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# **Food Norms and Preferences in Schools: is there Pluralistic Ignorance?**

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## Food Norms and Preferences in Schools: is there Pluralistic Ignorance?

### Abstract

*We use behavioural games to identify preferences, beliefs about others' preferences, and higher-order beliefs, amongst adolescents at a UK comprehensive school. Pupils systematically under-rate the attractiveness of 'healthy', and over-rate that of 'unhealthy', foods. The bias is consistently in the direction of higher-order beliefs. Pluralistic ignorance would explain much of the results and seems clearly instantiated in one case.*

Keywords: social norms, behavioural games, childrens' diets, experiment

JEL codes: D03

### 1. Introduction

Schoolchildren's diets are often seen as poor even in many affluent societies, with problems including an under-consumption of fruit and vegetables and over-consumption of processed items (Liu, 2013; Kim *et al.*, 2014). Schools may face a dilemma, since they may wish to improve diets but also need to maintain revenue and avoid waste. If schools simply change menus towards healthier foodstuffs, takings may fall as pupils buy food elsewhere or take packed lunches with low nutritional quality (Evans *et al.* 2010). Understanding the factors guiding children's food choices is therefore important for supporting healthier diets.

In a recent review, Higgs (2015) finds that social norms are a powerful influence on food choice. "Food norms" constitute implicit rules about appropriate eating behaviour. They are thought to influence food choice through motivations for affiliation, acceptance and group identification, and provide information about appropriate quantities and food items (Higgs, 2015; Robinson *et al.*, 2014). For adolescents, peer group norms are particularly important because during this period peers become a more salient reference group and teens experience a more intense need for peer approval and group acceptance (Bradford, 2004; Gardner and Steinberg, 2005; Collins and Steinberg, 2006). Moreover, adolescents themselves have reported peer norms influencing eating (Holmberg *et al.*, 2016; Stead *et al.*, 2011; Stevenson *et al.*, 2007), and recent studies find associations between their reported diets and the perceived behaviour of peers (Lally *et al.*, 2011; Stok *et al.*, 2012, 2014).

Evidence also suggests, however, that children misperceive the dietary choices of their peers, underestimating their average intake of healthy foods (Lally *et al.* 2011; Di Noia and Cullen, 2015). A possible explanation is an influence of social norms on perceived intake. This may take the form of "pluralistic ignorance", meaning that a food norm is falsely believed to be generally internalised. But it is not well-understood what food norms exist amongst schoolchildren, and how these compare to individual preferences and beliefs. Lally *et al.* (2011) note that conventional surveys may be defective to elicit children's norms because of the cognitive difficulty of reporting on what others generally think.

We sample children at a UK comprehensive school. We use a questionnaire to elicit preferences, incentivised guessing games to elicit first order beliefs about others' preferences, and incentivised coordination games to elicit higher order expectations constitutive of norms. We keep the survey format and rating scale identical across treatments, varying only the initial question asked.

A cost of this approach is that we do not distinguish operationally between injunctive norms, that is, how socially acceptable foods are amongst peers, and descriptive norms, that is, stereotypical preferences. Advantages are that potential for demand effects across treatments is minimised, and that the response distributions can be straightforwardly compared.

## 2. Experimental Design

We deploy a questionnaire, with items comprising conventionally healthy and unhealthy foodstuffs. We use a 4-point, ordinal, desired frequency scale:

- 1 = "something I don't want to have at all,"
- 2 = "something I don't want to have often"
- 3 = "something I want to have from time to time"
- 4 = "something I want to have often"

The same questionnaire is administered under three conditions. In "Coordinate", pupils state what the most common response will be. A pre-announced prize is awarded for the most correct answers. Since the other respondents are also attempting to give the most common response, this constitutes a 'pure coordination game' (Mehta et al 1994; Bardsley et al. 2010), with multiple identical Nash equilibria. Coordination games have been used to identify social norms, on the grounds that the shared expectations that constitute norms are what enable subjects' responses to converge (Krupka and Weber, 2013; Burks and Krupka 2013; Gächter *et al.* 2013). We operationalise the norm as the mode, since this constitutes the correct answer. In "Answer", pupils are asked simply to state their own preferred intake for each item.

In "Guess", pupils guess what the most common response has been in Answer, again with a pre-announced prize. The Guess condition elicits beliefs concerning others' preferences. Unbiased beliefs imply the same mode here and in Answer.

