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## "They said I'm a square for eating them": Children's beliefs about fruit and vegetables in England

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5 England  
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## 10 11 12 **Introduction**

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14 The health protective effects of fruit and vegetable intake are well established; research  
15 illustrates that consuming a diet high in fruit and vegetables can reduce the risk of developing  
16 coronary heart disease, cancer and stroke (Vainio & Weiderpass, 2006; He *et al.*, 2007;  
17 Oyeboode *et al.*, 2014). This evidence, together with the recognition that dietary habits in  
18 childhood influence dietary behaviour in later life (Kelder *et al.*, 1994; Krebs-Smith *et al.*,  
19 1995; Venter and Harris, 2009), demonstrates the importance of designing interventions to  
20 influence fruit and vegetable consumption from an early age. An essential precursor to  
21 increasing intervention success is an examination of the most salient behavioural determinants  
22 of children’s fruit and vegetable consumption (Baranowski *et al.*, 1997). Investigating beliefs  
23 about fruit and vegetable consumption among children, including their perceptions of possible  
24 barriers and facilitators towards intake, will provide a sound evidence base for dietary  
25 interventions targeted specifically at children.  
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43 A review of quantitative studies by Rasmussen *et al.* (2006) found key determinants of fruit  
44 and vegetable intake during childhood and adolescence to include gender (girls tend to have a  
45 higher fruit and vegetable intake than boys), age, socioeconomic position, high parental  
46 intake, preferences and high availability/accessibility at home. Similarly, a review of 21  
47 studies on determinants of fruit and vegetable consumption found availability, accessibility  
48 and taste preference to be most frequently linked to consumption (Blanchette and Brug,  
49 2006). However, although these findings are extremely useful in giving us guidance  
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3 regarding the extent to which different variables are effective at determining fruit and  
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5 vegetable intake, qualitative studies are able to add to this body of evidence by discovering  
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7 different, and unknown factors, and exploring these factors in greater depth (Krølner *et al.*,  
8  
9 2011).

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14 In a review of 31 qualitative studies investigating determinants of fruit and vegetable  
15  
16 consumption among children and adolescents (Krølner *et al.*, 2011) a number of determinants  
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18 were discovered which complemented those from the quantitative knowledge base including  
19  
20 time, availability, satiation power, sensory attributes and parental and peer influence.  
21  
22 However, the review predominantly included studies based in the US, and studies which  
23  
24 mainly used focus group methodology. Of the 31 studies, only three were from the UK, and  
25  
26 only one of these, (Ross, 1995) was conducted in a primary school population. Findings by  
27  
28 Ross provide an important insight into primary school children's beliefs about healthy eating  
29  
30 in Scotland where research is limited (Krølner *et al.*, 2011), yet this solitary piece of research  
31  
32 was conducted over 20 years ago. Ross' findings illustrate that children's food choices and  
33  
34 preferences were not driven by perceptions of what is healthy, or beneficial to their health.  
35  
36 Rather, key determinants included personal food preferences, convenience and social  
37  
38 popularity. Notably, Ross' study was conducted before the introduction of a number of fruit  
39  
40 and vegetable campaigns in the UK including the "five-a-day" campaign (introduced in  
41  
42 2003). The five-a-day campaign has aimed to increase awareness of the importance of fruit  
43  
44 and vegetables among people in the UK, and a further study to examine beliefs since this  
45  
46 drive to promote fruit and vegetable consumption is timely. Although Ross' study provided  
47  
48 interesting findings regarding beliefs about healthy eating, our study examines the barriers  
49  
50 and facilitators towards engaging in *more specific* health protective behaviours (such as eating  
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52 fruit and vegetables), meaning we can gain useful knowledge which can be used for effective  
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3 intervention development. Furthermore, focus group methodology was employed in the  
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5 research, as with the majority of studies in the review by Krølner et al., and this may lead to  
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7 methodological issues since taking part in research alongside peers may hinder discussion  
8  
9 regarding peer influences (Kirby *et al.*, 1995).  
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14 The current preliminary study aims to extend the limited knowledge base within England by  
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16 using individual interviews with children aged 9 – 11 years in a primary school setting to  
17  
18 explore their beliefs towards eating fruit and vegetables. This specific participant age group  
19  
20 was sampled because of the increased prevalence of obesity at this age (21.9%; Public Health  
21  
22 England, 2015). The area where the primary school is situated is one of the most deprived  
23  
24 areas in England (Public Health England, 2015), so this study not only adds to the existing  
25  
26 literature from England, but also explores the beliefs of children who are from a low  
27  
28 socioeconomic group who are typically likely to eat poor quality diets (Darmon and  
29  
30 Drewnowski, 2008). Furthermore, by focusing on the specific behaviour of consumption of  
31  
32 fruit and vegetables (rather than focusing on “healthy eating” in general), it was anticipated  
33  
34 that these beliefs will provide specific information that can be used to inform the focus of  
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36 interventions that are designed to change children’s eating behaviour.  
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## 43 **Method**

