

Meals described as healthy or unhealthy match public health education in England

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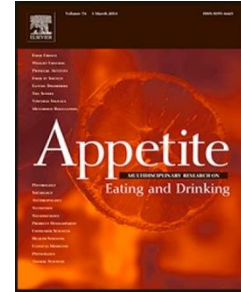
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3

4

5 **Meals described as healthy or unhealthy match public health education in England**

6

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8

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17 **Highlights**

18 - People's freely written reports of their recent eating episodes can be quantitatively studied.

19 - Eating practices perceived as healthy and unhealthy differ in foods and contexts.

20 - Public perception of healthy and unhealthy eating matches dietary guidance in England.

21 - Dietary guidelines should go beyond food groups to practices that contribute to health.

22

23 **Abstract**

24

25 Dietary guidelines for the general public aim to lower the incidence of nutrition-related

26 diseases by influencing habitual food choices. Yet little is known about how well the

27 guidelines are matched by the actual practices that people regard as healthy or unhealthy. In

28 the present study, British residents were asked in a cognitive interview to write a description

29 of an occasion when either they ate in an unhealthy way or the eating was healthy. The

30 reported foods and drinks, as well as sort of occasion, location, people present and time of

31 day, were categorised by verbal and semantic similarities. The number of mentions of terms

32 in each category were then contrasted between groups in exact probability tests. Perceived

33 unhealthy and healthy eating occasions differed reliably in the sorts of foods and the contexts

34 reported. There was also full agreement with the national guidelines on eating plenty of fruit

35 and vegetables, eating small amounts of foods and drinks high in fat and/or sugar, drinking
36 plenty of water, and cutting down on alcohol. There was a tendency to regard choices of
37 bread, rice, potatoes, pasta and other starchy foods as healthy. Reported healthy and
38 unhealthy eating did not differ in incidences of meat, fish, eggs, beans and other non-dairy
39 sources of protein or of dairy foods and milk. These results indicate that operationally clear
40 recommendations by health professionals are well understood in this culture but members of
41 the public do not make clear distinctions in the case of foods that can be included in moderate
42 amounts in a healthy diet.

43

44 **Key words**

45 Healthy eating, dietary guidelines, episodic memory, meal occasion, food and drink intake

46

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47 Introduction

48

49 This paper presents an experiment on people's understanding of the words "unhealthy" and
50 "healthy" when describing examples of their meals that fit these concepts. A large difference
51 in effect of just the two letters distinguishing "*un*healthy" from "healthy" was sought in
52 participants' accounts of a recent occasion of eating.

53

54 The context of this study was that guidelines on healthy eating are meant to encourage diets
55 that prevent disease and improve health. The primary question therefore is how the published
56 guidance might be influencing actual dietary practices. Misconceptions of dietary guidelines
57 have been reported to be common (Boylan, Louie & Gill, 2012). However, most studies
58 evaluated awareness or comprehension. No study has assessed if the distinctions individuals
59 describe between healthy and unhealthy eating resemble the dietary guidelines promoted in
60 the population.

61

62 Words selected by individuals to talk about their everyday activities possess ecological
63 validity within their culture, according to anthropological principles (Wittgenstein, 1953;
64 Romney, Weller & Batchelder, 1986; Dressler, Oths, Ribeiro et al., 2008). Salient features of
65 any enacted behaviour are manifested as particular words used by the person to describe that
66 event (Maguire & Dove, 2008). In this case, the vocabulary of a person's free account of
67 when she or he ate healthily or unhealthily would indicate the features held in memory for the
68 concepts of benefitting and risking health (Booth, Sharpe, Freeman et al., 2011). This paper
69 measures consensus among those personal standards in a convenience sample from a
70 particular locality and then compares that consensus with online public health messages from
71 government about eating choices.

72

73 Individuals are likely to report recent eating occasions because they are more available in
74 memory than remote events (Conway, 2009). Recall of eating occasions has an accuracy of
75 80-90% over about a week (Smith, Jobe & Mingay, 1991; Fries, Green & Bowen, 1996;
76 Armstrong, MacDonald, Booth et al., 2000). Therefore reports of recent eating patterns could
77 be valid and reliable, whether volunteered as healthy or unhealthy.

78

79 It was hypothesised that the vocabulary used in written description of a meal would differ
80 between conditions stated to be "healthy" or "unhealthy." It was further hypothesised that the

81 differences would correspond well with the concepts in national dietary guidance, at least
82 when they were unequivocal (Table 1).

83

84 **Method**

85

86 *Participants*

87

88 The participants were visitors to the School of Psychology during the Open Day at the
89 University of Birmingham in 2008. The volunteers for this experiment were mostly
90 prospective students or their accompanying relatives or friends. A total of 39 people took
91 part. No selection criteria were applied except that volunteers were British residents. Two
92 students and one staff member of the University helped to pilot the study. Procedure and
93 materials were not altered as result of piloting, so those three people were also included.
94 Participants categorised themselves as “child”, “young person” or “adult.” Only five wrote
95 “child” who were female high school pupils, and so they were included in the younger group
96 with 21 participants who wrote “young person”, mostly undergraduate students. The “adult”
97 participants, constituting the older group, included parents as well as postgraduate students
98 and university staff. All participants spoke English as their first language.