We test the following hypotheses:

- 1) modal choice is the same in Guess and Answer
- 2) modal choice is the same in Answer and Coordinate

Since distinct food items are considered, and distinct configurations of preferences, beliefs and norms may exist in relation to a given food item independently of others, we test 1) and 2) for each item separately, rather than in an aggregate test. Pluralistic ignorance requires 1) and 2) to be rejected, since 1) characterises unbiased beliefs about preferences and 2) characterises an internalised norm. Alternatively, one might theorise in the manner of standard microeconomics that expectations are rational, and that responses in Coordinate and Guess derive from unbiased expectations about responses in Answer. In that case hypotheses 1) and 2) would stand.

For each hypothesis and each food item, we observe whether the modes of the distributions coincide. Since no formal hypothesis test of modal coincidence exists, we deploy a two-sided non-parametric test of central tendency to judge formally whether the responses are drawn from the same distribution. A test of central tendency retains the ordinal information in the rating scale, whereas a categorical test would not. We reject a hypothesis if two modes diverge and the test statistic is significant (following Bardsley *et al.*, 2010).

### 3. Procedures

We surveyed 54 children aged 14-15 at a North of England comprehensive school in 2015, under two protocols. In the first (N=30) pupils responded under Answer followed by Guess conditions, and in the second (N=24) Coordinate followed by Answer. Guess and Coordinate were incentivised using £10 music store vouchers. 6 items were included typically regarded as healthy and 6 as less healthy. A question was also included on whether children were influenced by peers in their food choices.<sup>1</sup> All surveys were paper-based and communication was not allowed. Each pupil marked another child's script for a subset of the questions, to determine winners in the Guess and Coordinate condition. Data collection was via anonymous survey sheets in all cases, but the most common responses were established by a show of markers' hands for the purpose of awarding prizes.

### 4. Results

Frequency distributions of responses are shown for 'healthy' and 'unhealthy' items in Figure 1 below. A broadly consistent pattern is evident, whereby norms are positive (rating 3 or 4) for 'unhealthy', and negative (1 or 2) for 'healthy', food items, whereas modal preferences are sometimes positive for healthy and negative for unhealthy items. The attractiveness of healthy items is systematically under-rated and that of unhealthy items is over-rated.

Generally, modes differ between Answer and Guess (9/12 cases), and Answer and Coordinate (8/12 cases). Differences in modes, and test statistics, are summarised in Table 1 below. Statistically, it is debatable in the context of Table 1 whether to apply an adjustment for multiple comparison (Perneger, 1998, Mayo and Cox, 2006). We present the table with and without such adjustment, but concentrate on the adjusted values to avoid false positives.<sup>2</sup>

