Exposure to models' positive facial expressions whilst eating a raw vegetable increases children's acceptance and consumption of the modelled vegetable

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Abstract

Research has shown that seeing positive facial expressions (FEs) towards food increased children's desire to eat foods rated as disliked. However, the effect of adults' positive FEs whilst eating a raw vegetable on children's acceptance and intake of nutritious foods that are less preferred (e.g., vegetables) remains to be established. This study aimed to examine the effect of models' FEs eating raw broccoli on children's acceptance and intake of raw broccoli. 111 children aged 4-6 years (64 male, 47 female) were randomised to watch a video of unfamiliar adult models eating raw broccoli with a positive or neutral facial expression (FE), or a non-food control video. Children's acceptance and intake of raw broccoli was assessed. Data about parent and child characteristics was provided by parents. There was a main effect of FE type on children's frequency of tastes (p = .03) and intake of broccoli (p = .02). Children who were exposed to models eating broccoli with positive FEs had greater frequency of tastes (p = .04) and intake of broccoli (p = .03), than children in the control condition, but not compared to children in the neutral FE condition (p > .05). There was no effect of positive FEs on children's willingness to try broccoli (p > .05). These findings suggest that observing others enjoy a commonly disliked vegetable can encourage children's tastes and intake of the vegetable. Thus, exposing children to others enjoying vegetables could be a useful strategy for encouraging healthier eating in children. Further work is needed to determine whether a single exposure is sufficient and whether these effects are sustained over time.

Keywords: Children, Facial expressions, Modelling, Vegetable intake, Vegetable acceptance[1]

[1] Abbreviations used: FE, facial expression; FEs, facial expressions; F&V, fruit and vegetable; CEBQ, Children's Eating Behaviour Questionnaire; CFNS, Child Food Neophobia Scale.

1. Introduction

Globally, children typically consume fewer vegetables than recommended (Health Survey for England, 2018; Keats et al., 2018; Kupka et al., 2020), which is of concern because vegetables are a key source of vitamins and phytochemicals (Slavin & Lloyd, 2012), and adequate consumption is associated with reduced risk of adult chronic diseases (Boeing et al., 2012). Vegetables are often bitter in taste and innately less preferred (Wardle & Cooke, 2008), thus encouraging vegetable intake by children is challenging. Since poor dietary behaviour during childhood can persist into adulthood, it is important to identify methods of increasing children's vegetable acceptance as early as possible to establish healthy dietary behaviours (Craigie et al., 2011).

Social learning plays a role in guiding children's eating behaviour; children may observe and model another's eating behaviour (Bandura, 1977). Modelling appears to reduce food neophobia in children, as children consume more novel food after observing an adult model eating the food (Addessi et al. 2005; Harper & Sanders, 1975). Through vicarious learning, children may imitate a behaviour after observing positive consequences (Bandura, 1977), e.g., a model's conveyance of food enjoyment using a statement (e.g., "this is yummy") can increase children's F&V acceptance (Appleton et al., 2019; Hendy & Raudenbush, 2000). For example, preschool children have been found to be more accepting of novel fruit when teachers made enthusiastic comments about the fruit (Hendy & Raudenbush, 2000). Furthermore, 7–10-year-old children showed higher liking and carrot intake after observing characters mention their liking of carrots (Appleton et al., 2019). This demonstrates that positive information about a models' enjoyment of food has a greater impact on encouraging children's acceptance of the modelled fruit or vegetable than modelling alone.

Food enjoyment is also conveyed through facial expressions (FEs). Children may look to others for guidance when exposed to new foods they are unsure about. Smile signals from adults can encourage children's approach behaviour to an unfamiliar toy (Klinnert et al., 1986), thus observing positive FEs towards eating food may encourage approach and acceptance of novel food. Limited research exploring the effect of models' FEs towards food on the eating behaviour of others shows that exposure to positive FEs can influence eating behaviour (Barthomeuf et al., 2012; Barthomeuf et al., 2009). Exposing adults and children to static images of adults looking at a bowl of food with a pleasure, disgust, or neutral FE has shown that adults' pleasure and neutral FE towards food increases adults' and children's desire to eat foods rated as disliked (Barthomeuf et al., 2012; Barthomeuf et al., 2009). Thus, observing adults enjoying, or at least not disliking, typically less preferred but nutritious foods, such as vegetables, may be a useful strategy to increase children's vegetable acceptance and intake. Determining whether positive FEs are particularly useful for increasing disliked food desirability, in comparison to neutral FEs, remains to be established. Also, static images do not represent the dynamic nature of FEs whilst eating. Thus, video stimuli are a more ecologically valid method for participants to observe others' FEs whilst eating.