### 44 *Participants*

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46 All children (n = 15) who were attending an after school club at a primary school in Telford  
47  
48 and Wrekin Local Authority (situated in the West Midlands, UK), were asked if they were  
49  
50 willing to be interviewed about their beliefs towards fruit and vegetables. The after school  
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52 club was based within the school environment, was open to all pupils and had the purpose of  
53  
54 providing wrap around care for children with working parents. Parental consent was gained  
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3 for 11 children (73% of those initially approached) and these children comprised the final  
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5 sample. While there is a lack of consistent rules regarding the size of the sample in qualitative  
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7 investigations (Patton, 2015), this sample size was deemed adequate in accordance with  
8  
9 suggested guidelines for thematic analysis (Braun and Clarke, 2013). Participants were aged  
10  
11 between nine and 11 years (mean = 10 years, SD = 0.77); eight were female and three were  
12  
13 male. In terms of ethnicity, the sample was predominantly White British (n = 9) with the  
14  
15 remaining two participants being of White/Black Caribbean ethnicity, reflective of ethnic  
16  
17 proportions of pupils in the school (86% White British).  
18  
19

### 20 21 22 *Materials*

23  
24 The data were gathered through semi-structured one-to-one interviews. This approach was  
25  
26 chosen over focus group methodology due to its suitability for the focus of the study;  
27  
28 exploring experience type research questions and those relating to individual participant  
29  
30 perceptions (Braun and Clarke, 2013). An interview schedule consisting of six questions was  
31  
32 prepared to elicit beliefs and elements of underlying motivation about fruit and vegetables.  
33  
34 Questions included: ‘What do you think are the good/bad things about eating fruit and  
35  
36 vegetables?’ and ‘What makes it easier/more difficult for you to eat fruit and vegetables?’ In  
37  
38 addition, participants were asked for their age and prompts were used to encourage children to  
39  
40 expand on their thoughts where necessary. Prompts were individual to each interview and did  
41  
42 not ask about specific fruits or vegetables; they were used to engage the participants in a more  
43  
44 detailed discourse of their beliefs from previous answers given.  
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### 50 51 52 *Procedure*

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54 After gaining ethical approval from [name deleted until published] ethics committee, fifteen  
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56 children attending the after school club were invited to take part in the research through a  
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3 letter of invitation sent home to parents. Parental informed consent was obtained through an  
4  
5 'opt in' consent form, alongside verbal consent from 11 of the invited participants. Prior to  
6  
7 interviewing, all participants were given an age-appropriate information sheet briefly  
8  
9 outlining the study. Interviewing took place in a private room at the after school club, **where**  
10  
11 **the interviewer (the third author), who was not known to the children, initially introduced**  
12  
13 **herself, and the participants were reminded** of their rights to withdraw **and that they would be**  
14  
15 **given a pseudonym to protect their identity.** Interviews lasted up to twenty minutes and after  
16  
17 11 interviews were conducted, saturation of themes was evident in the data **with no new**  
18  
19 **themes arising** (Morse, 1995).  
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25 Each audio taped interview was transcribed verbatim and analysed using inductive thematic  
26  
27 analysis following guidelines from Braun and Clarke (2006). Within this paper a realist  
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29 approach was adopted where, rather than trying to fit data into a particular theory or  
30  
31 framework, themes were formed which have been guided by the data. Firstly, each transcript  
32  
33 was read several times independently by authors one and three to become familiar with the  
34  
35 data and then one interview at a time was selected for analysis with possible codes generated  
36  
37 systematically for any text that appeared relevant or interesting. Once all the data were  
38  
39 initially coded, transcripts were compared with each other and the codes were collated into  
40  
41 potential themes. Significant statements were extracted from the transcripts in support of each  
42  
43 of the themes. At this stage of the analysis several master themes were identified and these  
44  
45 were checked in relation to the coded extracts and the whole of the interviews to ensure they  
46  
47 were rich enough in evidence. The **first** and **third** authors conducted this entire process  
48  
49 independently to increase the validity and reduce interpretive bias. **Following this, the authors**  
50  
51 **had a full day meeting where they discussed their analyses, and reached agreements through**  
52  
53 **in depth discussion regarding the composition, names and definitions of themes.**  
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5 The interpretive role of the researcher is key a feature in thematic analysis, therefore it is  
6 important to take researcher backgrounds into consideration due to their potential impact on  
7 the interpretation of the data. The first author is a Caucasian female university lecturer, who  
8 had previously conducted research into healthy eating attitudes and behaviour, while the third  
9 author is also a Caucasian female, who was at the time a trainee health psychologist working  
10 on a programme to improve nutrition in families in a low income area.  
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## 20 **Results**