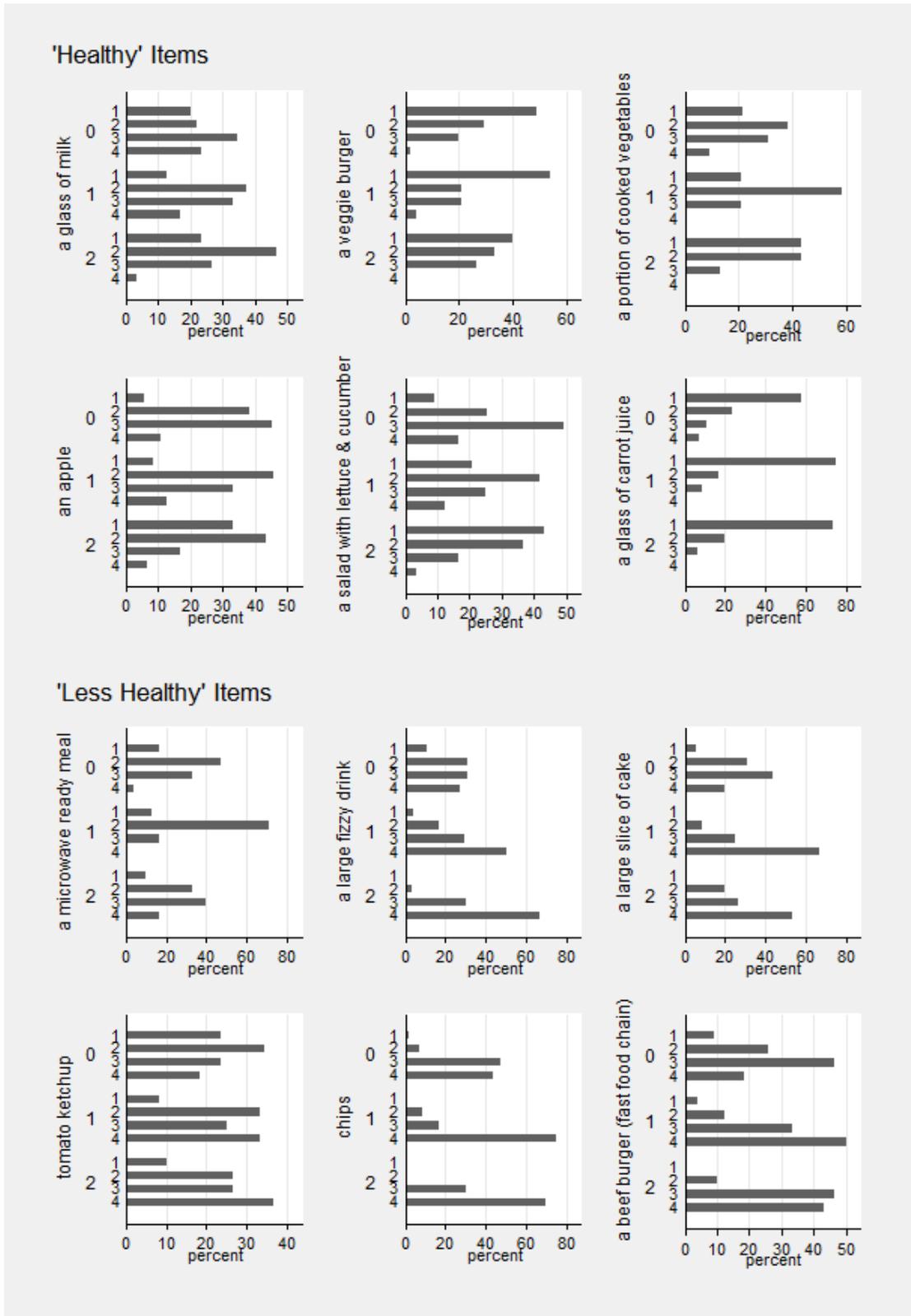
Hypothesis 1 is rejected at or below 5% corrected significance in 7/12 cases, and hypothesis 2 is rejected in 2/12 cases. With one exception the signs of modal differences are reversed across the healthy and unhealthy items. Food norms are, with the same exception, consistent with the direction of bias: where the norm is positive (negative), popularity is over (under)-rated.

From Table 1, pluralistic ignorance is observed for cakes, in that both hypotheses are rejected at the 5% level or below, and the direction of bias is in the direction of the norm. In a further 6 cases, results are directionally consistent with pluralistic ignorance but either or both comparisons lack statistical significance after correcting for multiple comparison. It should be noted that sample sizes in the current study are small.

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<sup>1</sup> The questionnaire also included items not reported here which did not have a focus on social norms in relation to healthy and unhealthy foods. These included items designed to test which foods were salient in a non-normative sense, to elicit attitudes towards 'food bullying', and items trialling alternative rating scales. For full details see the Appendix. We report Question 5 with the exception of one item (home-made beef burger) which is neither conventionally healthy nor unhealthy.

<sup>2</sup> We apply Hochberg's 'step-up' procedure, which ranks among the highest power adjustments and is robust to positive correlation, treating the healthy and unhealthy items as distinct families. This renders the 4 results from Table 1 with p-values in the range  $0.016 \leq p \leq 0.05$  non-significant.



**Figure 1: Frequency distributions of rating scale responses**

Notes

- 0 = Answer; 1 = Coordinate; 2 = Guess

	Item	Norm (Coordinate mode)	Modal Change Guess - Answer	Modal Change Coordinate - Answer	Guesses Under: Over Modal Answer
<b>'Healthy' Items</b>	A veggie burger	1	0 (0.16)	0 (0.56)	n/a
	A glass of carrot juice	1	0 (0.14)	0 (0.03)	n/a
	A glass of milk	2	-1 (.03)	-1 (.58)	21:1
	A portion of cooked vegetables	2	<b>-0.5 (.01)*</b>	0 (.18)	13:4
	An apple	2	<b>-1 (.00)*</b>	-1 (.49)	23:2
	A salad with lettuce & cucumber	2	<b>-2 (.00)*</b>	-1 (.04)	24:1
<b>'Less Healthy' Items</b>	A microwave ready meal	2	+1 (.10)	0 (.33)	3:17
	A large fizzy drink	4	<b>+1.5 (.00)*</b>	+1.5 (.03)	1:29
	A large slice of cake	4	<b>+1 (.00)*</b>	<b>+1 (.01)*</b>	6:16
	Tomato ketchup	3	<b>+2 (.00)*</b>	+1 (.11)	3:19
	Chips	4	<b>+1 (.00)*</b>	+1 (.08)	0:21
	A beef burger (fast food chain)	4	0 (.00)*	<b>+1 (.00)*</b>	3:13