This study examined the effect of adults' FEs whilst eating raw broccoli on children's acceptance and intake of a typically less preferred vegetable. Children aged 4-6 years were examined because emotion recognition develops significantly between 3-4 years (Pons et al., 2004), and 4-6-year-olds have the capacity to understand and cooperate with online procedures. Furthermore, food neophobia peaks between 2-6 years, thus children aged 4-6 years are less likely to try new foods, particularly vegetables (Dovey et al., 2008). Investigating others' FEs in isolation (e.g., without statements about food tastiness) will improve understanding of the role of FEs in modelling of eating and contribute to developing strategies to help children learn pleasure from nutritious foods (Marty et al., 2018). Based on previous literature, it was hypothesised that children's acceptance (willingness to try, and frequency of tastes) and intake of raw broccoli would be higher after exposure to models eating raw broccoli with positive FEs, compared to models consuming raw broccoli with neutral FEs, or a non-food control video.

2. Method

2.1. Participants

A power calculation (G*Power 3; Faul et al., 2007) indicated that to detect a significant main effect of condition with $d = 0.6$, (based on research examining intervention effects on children's vegetable intake; Farrow et al., 2019), 80% power, $\alpha = 0.05$, 108 children were required. In total, 117 4-6-year-olds and their parents were recruited from the UK via online advertisements and social media between October 2020 and February 2021. Children with food allergies, food intolerances, or medical conditions affecting eating behaviour were excluded. Ethical approval was obtained from Aston University Research Ethics Committee (#1688). Parents provided informed consent for their own and their child's participation and children provided verbal assent.

2.2. Design

In a between-subjects design, children were randomly assigned to one of three conditions (positive, neutral or control) in which they were shown one of three stimuli (see 2.3.6. for details).

2.3. Measures

2.3.1. Children's vegetable acceptance and intake

Children's acceptance and intake of raw broccoli was measured after the manipulation. Raw broccoli was used due to its bitter taste, and bitterness is innately less preferred (Wardle & Cooke, 2008). Broccoli is also likely to be unfamiliar to children in its raw form. Broccoli acceptance was measured as the willingness to try broccoli and the frequency of tastes of broccoli. Willingness to try broccoli was assessed by measuring children's greatest observed engagement with broccoli on a 7-point scale (Table 1; Blissett et al., 2012; Blissett et al., 2016). For example, if a child placed raw broccoli in their mouth but did not swallow it, placed in mouth (score = 5) was recorded as the greatest observed engagement. If the child verbally refused the broccoli but then went on to touch it, touched (score = 3) was recorded as the greatest observed engagement. Higher engagement scores indicated greater willingness to try broccoli. The frequency of children's tastes (defined as any occurrence of oral exposure to the broccoli) was determined by counting the number of times broccoli was placed in mouth, swallowed but refused, and swallowed and accepted. Broccoli intake was measured as the grams of broccoli consumed; parents weighed the broccoli in grams pre- and post- intake and reported the weights to the researcher.

2.3.2. Demographics and Lifestyle Questionnaire

Demographic information was gathered; child sex and age, and parent gender, age, ethnicity, education level and number of children was assessed (Blissett et al., 2019). Parents reported their child's height and weight, to calculate BMI. BMI z scores (zBMI) were used in analyses to adjust for sex and age. Information about parent and children's food allergies, food intolerances, or medical conditions affecting eating behaviour were used to exclude participants. Parent and child habitual F&V intake was assessed, to check for differences between conditions (e.g., "how many servings of vegetables do you/ your child normally eat a day?" and "think back carefully, how many servings of vegetables did you/ your child eat yesterday?"; Thomas et al., 2016). Parents reported if their child had tried raw broccoli before, to assess children's familiarity with raw broccoli.