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22 On analysis six master themes were identified; ‘effect on the senses’, ‘feelings about food’,  
23 ‘healthy versus unhealthy foods’, ‘effects on health’, ‘convenience’ and ‘family and friends’.  
24 While each of these themes dealt with different beliefs about fruit and vegetable intake they  
25 were also interrelated. Each master theme will now be briefly discussed and quotes presented  
26 to illustrate points throughout, using pseudonyms to protect the identity of the participants.  
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### 36 *Theme 1: Effect on the senses*

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38 While fruit and vegetable intake is often linked to taste, several participants also judged their  
39 intake on the smell, appearance and texture of the foods they had tried. Some of the children  
40 associated fruit and vegetables with a positive taste using words such as ‘sweet’ and ‘nice’ to  
41 describe the foods, whereas others associated fruit and vegetables with a negative taste using  
42 words such as ‘funny’: ‘*some of them taste funny*’ (Julie, aged 10) and ‘minging’: ‘*erm,*  
43 *mushrooms always taste minging*’ (Ruth, aged 10).  
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54 Participant: ‘*Some of them taste quite nice... some of them don’t taste that nice*’.

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56 Interviewer: ‘*What do you think are the bad things about eating fruit and vegetables?*’  
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3 Participant: *'Sometimes they can taste really, really horrible'*. (Lizzy, aged 11)  
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7 The texture of fruit and vegetables, mainly in the mouth, was also important to some of the  
8 children. For example, Rachael commented that she didn't like pears because they are too  
9 hard, whereas Christopher said he didn't like mushrooms because of the softness. Two  
10 participants when discussing their beliefs about eating fruit and vegetables compared the  
11 texture of these foods to what it would be like if they were eating animals. For example, here  
12 is how two children described eating mushrooms, a negatively perceived food highlighted by  
13 the children themselves in the discourse:  
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25 Interviewer: *'Why don't you like mushrooms?'*

26  
27 Participant: *'It's just the flavour of them and how soft they are. They make me feel like*  
28 *I'm eating a small furry animal'*. (Christopher, aged 9)  
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34 *'They [mushrooms] taste like slimy worms and they are yuck'*. (Ruth, aged 10)  
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39 In addition to taste and texture, some of the children also associated some fruit and vegetables  
40 with a negative appearance and/or aroma suggesting that some are less appetizing to look at  
41 and smell more unpleasant than others.  
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48 Interviewer: *'What makes it difficult for you to eat fruit and vegetables?'*

49 Participant: *'Sometimes they look minging and look really gooey and horrible'*.

50  
51 Interviewer: *'And does that put you off?'*

52 Participant: *'Yeah'*. (Ruth, aged 10)  
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3 *'They stink!' [onions]'* (Lauren, aged 10)  
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7 Finally, several of the children believed that disguising fruit and vegetables using various  
8 methods such as covering these foods up with sauces and mashing them in with other foods  
9 made them easier to eat. Disguising vegetables in this way would help to cover up the effect  
10 that fruit and vegetables have on the senses, such as negative tastes and textures, as mentioned  
11 above by some of the children.  
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21 Interviewer: *'What makes it easier for you to eat fruit and vegetables?'*

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23 Participant: *'When you have your Sunday dinners with vegetables to mash them in*  
24 *with your potato'.* (Keera, aged 9)  
25  
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28  
29 *'If it was mixed in with a like a... err... a kinda sauce, and with sauce and meat and*  
30 *everything, and vegetables in there, and like a stir fry and everything'.* (Lizzy, aged  
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#### Theme 2: Feelings towards fruit and vegetables

Some of the children spoke about fruit and vegetables with strong emotions which was important in maintaining their beliefs about these foods. One of the participants, Christopher had mixed feelings, using words such as 'love' and 'hate' to describe his feelings towards eating fruit and vegetables.