**Table 1: differences in mode, and changes in central tendency**

Notes:

1. For bi-modal distributions, the “mode” is defined as the mid-point between the two modes
2. Uncorrected p-values in parentheses are for the 2-tailed Wilcoxon signed ranks test for Answer vs. Guess (N=30) and Answer vs. Coordinate (N=24). \* indicates significance at 5% level or below after applying Hochberg’s (1988) procedure for multiple comparison.
3. Figures are in bold wherever (corrected)  $p < 0.05$  and there is a difference in mode
4. The ratio of over- to under-estimates of desired intake in column 4 is only informative when the distribution of preferences has an interior mode (value 2 or 3), since exterior modes necessitate errors in one direction only.

For a second measure of biases in beliefs, we also consider the ratio of under-estimates to over-estimates of desired frequency of intake, shown in the rightmost column of Table 1. Under pluralistic ignorance, these ratios should follow the norm. That is, if a norm favouring intake is not actually internalised but is believed to be, this should cause overestimates of its desired frequency of intake. Conversely, in the corresponding circumstances, a norm against a food item would result in systematic underestimates of its desired rate of consumption. The consistency of the results with this pattern is striking. We do not offer a statistical test for this, however, as it was not pre-planned. Overall, 26/30 pupils under-rated the popularity of healthy foods in rows 3-6 of Table 1 more often than they over-rated it, compared to just 1/30 who over-rated it more often. The corresponding figures for unhealthy foods are 1/30 and 29/30 respectively.

## 5. Discussion

Our results provide evidence of pluralistic ignorance one food item, and are directionally consistent with this phenomenon for most items tested. Norms consistently favour unhealthy items and disfavour healthy ones. Preferences in some cases favour healthy items or disfavour unhealthy ones, but pupils seem generally to believe that preferences and norms are aligned. It will therefore be likely that pupils often make choices that do not reflect their own preferences, in order to conform. This would be consistent with the view of the headmaster (personal communication) that the children in some sense agree that they ought to be making healthy choices, and understand which choices are healthier, but typically fail to do so at school. It may also explain childrens' underestimation of peers' intake of healthy food (section 1). An exception to the general pattern of results is microwave ready-meals, an unhealthy item where the norm is unfavourable. In this case however, the item is not consumed at school. So this may be a parental, rather than peer group, norm.

Our interpretation involves an assumption about causality, that norms drive behaviour and beliefs about preferences, which cannot be directly inferred from survey data. The prior likelihood is strong that norms influence behaviour, however (Edgerton, 1985), and such influence seems to imply belief in their internalisation, to underpin compliance and enforcement. The implications are that campaigns directed at children need to address the social norm, not merely information about health characteristics of food or the importance of healthy eating.

Our questionnaire also collected some information regarding perceived choices. We asked children whether they tried to "fit in" when choosing food. Although less than 20% of pupils answered positively in Answer, over 40% of pupils predicted a positive answer in Guess, indicating a widespread perception of norm compliance by others

From a public health policy perspective, a misperceived discrepancy between self and others opens up the potential to influence young people's diets by modifying the perceived norm through making public the true distribution of behaviours and peer group attitudes. Our results indicate that salads, fizzy drinks and cakes would be among appropriate cases to concentrate on. The logic behind such intervention is to lower social pressure to conform by showing that personal attitudes and behaviour are shared in the group and therefore acceptable. This should also reduce the perceived universality of norms and therefore their prescriptive power (Prentice and Miller, 1993). Examples of successful interventions based on the correction of misperceptions of social norms can be found for

alcohol misuse among university students (DeJong et al., 2006; Perkins et al., 2010) and for intake of salads and burgers in a college canteen (Mollen et al., 2013).

## 6. Conclusions

We find misperceptions of preferences, with children systematically under-rating attractiveness of healthy items and over-rating that of unhealthy items. The bias is generally consistent with a perceived alignment of norms and preferences, against healthier items and in favour of less healthy items. A tendency to overestimate the internalisation of food norms would explain our results. A pronounced form of this whereby the norm is generally not internalised, but is generally believed to be, is pluralistic ignorance. This fits the directional pattern of results in 50% of the cases tested, and there is significant evidence for it in one case. Many pupils also report that others attempt to fit in when choosing food. The pattern of results suggests there may be potential for modifying norms to favour healthier diets, by making public the distribution of pupils' reported preferences. Future research might also investigate the variation of food norms across different socio-economic contexts, or evaluate interventions intended to modify food norms directly.