2.3.3. Children's Eating Behaviour Questionnaire (CEBQ; Wardle et al., 2001)

Four subscales of the CEBQ measured children's typical eating behaviour (Wardle et al., 2001): food responsiveness (5 items, e.g., 'my child is always asking for food'), enjoyment of food (4 items, e.g., 'my child loves food'), satiety responsiveness (5 items, e.g., 'my child gets full up easily') and food fussiness (6 items, e.g., 'my child refuses new food at first'). Parent responses are on a scale of 1 to 5 where 1 = never and 5 = always. Food approach (enjoyment of food and food responsiveness) and food avoidance (satiety responsiveness and food fussiness) have been associated with food acceptance, so were measured to check for differences in scores between conditions and associations with outcome measures (Blissett et al., 2019; Cooke et al., 2004; Fildes et al., 2015). The CEBQ has been found to be a reliable and valid measure in children (Carnell et al., 2007; Wardle et al., 2001). In this study, subscales had good internal consistency (α = 0.79-0.89).

2.3.4. Child Food Neophobia Scale (CFNS; Pliner, 1994)

A reduced 6-item CFNS measured children's food neophobia (e.g., 'my child does not trust new foods'; Pliner, 1994). Parent responses are on a 7-point Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly). Food neophobia has been associated with lower F&V intake and variety in children, so was measured to examine associations with outcome measures and differences in children's neophobia between conditions (Cooke et al., 2003; Perry et al., 2015). The CFNS has been found to be a reliable and valid measure (Cooke et al., 2006; Pliner, 1994; Perry et al., 2015). Cronbach's alpha in this study was 0.94.

2.3.5. Randomisation checks

Parents completed several questionnaires about their child's characteristics: sensory processing, anxiety, empathy, and autistic traits. Children differ in these traits, which have been associated with selective eating behaviours (see Supplementary Material 1). These traits were examined to check participants did not differ in these measures between conditions.

2.3.6. Experimental Stimuli

Each of the three stimuli comprised 6 randomised video clips of unfamiliar adult models (*M* video clip length = 10.6 seconds; SD = 1.95). Overall, stimuli lasted approximately 1 minute in length (positive = 62 seconds; neutral = 57 seconds; control = 60 seconds). Each of the 6 video clips in the stimuli featured a model facing forward, eating one piece of raw broccoli, and displaying a positive FE (positive condition) or neutral FE (neutral condition). Each control video clip showed a model putting pens away into a pencil case whilst expressing a neutral FE (control condition). See Supplemental videos 1-3 for examples of positive, neutral and control clips. Videos had no sound, to remove its potential influence on eating behaviour. Models were adults (3 men, 3 women) aged 20-26-years-old, comprising White and Asian ethnicities (White British = 4; Asian British = 2). Each stimulus featured the same 6 models. A pilot study (n = 20 adults) and FaceReader 7.0 software showed that stimuli conveyed the intended valence.

2.4. Procedure

Parents completed an online questionnaire about their own and their child's characteristics. Parents were then contacted via email to arrange an online video session. For the session, parents were asked to prepare a bowl of raw broccoli (roughly 30g, 5 florets) and to record the weight. Sessions took place between 10am – 7pm, on any day of the week suitable for participants, using the online platform Zoom. Screen share was used to show children the study materials. First, parents reported the time since their child had last eaten. Children gave verbal consent and rated their hunger using the Teddy Picture Rating Scale (from 1 'very hungry' to 5 'not hungry at all/ very full'; Bennett & Blissett, 2014). Children then watched the randomly assigned video (positive, neutral or control) and after, were asked to report how they thought the models felt about eating broccoli or putting pens away, using a 3-point smiley face scale (positive, neutral, or negative), to check that they were engaged during the video. Next, children were told they would be given a snack to try if they would like to and that the researcher would turn off their camera and microphone whilst they were given the snack. When ready to move on from the snack, children were told to put their thumb up, and then the researcher would return. Parents then gave their child the raw broccoli snack, which was consumed ad libitum. Parents were told not to pressure or encourage their child to eat the snack. Children's interaction with the broccoli was video recorded through Zoom. Parents reweighed the broccoli and told the researcher the pre- and post- broccoli weights (parents were asked to covertly weigh the broccoli each time, to avoid influencing their child's eating behaviour). Finally, parents and children could ask questions and were debriefed and thanked for their participation. Children received a certificate and parents received a £5 online shopping voucher after participating. Sessions lasted approximately 10 minutes.