Interviewer: *'Is there anything you don't like about fruit and veg?'*

Participant: *'No, I love them... There are some I hate'.* (Christopher aged 9)

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3 Several of the children also felt eating fruit and vegetables was a chore, commenting that they  
4  
5 have to eat fruit and vegetables, using words like 'got to' and 'forced to' when describing  
6  
7 their feelings. This implies that it was an activity that had to be undertaken regardless of  
8  
9 choice. Other children talked about how they needed to be forced to eat fruit and vegetables;  
10  
11 with Ruth emphasising how long these foods take her to eat.  
12

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15  
16 *'Yeah, I do say that I have five fruit and veg a day, but lately I have to be forced to eat*  
17  
18 *about four, but I have to have to eat them slowly as it takes ages to eat one'.* (Ruth,  
19  
20 aged 10)  
21  
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### 23 24 25 *Theme 3: Healthy versus unhealthy foods*

26  
27 Fruit and vegetables were often weighed up against unhealthy foods, which the children  
28  
29 explained were foods such as chocolate, crisps and sweets. Most of the children were aware  
30  
31 of the benefits of eating healthy rather than unhealthy foods which contain extra ingredients  
32  
33 added during their production, such as salt and sugar: *'You get energy that lasts, it's [fruit and*  
34  
35 *vegetables] not full of sugar'* (Darren, aged 10). Yet some children still commented that they  
36  
37 had a preference for unhealthy foods. The appeal of foods such as chocolate and sweets had a  
38  
39 tendency to be associated around desire, taste and accessibility.  
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45 Interviewer: *'What do you think are the bad things about eating fruit and vegetables?'*

46  
47 Participant: *'Erm that it doesn't taste as nice as some other things like sweets'.*

48  
49 (Alexei, aged 9)  
50  
51  
52

53  
54 *'When there are erm lots of chocolate and crisps and things like that, and I want them*  
55  
56 *more than fruit and vegetables'.* (Lizzy, aged 11)  
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5 Unhealthy snacks like chocolate were also seen as a reward for one participant who  
6  
7 commented that her grandmother buys them to spoil her. For Ruth this means she doesn't  
8  
9 need to ask her mother to buy her chocolate, which she said she finds amusing.  
10  
11

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14 Interviewer: *'What does your grandma do? What does she say?'*

15  
16 Participant: *'She says "you do need to eat more fruit and veg instead of than crisps  
17  
18 and chocolate", but I get spoiled by her [grandmother] anyway, because she buys me  
19  
20 the chocolate.'*

21  
22 Interviewer: *'Does she? [Laughs]'*

23  
24 Participant: *'[Laughs] yeah, it's quite funny actually, because I don't have to ask my  
25  
26 mum at the shop'. (Ruth aged 10)*  
27  
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#### 31 *Theme 4: Effects on health*

32  
33 The ability to **be more active** from eating fruit and vegetables emerged as a sub-theme from  
34  
35 some of the interviews. For instance, about half of the children reported that fruit and  
36  
37 vegetables give you energy to enable you to be physically active.  
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42 Interviewer: *'What do you think are the good things about eating fruit and  
43  
44 vegetables?'*

45  
46 Participant: *'Makes your energy go really, really high, so you're bouncing and stuff'.  
47  
48 (Lauren, aged 10)*  
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53 Two of the children (Ruth and Keera) also mentioned that eating fruit and vegetables helps to  
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55 control body weight emphasising that these foods help you to lose weight.  
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5 Interviewer: *'What do you think are the good things about eating fruit and*  
6 *vegetables?'*  
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8  
9 Participant: *'You lose weight'*.

10  
11 Interviewer: *'You lose weight. Why do you lose weight?'*

12  
13 Participant: *'Because you are eating healthy, instead of chocolate and crisps'* (Ruth,  
14  
15 aged 10)  
16  
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18  
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20 When discussing the benefits of eating fruit and vegetables, several of the children also  
21 mentioned that they gain nutrients from eating these foods, which has a positive and  
22 protective impact on health: *'They [fruit and vegetables] are healthy and it's good for my*  
23 *teeth'* (Keera, aged 9). The most commonly cited nutrients were fibre, vitamins and calcium.  
24  
25 This display of knowledge shows that some of the children are insightful into the reasons why  
26  
27 we need to have fruit and vegetables in our diet.  
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36 *'Well if you eat fruit and vegetables then you are going erm [to] get a bit of calcium in*  
37 *your body, and it's good for your health'* (Eloise, aged 11)  
38  
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40  
41  
42 *'They get lots of fibre in you'*. (Lizzy aged 11)  
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46  
47 *'All the vitamins inside of the fruit'*. (Julie aged 10)  
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49

50  
51 In addition to identifying the positive health benefits of eating fruit and vegetables, some of  
52 the children also mentioned some negatives. This included comments about how eating too  
53  
54 much fruit could be potentially harmful for your body and have a negative impact on body  
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3 size. On further prompting, it was found that [these beliefs were](#) associated with the view that  
4  
5 eating more than the recommended amount of five portions a day would be harmful to health.  
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8  
9 Interviewer: *'What do you think are the bad things about eating fruit and vegetables?'*