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## **Appendix: Questionnaire**

The questionnaire has different versions, for use in the 2 protocols. The one below (p11) is the Coordinate version, used in the Coordinate and Answer protocol. The Answer and Guess versions are identical except for the opening paragraph. The alternative opening paragraphs are:

for Answer (following Coordinate):

### **“What is your own answer?”**

Please answer all the questions. This time we would just like to know your own answer to each question.”

for Answer (before Guess):

### **“Please answer all the questions.**

We’re going to run a competition with prizes, so don’t let anyone see what you are writing. For each question we just want to know your own answer. But when everyone is finished, we will use the answers to make a quiz. We will mark some of the quiz questions. Three HMV vouchers worth £10 will be won by pupils who get those questions right.”

for Guess:

### **“What was the most common answer?”**

It’s a competition, so don’t let anyone see what you are writing. For each question, you have to guess what the most common answer was in the room. When everyone is finished, we will choose some questions to see what the most common answers really were. Three HMV vouchers worth £10 will be won by pupils who guessed correctly in those questions.”

### What will the most common answer be?

Please answer all the questions. It's a competition, so don't let anyone see what you are writing. You have to guess what the most common answer will be in the room. When everyone is finished, we will choose some questions to see what the most common answers really are. Three HMV vouchers worth £10 will be won by pupils who guessed correctly in those questions.

1. For lunch tomorrow I would like to have \_\_\_\_\_ (one word).

2. When you are choosing food at school, do you want to fit in with how other kids are eating?

Yes / No

3. How cool is each meal? (1=very uncool, 2=uncool, 3=cool 4=really cool)

a)	Chilli con carne	1	2	3	4
b)	Salad with cold chicken and new potatoes	1	2	3	4
c)	Beef burger with chips	1	2	3	4
d)	Fish and chips	1	2	3	4
e)	Vegetable lasagne with salad	1	2	3	4

4. How attractive is each meal?

(1=totally unattractive, 2=unattractive, 3=attractive, 4= very attractive)

a)	A meal cooked by my parents at home	1	2	3	4
b)	A meal in a burger chain in town	1	2	3	4
c)	A meal in a fancy restaurant in town	1	2	3	4
d)	A school meal	1	2	3	4

5. on a scale of 1 to 4, rate the following meals or food items, where

1= something I don't want to have at all

2= something I don't want to have often

3= something I want to have from time to time

4= something I want to have often

a)	a glass of milk	1	2	3	4
b)	a beef burger from a fast food chain	1	2	3	4
c)	a veggie burger	1	2	3	4

- 1= something I don't want to have at all  
 2= something I don't want to have often  
 3= something I want to have from time to time  
 4= something I want to have often

d) a microwave ready meal	1	2	3	4
e) a portion of cooked vegetables	1	2	3	4
f) a large fizzy drink	1	2	3	4
g) an apple	1	2	3	4
h) a large slice of cake	1	2	3	4
i) a salad with lettuce and cucumber	1	2	3	4
j) tomato ketchup	1	2	3	4
k) a home-made beef burger	1	2	3	4
l) a glass of carrot juice	1	2	3	4
m) chips	1	2	3	4

6. A boy called Tom gets out his packed lunch and eats it in the playground, but he does not take out his apple because he does not want to be seen eating it. Tom's behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool

7. A boy called Steve gets out his packed lunch and eats it in the playground, where everyone can see him. He takes out his apple and some older boys come along, make fun of him and push him around because he is eating an apple. Steve's behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool

8. A boy called Jim gets out his packed lunch and eats it in the playground, where everyone can see him. He takes out his apple and a gang of older boys come along, make fun of him and push him around because he is eating an apple. The gang's behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool

9. A group of kids are eating some snacks in the school playground. They drop all the packaging and empty drinks cans on the ground instead of putting it in the bin nearby. Their behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool

10. A girl takes her bag into the toilet with her. She gets out her packed lunch and takes out a slice of cake. She eats the cake in the toilet, so that the other girls will not see her eating it. Her behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool

11. A girl takes her packed lunch into the school canteen. After eating her sandwiches, she gets out a large slice of cake. A group of girls at her table see this and start talking about how to keep slim, how 'disgusting it is to stuff your face with sweet food', and how 'some girls are just, like, these uncontrolled binge cake eaters'. The group's behaviour is

- a) stupid                      b) unwise                      c) understandable                      d) cool