2.5. Video analysis

Recorded videos of the children consuming broccoli were used to analyse willingness to try broccoli and the frequency of tastes. Also, to adjust for potential differences in parental behaviour between conditions, the frequency of parental prompts to eat were recorded, which were defined as any direction from the parent towards the child trying the food (e.g., encouragement: "do you want to try it?", or pressure to eat: "eat this now"). All videos were coded in full by a single observer (KLE), from the time of presentation of the broccoli to the time the child indicated they were ready to move on (*M* duration = 97.8s, SD = 94.5, range = 8.0 – 434.0s). A proportion (10%) of the videos were coded by a second coder (JB). Intra-class correlation coefficients indicated excellent inter-rater reliability: parental prompts = 0.92; greatest engagement = 0.97; frequency of tastes = 0.99.

2.6. Statistical analysis

SPSS Version 26 was used for statistical analyses. Differences between conditions on child sex (Chi-square tests), demographic measures and habitual F&V intake (one-way

ANOVA) were assessed. Child hunger was correlated with outcome measures as a potential covariate (Pearson's correlations). One-way ANOVA examined differences between conditions in CEBQ subscales, food neophobia and randomisation check measures. CEBQ subscales and food neophobia scores were correlated with outcome measures as potential covariates (Pearson's correlations). The frequency of parental prompts was examined for differences between conditions (one-way ANOVA). One-way ANOVA/ANCOVA explored the main effect of condition on broccoli acceptance and intake and Bonferroni t-tests followed up significant main effects of condition.

3. Results

3.1. Sample characteristics

In total, 117 parents and children participated. Participants were excluded due to inadequate experimental control (e.g., not following instructions or the presence of siblings eating broccoli; n = 5) and intake data not being provided (n = 1). Hence, the final sample included 111 participants. Parents (109 women, 2 men) had a mean age of 37.1 years (range = 28-50). Parental ethnic background was 93.7% White, 2.7% Indian and 3.6% mixed ethnicities. Parental highest educational level achieved: 1.8% GCSE (or equivalent), 12.6% A level (or equivalent), 40.5% undergraduate degree, 44.1% postgraduate qualification and 0.9% 'other'. Children (64 males, 47 females) had a mean age of 5.5 years (65.6 months; range = 49 – 83 months) and a mean BMI z-score of 0.20 (range = -3.99 – 3.70). BMI z-scores could not be calculated for 5 children due to missing height and weight data from parents. Sample characteristics were analysed; there were no significant differences between conditions in parent or child demographics, habitual F&V intake, hunger rating or the number of minutes since the child had last eaten (all *p*s > .05; Table 2). Child sex did not differ significantly between conditions ($X^2(2, N = 111) = 1.01, p = .58$). Child hunger did not correlate with broccoli intake ($r(109) = -0.10, p = 0.30$), willingness to try ($r(104) = -0.05, p$

= 0.61), or frequency of tastes ($r(96) = -0.04$, $p = 0.72$). Parental prompts were not significantly associated with broccoli intake ($r(102) = -0.02$, $p = 0.86$). There were no significant differences between conditions on CEBQ subscales, food neophobia (all *p*s > .05; Table 3) or randomisation checks (all *p*s > .05; Supplemental Table 1). Finally, correlations revealed that the CEBQ subscales and food neophobia scores were not significantly associated with dependent variables, except for a significant negative relationship between parental ratings of child food fussiness and broccoli intake ($r = -0.21$, $p < 0.05$; Table 4). Few parents prompted their child to eat (positive n = 10; neutral n = 10; control n = 8). Parents who prompted their child did so no more than 4 times in each condition, and number of parental prompts did not differ between conditions ($F(2, 103) = 0.22$, $p = .80$). Most children (67.6%) correctly identified how the models felt (positive = 87.2%; neutral = 55.3%; control = 58.8%). Excluding children who did not accurately identify how the models felt, did not change the overall pattern of results below.