10  
11 Participant: *'Erm, if you eat too many then it's becomes a habit and may like erm*  
12  
13 *change in size... it's like get a bigger type of figure maybe''*. (Eloise, aged 11).  
14  
15

16  
17  
18 *'If you eat too much of it a day then it can get to bad for you because you are only*  
19  
20 *meant to eat five portions a day, so if you eat over that it could do you some harm'*

21  
22 (Rachael, aged 11)  
23  
24  
25

26  
27 In addition to the above, two of the children also discussed how fruit and vegetables had  
28  
29 resulted in negative health consequences. This included vomiting and 'heaving' as mentioned  
30  
31 below by Lauren and Keera.  
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35  
36 *'When you don't like it, you heave on it'*. (Lauren, aged 10)  
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39  
40 *'I don't like sprouts, cabbage, peas and carrots... because when I last tried them I was*  
41  
42 *sick and everything, and I didn't like it'*. (Keera, aged 9)  
43  
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#### 46 47 *Theme 5: Convenience*

48  
49 Increased accessibility to fruit and vegetables for Rachael, Darren and Matthew made it easier  
50  
51 for these children to eat these foods.  
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3 *'Well our fruit is kept at the side, so I can just pick a piece up instead of a chocolate*  
4 *bar ... and vegetables we have every day with our meals'. (Rachael aged 11)*  
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8

9  
10 For Darren and Matthew increased accessibility was made more convenient by someone else  
11 (their mothers) putting these foods on their dinner plate. Although this requires little effort, it  
12 helps to illustrate how influential the behaviour of parents can be at this age.  
13  
14

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18 Interviewer: *'What makes it easier for you to eat fruit and vegetables?'* (Interviewer)  
19

20 Participant: *'Mum putting it on plate and giving it to me to eat, so I have to eat it'.*  
21

22 (Matthew, aged 10)  
23  
24  
25  
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27 The way that the fruit and vegetables were prepared also increased children's accessibility to  
28 these foods. For instance, some of the children believed that it was easier to eat fruit if you  
29 sliced it into pieces.  
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36 *'You could just cut them up'. (Keera, aged 9)*  
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40 *'It's harder to eat when it's like full...So when you slice it, it's better'. (Lauren, aged*  
41 *10)*  
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47 Several of the children also commented that having fruit and vegetables mixed together or  
48 prepared in sauces or soups made it easier for them to eat, through either reducing their size or  
49 [disguising them](#).  
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3 *'Mix them all, and just say you like something... and you hated some, you mix with the*  
4 *ones you like and you don't know'. (Keera, aged 9).*  
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9  
10 Although some of the children believed that having fruit and vegetables prepared in slices  
11 makes it more accessible and convenient for them to eat, it actually seems that preparation per  
12 se is a barrier they may face and have to overcome before consumption.  
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15  
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17  
18 *'Erm, you can just pick some things up to eat, whereas some things you have to*  
19 *prepare'. (Alexei, aged 9)*  
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25 The amount of effort that the children have to put into preparing fruit and vegetables could  
26 also have an influence on their access to these foods.  
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30  
31 *'When they're like in pieces and in chunks, it's quite hard because I have to keep on*  
32 *cutting them up all the time'. (Christopher, aged 9)*  
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37  
38 The lack of available fruit and vegetables was another convenience barrier that one of the  
39 children faced prior to consumption. During her interview Keera discussed the lack of  
40 availability of fruit and vegetables in her home due to the high cost of purchasing these foods  
41 and the fact that her brother consumes them in large quantities.  
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48 *'We don't buy much fruit and vegetables... because my brother loves them. He eats*  
49 *them as well and gives them out [to his friends]... we don't have much money and they*  
50 *cost a lot of money'. (Keera, aged 9)*  
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3 *Theme 6: Family and friends*  
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5 This final theme relates to how the participants felt the social environment in which they live  
6 influenced their intake and beliefs about fruit and vegetables. This includes influences from  
7 the people they are related to and the people they socialise with. For the majority of the  
8 participants, the family unit (namely parents, siblings, cousins and grandparents) were seen as  
9 positive social influences. Reasons given by some of the participants for why family members  
10 would want them to eat fruit and vegetables included for health, for variety of diet, weight  
11 loss and growth.  
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23 *'My mum and dad ... just want to make [me] healthy... and lead a healthy life'.*

