and vegetables (song sheet provided, adapted from *Old McDonald Had a Farm*).
2. Run toward a picture of the food when its name is called.
3. Listen to the noise made when the food is snapped or squeezed.

Touch
1. Feel the texture of the outside of the whole foods.
2. Feel the texture of the foods after they've been chopped up.
3. Compare the texture of the chopped up foods before and after they have been cooked.

Smell
1. Listen to a story about a child smelling foods in the shop and at home, smelling the foods while listening to the story.
2. Smell the cooked food.
3. Compare the smells of the cooked and uncooked food.