3.2. Acceptance of raw broccoli

5 participants were excluded from video analysis due to recordings being inadequate for measuring children's willingness to try raw broccoli (e.g., could not see child's interaction with the broccoli), thus the sub-sample for this analysis consisted of 106 children. Sixty-seven percent of children swallowed at least one bite of the raw broccoli. One-way ANOVA showed there was no significant main effect of condition on the willingness to try broccoli ($F(2, 103) = 1.78$, $p = .18$, $\eta_p^2 = .03$; Figure 1).

13 participants were excluded from video analysis due to inadequate recording for measuring children's frequency of tastes (e.g., could not determine the number of oral exposures), thus the sub-sample for this analysis consisted of 98 children. For the frequency of tastes, one-way ANOVA revealed a significant main effect of condition ($F(2, 95) = 3.67$, $p = .03$, $\eta_p^2 = .07$; Figure 2), whereby frequency of tastes was significantly higher in the

positive compared to the no-food condition (p = .04), but not the neutral condition (p = .11). Neutral and no-food conditions did not differ significantly (p = 1.00).[2]

3.3. Broccoli intake

Raw broccoli was novel for 87.4% of participants. Few children had tried raw broccoli before (positive n = 4; neutral n = 4; control n = 6) and excluding these children did not change the overall pattern of results below. One-way ANCOVA controlling for food fussiness showed that there was a significant main effect of condition on broccoli intake ($F(2, 107) = 3.90$, $p = .02$, $\eta_p^2 = .07$; Figure 3). Bonferroni corrected t-tests showed that broccoli intake was significantly higher in the positive, compared to the no-food condition (p = .03), but not the neutral condition (p = .10). Neutral and no-food conditions did not differ significantly in their effects on broccoli intake ($p > 0.05$).

4. Discussion

This study aimed to test the effect of models' FEs whilst eating raw broccoli on children's acceptance and intake of raw broccoli. The findings indicate that 4-6-year-old children who were exposed to unfamiliar adult models expressing positive FEs whilst eating broccoli had significantly more tastes and intake of raw broccoli than children who were exposed to a no-food control video. However, contrary to the hypotheses, models' FEs whilst eating broccoli did not significantly influence initial willingness to try broccoli.

Children who were exposed to adults showing enjoyment whilst eating broccoli consumed on average more than double the amount of broccoli in the positive condition (11g), than children in the control condition (5g). This finding is consistent with research which showed that exposure to pleasure FEs from adult models increased children's desire to eat disliked foods (Barthomeuf et al., 2012) and builds on this by demonstrating that

[2] p = 1.00 due to Bonferroni correction

observing positive FEs whilst eating food can increase children's actual intake of a typically less preferred nutritious food.

One explanation for the beneficial effect of positive FEs whilst eating could be that conveying food enjoyment gives the observer information about the safety and palatability of food. This is particularly important when food is novel for children, to protect from ingestion of harmful foods (Dovey et al., 2008). Raw broccoli was novel for most participants, thus children may have eaten more broccoli after watching adults enjoy eating it, because they believed it was enjoyable to eat. However, it is unlikely that eating behaviour was influenced by the perceived safety of food, as most children were willing to try raw broccoli regardless of condition and they were in a safe environment at home. Thus, information about food tastiness rather than safety may be more influential for children in this age range and context.