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25 (Darren, aged 10)  
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30 *'They keep on saying I need to keep eating more fruit and vegetables to keep winning*  
31 *the competitions'.* (Christopher, aged 9)  
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36 Whilst talking about their families, the children tended to mention the female members more  
37 than male members as having a positive social influence. This included mothers and  
38 grandmothers and probably reflects the fact that mothers tend to be the main food providers in  
39 households. Several of the participants also reported that their mothers and/or grandmothers  
40 provided them with advice about fruit and vegetables and/or made sure they have access to  
41 fruit and vegetables to eat.  
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51 *'Erm, my Nan wants me to eat both... and my mum wants me to eat fruit'.* (Rachael,  
52 aged 11)  
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3 Family members that were not portrayed as positive social influences were some of the  
4 participants' brothers. For example, Eloise mentioned that their brother teased her by eating  
5 chocolate in front her when she had to eat some fruit. Furthermore, Keera mentioned that her  
6 brother was one of the reasons why her family do not buy many fruit and vegetables (see  
7 Theme 5: *Convenience*). This is due to him eating too many and handing them out to friends.  
8 Although Keera does stress that her brother loves eating fruit and vegetables which is  
9 positive, his indulgent behaviour has a negative influence on her accessibility to these foods.  
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20 There was limited evidence in the interviews of the positive social influences of participants'  
21 friends in encouraging the consumption of fruit and vegetables, with only three children  
22 talking about friends: '*my best friends*' (Lizzy, aged 11) when asked who they think would  
23 want them to eat more fruit and vegetables. More commonly, participants perceived their  
24 friends as negative social influences. For instance, Ruth and Lauren report that their friends  
25 see them as 'stupid' or 'square' for eating fruit and vegetables.  
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36 Participant: '*My friends, because they said I'm a square for eating them*'.

37 Interviewer: '*They think you are a square?*'

38 Participant: '*Yeah for eating the vegetables*'

39 Interviewer: '*Okay why do they think you are a square? What do they think is square  
40 about it?*'

41 Participant: '*They think it's too healthy and all that stuff*'. (Ruth, aged 10)

42 Interviewer: '*Why don't your mates want you to [eat fruit and vegetables]?*'

43 Participant: '*Because they think it's a bit stupid... they say that you should eat junk  
44 food and stuff*' (Lauren, aged 10)  
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5 There were also several comments from the participants about how they need to seek  
6 permission to access unhealthy foods, although it wasn't always mentioned by whom the  
7 authority was governed.  
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14 *'Well sometimes I get allowed to eat unhealthy and I get chocolate and crisps, and*  
15 *toffee and things like that, so I eat all that'. (Matthew, aged 10)*  
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21 The need to seek permission from family members is emphasised by Ruth, who mentions that  
22 she would normally have to seek parental permission to buy chocolate, however as her  
23 grandmother buys it for her instead she doesn't need to ask her mother to do so (see Theme 3:  
24 *Healthy versus Unhealthy Foods*).  
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### 30 31 **Discussion**