Unlike intake and frequency of tastes, children's willingness to try broccoli was not significantly influenced by models' FEs. One explanation could be a lack of sensitivity in the measure; most children tried and swallowed the broccoli, irrespective of condition, meaning they scored highly on the scale, even if they consumed little. However, the frequency of tastes was influenced by models' FEs; children showed greater frequency of tastes of broccoli after exposure to models enjoying broccoli, a behaviour which is clearly linked with greater broccoli intake. Thus, positive FEs appear useful for increasing children's tastes and intake of broccoli and given that positive modelling can reduce food neophobia in children (Hendy & Raudenbush, 2000; Greenhalgh et al., 2009), which is associated with lower intake and variety of vegetables (Cooke et al., 2003; Perry et al., 2015), positive modelling may be a useful intervention tool to increase vegetable acceptance. However, since most children tried the broccoli, examining the moderating effect of food neophobia in future work, in a sample which includes more reticent eaters, may help to determine whether positive FEs increase vegetable acceptance and intake for children who are less willing to try vegetables.

There was no difference in children's broccoli intake or the frequency of tastes between positive and neutral conditions. It is possible that children modelled the adults' eating behaviour simply because they observed the models eating the food, as found previously (Addessi et al., 2005; Harper & Sanders, 1975). However, because there was no significant difference between neutral and control conditions, the presence of positive FEs whilst eating food was more important for influencing children's eating behaviour than mere presence of the model eating. Recruiting a larger sample to increase power would help to elucidate this point. Nonetheless, these findings demonstrate the importance of observing others having a positive eating experience on children's eating and highlight the need to include appropriate control conditions to establish the effectiveness of positive FEs for increasing vegetable intake.

This study was conducted remotely using an online platform (Zoom), due to restrictions during the COVID-19 pandemic. This approach was shown to be a viable methodology for examining children's eating and had several advantages. Firstly, it enabled recruitment of families from across the UK, instead of limiting recruitment to local families with time and capacity to travel. Secondly, remote testing reduced the time burden for researcher and participants: there was no travel time and testing could occur outside of the working day. Thirdly, children engaged well in the online study, possibly due to familiarity with using online platforms since the COVID-19 pandemic, and being relaxed in their own home, providing greater ecological validity of eating environment. Fourth, parents and children followed instructions well, and recording eating episodes using Zoom produced good quality video recordings. A further strength of the study was improvement on the use of static images (Barthomeuf et al., 2012; Barthomeuf et al., 2009) by using video stimuli, which allowed children to observe dynamic FEs whilst eating. Indeed, exposure to videos of positive peer modelling have been found to increase preschool children's intake of a modelled vegetable (Staiano et al., 2016), thus, video stimuli are an effective method for exposing children to individuals FEs whilst consuming food.

However, the remote method used in this study had some limitations, such as excluding data from sessions where siblings ate broccoli alongside the participant, because siblings can influence children's eating (Salvy et al., 2008). Another limitation was the presence of, and comments from the parents. However, the number of parental prompts did not differ between conditions, so were unlikely to have affected the results. Limitations were also that most parents were white mothers with a university education, thus did not represent families where F&V is often low. Since parent and child habitual F&V intake was reasonably high, children may have been more likely to try raw broccoli due to familiarity with vegetables (e.g., cooked broccoli) and bitter tastes. Therefore, this study may underestimate the effect of positive FEs on vegetable intake by children who are less familiar with vegetables. Overall, this suggests that more work is needed to establish whether the present findings apply to individuals who need these interventions the most.

This study is the first to demonstrate that exposing 4-6-year-old children to video stimuli of unfamiliar adults expressing positive FEs whilst eating raw broccoli, more than doubles children's intake of raw broccoli. Given this, exposure to adults enjoying food may be a useful strategy for encouraging healthier eating behaviour in children. The emphasis on food pleasure from others can help children to learn pleasure from nutritious foods (Marty et al., 2018), which is an important focus for public health campaigns (Haines et al., 2019). These initial findings could be the basis of a simple intervention encouraging parents to show food enjoyment using FEs, during family eating occasions. However, more work is needed to establish whether these effects are sustained over time, whether a single exposure to positive modelling is adequate, and whether the effect would be similar for familiar but disliked foods.

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Table 1: 7-point scale of children's willingness to try broccoli

Behaviour Category	Description of Behaviour	Example
(1) Physical refusal	Any occurrence of the child physically refusing the broccoli	Turning head away from offered broccoli
(2) Verbal refusal	Any occurrence of the child verbally refusing the broccoli	Child said "I don't want it"
(3) Touched	Any occurrence of the child physically touching the broccoli, but no further interaction with it	Picks up broccoli but puts it back in the bowl
(4) Smelled	Any occurrence of the child smelling the broccoli, such as by picking it up and bringing it to the nose, but no further interaction with it	Smelling the broccoli after picking it up
(5) Placed in mouth	Any occurrence of the child placing the broccoli to or inside the mouth, but no further interaction or its consumption	Putting broccoli into the mouth without biting it, holding it inside the mouth, but refused to swallow
(6) Swallowed but refused	Any occurrence of the child chewing and swallowing some of the broccoli but	Biting off a piece of broccoli, chewing and

	refused further or expressed dislike	swallowing it but refuse another bite
(7) Swallowed and accepted	Any occurrence of the child chewing and swallowing some of the broccoli without a negative reaction	Biting off a piece of broccoli, chewing and swallowing it and eating another piece

Table 2: Mean (SD) sample characteristics for participants in each condition (one-way ANOVA)

		Positive (n = 39)	Neutral (n = 38)	No-Food (n = 34)	*F*	*p*
Parent	Age (years)	37.55 (4.04)	36.92 (4.19)	36.74 (3.99)	0.41	0.67
	Vegetable intake	2.88 (1.34)	3.16 (1.15)	2.54 (1.14)	2.28	0.11
	Fruit intake	2.15 (1.05)	1.92 (1.11)	1.91 (1.22)	0.57	0.57
Child	Males (%)	64.10	52.60	55.90	-	-
	Age (months)	67.97 (9.42)	63.61 (10.70)	64.97 (10.32)	1.87	0.16
	BMI (z-score)	0.21 (1.41)	0.12 (1.57)	0.29 (1.35)	0.12	0.89
	Vegetable intake	2.59 (1.17)	2.36 (1.16)	2.37 (1.15)	0.49	0.61
	Fruit intake	2.83 (1.05)	2.41 (0.92)	2.47 (0.87)	2.21	0.12
	Hunger rating	2.82 (1.28)	2.79 (1.40)	3.03 (1.24)	0.35	0.70
	Minutes since child last ate	100.64 (71.07)	82.95 (84.31)	87.06 (77.89)	0.55	0.58

Table 3: Mean (SD) individual differences for child participants in each condition (one-way ANOVA)

	Positive (n = 39)	Neutral (n = 38)	No-Food (n = 34)	*F*	*p*
CEBQ Enjoyment of Food	3.91 (0.67)	3.89 (0.59)	3.88 (0.73)	0.02	0.98
CEBQ Satiety Responsiveness	2.82 (0.64)	2.75 (0.68)	2.86 (0.56)	0.29	0.75
CEBQ Food Fussiness	2.80 (0.69)	3.03 (0.60)	2.78 (0.74)	1.52	0.22
CEBQ Food Responsiveness	3.12 (0.83)	2.89 (0.60)	2.99 (0.80)	0.90	0.41
CFNS	22.33 (9.14)	24.82 (8.19)	22.76 (9.82)	0.82	0.45

Note. Children's Eating Behaviour Questionnaire (CEBQ); Child Food Neophobia Scale (CFNS).

Table 4: Pearson Correlation coefficients for broccoli intake, willingness to try, frequency of tastes and CEBQ subscales

	1	2	3	4	5	6	7
1. Broccoli intake	-						
2. Willingness to try	.49**						
3. Frequency of tastes	.62**	.45**					
4. Enjoyment of Food	.17	.16	.07				
5. Satiety Responsiveness	-.12	-.18	-.05	-.68**			
6. Food Fussiness	-.21*	-.18	-.12	-.66**	.45**		
7. Food Responsiveness	.07	.01	-.002	.52**	-.46**	-.29**	
8. Food Neophobia	-.18	0.14	-.12	-.62**	.43**	.86**	-.31**

*p < .05, **p < .01.