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33 It is encouraging that many of the six master themes which emerged from this study reflect  
34 those identified by earlier research in a **Scottish** sample (Ross, 1995). Furthermore, many of  
35 the themes enhance those illustrated in the review by Krølner et al. (2011) particularly in  
36 relation to the importance of peer influence on fruit and vegetable consumption in younger  
37 children. It is also encouraging that many of the children in the present study, **despite growing**  
38 **up in one of the most deprived areas of the UK, with higher levels of child obesity and lower**  
39 **life expectancy (Public Health England, 2015)**, seemed to be aware of the health benefits of  
40 eating a healthy diet and have a good understanding of what it means to eat healthily. This was  
41 demonstrated by their discussion of how eating fruit and vegetables **is healthy**. **The children**  
42 **reasoned that they were healthy** because they contain important nutrients for health such as  
43 calcium, vitamins and fibre, **and they also identified specific benefits such as being good for**  
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3 teeth and increasing energy levels. However, the findings suggest there are other key factors  
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5 which may play a part in determining children's fruit and vegetable intake. These include the  
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7 sensory attributes of the fruit and vegetables, convenience and availability, and also the  
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9 influence of parents, grandparents, siblings and friends.  
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14 The theme entitled "effect on the senses" suggests that it is not only the *taste* of fruit and  
15  
16 vegetables, but also *texture*, *appearance*, and *aroma* which influence children's food choices.  
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18 This finding reflects those previously reported in the qualitative literature (Atik and Ertekin,  
19  
20 2013; Krølner *et al.*, 2011) and shows that sensory appeal is a key factor to consider when  
21  
22 developing interventions to promote fruit and vegetable intake. Some practical methods were  
23  
24 also suggested for disguising the taste of fruit and vegetables that were not liked, including  
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26 mashing vegetables with other food, or disguising the taste with a sauce. Although disguising  
27  
28 the taste may be a very good short-term solution to encourage fruit and vegetable consumption  
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30 amongst young children, it may not be such a good method for encouraging long term  
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32 acceptance (Pescud and Pettigrew, 2014). Other methods for encouraging children to accept  
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34 and enjoy vegetables and fruit, such as repeated exposure to them have found to be effective in  
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36 the short term as a stand-alone intervention (Wardle *et al.*, 2003; Cooke, 2007).  
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43 The master theme labelled "convenience", incorporated sub-themes of accessibility and  
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45 availability which have been found to be important factors influencing fruit and vegetable  
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47 consumption in children (McKinley *et al.*, 2005; Blanchette and Brug, 2006; Rasmussen *et al.*,  
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49 2006; Krølner *et al.*, 2011) as well as in adults (Kamphuis *et al.*, 2006). Availability and  
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51 accessibility were mainly discussed in terms of parents (or carers) putting fruit and vegetables  
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53 on children's plates at meal times, or in terms of being placed in an accessible position where  
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55 children are able to help themselves. It is interesting that the limited variety of fruit and  
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3 vegetables typically associated with children of lower socioeconomic status (Krølner *et al.*,  
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5 2011) did not emerge from the data. However, as these children live in one of the most  
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7 deprived areas in England, availability and accessibility in terms of the opportunity to buy  
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9 fresh fruit and vegetables within their environment should not be overlooked (Sallis and  
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11 Glanz, 2006). Another factor which seemed to make it more likely for children to eat fruit and  
12  
13 vegetables, was the preparation of the food, e.g. whether it was sliced up, peeled, or a piece of  
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15 food that could readily be picked up and eaten without having to prepare in any way. If fruit  
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17 and vegetable consumption can be increased by simple measures such as making fruits and  
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19 vegetables readily available and easy to eat, canteen-based interventions in schools may be  
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21 effective (Lachat *et al.*, 2009).  
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27 The theme “family and friends” suggests that parents (or carers) are key facilitators for fruit  
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29 and vegetable consumption for this age group which is important due to the effects of a child’s  
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31 home environment on the development of patterns of healthy eating during childhood  
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33 (Rosenkranz and Dzewaltowski, 2008). Parents are not only fundamental in making fruit and  
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35 vegetables available and accessible at home (Hearn *et al.*, 1998), but are also gatekeepers to  
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37 all food available at home (Wansink, 2006; Rosenkranz and Dzelwaltowski, 2008) including  
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39 unhealthy foods, such as sweets and crisps. Throughout the study it was clear that the children  
40  
41 had a preference for unhealthy foods such as chocolate and sweets, and these were often  
42  
43 compared directly with fruit and vegetables in terms of taste, appeal, and rewards.  
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45 Furthermore, some of the children in the present study also discussed the need to seek  
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47 permission to eat foods such as chocolate and sweets, and it was evident that the rewards from  
48  
49 eating unhealthy foods were fuelled by the desire and excitement associated with these foods.  
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51 This theme has also emerged in previous studies. For example, the “appeal of the forbidden”  
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53 was identified as a theme in a study with 7-11 year olds in Turkey (Atik and Ertekin, 2013).  
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3 Restricting access to unhealthy foods, or using unhealthy foods for rewards, can have both  
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5 positive and negative consequences. For example, research has shown that restricting the  
6  
7 availability of snack foods in a school environment can positively impact fruit and vegetable  
8  
9 intake in primary school aged children (Gonzalez *et al.*, 2009). Yet conversely, other research  
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11 shows that using unhealthy foods as rewards for eating healthy foods may not only result in  
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13 increasing the palatability of that particular unhealthy food, but also in decreasing the  
14  
15 acceptability of the healthy food. In addition, parents restricting access to unhealthy foods  
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17 may be unintentionally increasing the desire towards these foods (Savage *et al.*, 2007).  
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19 Children's preferences towards eating fruit and vegetables may therefore not only be  
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21 dependent upon the availability of fruit and vegetables at home, but also the way in which  
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23 parents control children's eating behaviour.  
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29 Finally, for some of the children, the main social barrier was that friends, and sometimes  
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31 siblings (in this case brothers), were the least supportive towards eating fruit and vegetables  
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33 and the negative influences of peers was demonstrated much more strongly than any positive  
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35 influences. Some friends were reported to believe that eating fruit and vegetables is a negative  
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37 social behaviour often due to the perceived 'squareness' of healthy foods and the view that  
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39 'junk' food is better. Brothers were criticized for teasing their siblings about eating fruit and  
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41 vegetables, or for indulging in unhealthy foods such as chocolate and crisps. The findings  
42  
43 regarding peers support those found from other qualitative studies, which similarly suggest  
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45 that there is a strong peer pressure towards eating unhealthy food, rather than towards  
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47 healthier foods such as fruit and vegetables (Krølner *et al.*, 2011). This is an important finding  
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49 in this young age group. Previous literature suggests that peer influences are a particular  
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51 concern for older adolescent children (Krølner *et al.*, 2011), yet evidence from this research  
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53 suggests that negative influences of peers may also be strongly evident in primary school aged  
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3 children. It is possible that the shift from parent to child control over fruit and vegetable  
4 intake (e.g. from cutting up and preparing fruit to expecting the child to do this him/herself)  
5 may start during this period, leading to a rising influence from peers. This shift in influence  
6 may also help to explain the rise in obesity through the years at primary school, which is a  
7 national concern across England (Health and Social Care Information Centre, 2015).  
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16 The influence of older siblings is an intriguing finding that is not well documented in the  
17 existing literature. Although siblings often act as role models for their younger brothers and  
18 sisters which can have a positive effect on behaviour (Whiteman, McHale and Soli, 2011),  
19 teasing can also be a normal part of a sibling relationship, which may sometimes lead to  
20 negative outcomes (Keery, Boutelle, van den Berg, Thompson, 2005). Teasing and even  
21 bullying by peers for eating fruit and vegetables in school has been reported in previous  
22 studies (Krølner *et al.*, 2011). The reasons associated with the low social value of fruit and  
23 vegetables, compared to the high acceptability given to 'junk' food, may be partly due to the  
24 attractive and frequent appearance of 'junk' food in advertisements and television programmes  
25 (Olafsdottir and Berg, 2016), a topic which warrants further detailed investigation. Although  
26 some interventions based upon peer role models already exist (for example the use of the  
27 concept of "Food Dudes"; Lowe *et al.*, 2004), the current findings would suggest that siblings  
28 as well as peers would be useful role models on which to base interventions to promote  
29 healthy eating as a positive social behaviour.  
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49 Although the sample came from a deprived area, and consisted of boys and girls, with ethnic  
50 variation, the results showed there to be a clear belief architecture described by children in this  
51 study and it is reassuring to see that many of the themes emerging from the interviews reflect  
52 those from previous studies (Krølner *et al.*, 2011). One limitation, however, that should be  
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3 noted is that these findings are based on beliefs of a **small sample of** children purposefully  
4 recruited from **the after school club** of one primary school. **The primary school was** situated in  
5 an area which is **in one of** the most deprived areas in England (Public Health England, 2015)  
6 **and it** may be that children from different populations, or even **from** different schools within  
7 this geographical area would have different beliefs. **Indeed, it is also possible that views of**  
8 **the children from the after school club** may differ from children in the rest of the school.  
9 **These are likely to be children who have working parents (in comparison to other children**  
10 **who may have one or both parents who are unemployed), which may influence both shopping**  
11 **and eating practices.**

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16 **Another limitation that should be acknowledged is that** although the **first and third** authors  
17 attempted to minimize bias by analysing the data for themes separately to triangulate the  
18 findings, it is still possible that some bias due to the researchers' interests and backgrounds  
19 may have influenced the categorisation of the themes. **A final limitation is that the interview**  
20 **schedule used in this study asked about fruit and vegetables together and did not distinguish**  
21 **between the two. In future studies it would be useful to ask about them separately, as there is**  
22 **some evidence that interventions are more effective if they are targeted independently**  
23 **(Chapman and Armitage, 2012). Future research would also benefit from exploring the beliefs**  
24 **of younger children, since there is clear evidence that the rate of obesity rises steeply through**  
25 **the primary school years (Health and Social Care Information Centre, 2015).**

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50 In summary, the present findings suggest that although children seem to have a good  
51 awareness of the health benefits of fruit and vegetables, they **can** still hold some negative  
52 beliefs towards these foods. Negative beliefs were associated with sensory attributes such as  
53 taste, appearance and texture, the competing desirability of other, unhealthy foods, **and the**

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3 negative influences by siblings and peers. Suggestions for interventions could include  
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5 increasing the availability of pre-prepared fruits and vegetables in both home and school  
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7 environments, as well as increasing their appeal (e.g. by encouraging children to make  
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9 pictures with different types of chopped fruit, or chopping them into interesting shapes).  
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11 Additionally, an approach to eating more fruit and vegetables which focuses on siblings or  
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13 friends is recommended as friends and siblings would seem to play a key role in terms of  
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15 promoting the consumption of these foods.  
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