Figures

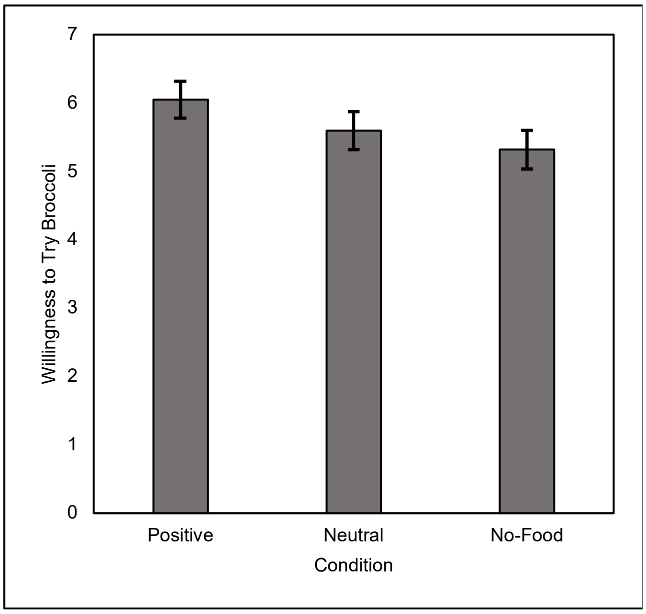

Figure 1: Mean willingness to try raw broccoli split by condition (standard error).

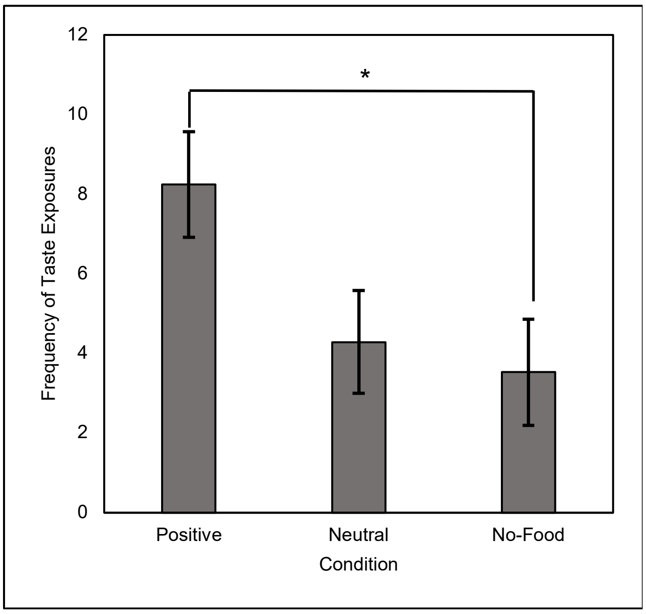

Figure 2: Mean frequency of tastes split by condition (standard error). *$p < .05$.

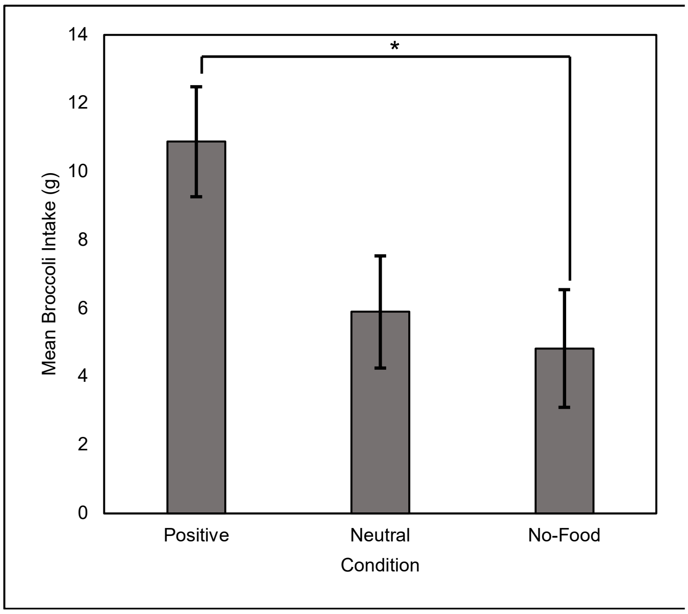

Figure 3: Estimated marginal means of amount (g) of broccoli consumed split by condition (standard error). *p < .05.