99

100 *Design*

101

102 The study had the experimental design of comparisons between subjects in two different
103 conditions, eating perceived as unhealthy or healthy. Each participant had a single interview
104 session. Attempting random assignment to conditions might have imposed the reporting of
105 unhealthy eating on some who were unwilling to confess such practices. Therefore the
106 volunteers were allowed to assign themselves from the initially proposed condition of
107 “unhealthy” eating to the condition of “healthy” eating.

108

109 *Recruitment*

110

111 Volunteers were recruited by two researchers (one male and one female) in a room displaying
112 some of the research carried out in the School. The experiment was presented as *Research on*
113 *healthy eating* through a notice on the investigators’ table inviting people to take part. Each
114 investigator administered questionnaires to different attendees as they came to the table. The

115 volunteers were asked the question: *Would you be willing to tell us about a time when you ate*
116 *in an unhealthy way?* If the person seemed doubtful or did not say ‘yes’ immediately, the
117 investigator offered the other option: *...or you may prefer to tell us about when you ate in a*
118 *healthy way.* Volunteers who agreed to either of these options then described the respective
119 occasion in writing.

120

121 *Measurement Questionnaire*

122

123 Accurate accounts of everyday behaviour can be elicited by participant’s free recall of recent
124 activities, including eating occasions (Smith, Jobe & Mingay, 1991; Fries, Green & Bowen,
125 1996; Armstrong, MacDonald, Booth et al., 2000). The specification of the occasion to be
126 recalled needs to be sufficiently rich in detail to provide non-leading prompts to the mental
127 reconstruction of that event. This principle is the basis of the cognitive interview: questions in
128 a structured series serve as mnemonics, about time of day, location, people present and other
129 features particular to one incident (Knibb & Booth, 2011). The answer about the timing of an
130 occasion of a recognised piece of behaviour provides information about its frequency during
131 that period of time and also distinguishes an autobiographical memory from general
132 knowledge (Tulving, 1972).

133

134 Thus, participants responded in their own words to a sequence of question items that applied
135 the principles of the Cognitive Interview to support recall of the eating episode that they
136 regarded as healthy or unhealthy. The first item asked the participant to describe the eating
137 occasion. This item included prompts to report the sort of occasion, the location, the number
138 of people present and the food and drink consumed with rough quantities. The second item
139 asked for the date and time of the episode. The third and fourth items asked the participant for
140 factors that she or he thought would make eating in that way again in the future more likely
141 (3rd item) or less likely (4th). The responses to these last questions are not presented in this
142 paper since they were used as data in another study about influences on lapsing from a dietary
143 change.

144

145 *Analysis of Data*

146

147 The difference from 50% in the proportion of participants who opted to describe healthy
148 eating rather than unhealthy eating was tested using Fisher’s test of exact probabilities (FEP)

149 with one-tailed p values. The difference between occasions of healthy and unhealthy eating in
150 the reported time period between occurrence and recall was inferred by Mann-Whitney U test
151 of ranks. A p value below 0.05 was used to reject the null hypothesis.

152

153 The words describing an occasion were divided into the Food intake, Sort of occasion,
154 Location, and People present, corresponding to the CI prompts to recall. Within each of these
155 features, words that were regarded by the investigators as meaning the same were assigned to
156 one conceptual category. The number of times that each category had been written was
157 contrasted between *healthy* and *unhealthy* eating episodes using FEP with two-tailed p
158 values.

159

160 In addition, the agreement of elicited food words and their health attributions with current
161 UK Food Standards Agency's dietary guidelines (Table 1) was assessed by a member of the
162 research team (AL-C) with a bachelor degree in human nutrition and checked by a registered
163 research nutritionist (DAB).

164

165 **Results**

166

167 *Choice to report healthy over unhealthy eating*

168

169 A total of 61% of participants preferred not to report *unhealthy* eating, $p = 0.07$ (FEP; Table
170 2). Reliably higher proportions of adults as well as of females opted to describe *healthy* rather
171 than *unhealthy* eating, $p < 0.0002$ and $p < 0.01$.

172

173 *Descriptions of healthy and unhealthy meals*

174

175 The accounts of episodes of eating a *healthy* or *unhealthy* meal configured foods and the
176 context of eating into a coherent whole. Examples of descriptions of *healthy* meals included
177 the following.

178

179 I had cereal and fruit for breakfast.

180

181 Lunch time at college with friends. Cheese sandwich, brown bread, one
182 apple, one glass of water.

183

184 Dinner with cousins at their home fruit, chapatti and vegetable soup.

185

186 The following are examples of descriptions of meals regarded as *unhealthy*.

187

188 One regular pizza and two glasses of fizzy lemonade on my sofa in front of
189 the TV alone.

190

191 Fish and chips - one portion, a month ago, afternoon, with a friend, no
192 occasion just for fun

193

194 Out on a Friday night with friends. Drank about 8 pints of beer and then
195 went for an Indian meal about midnight

196

197 Overall, recorded occasions of perceived eating healthily and unhealthily occurred about one
198 day before their recall, median (lower quartile; upper quartile) = 0.95 days (0.60; 2.00). No
199 reliable difference in recency was found between *healthy* and *unhealthy* conditions, 0.85 days
200 (0.50; 1.40) vs. 1.05 days (0.60; 3.40), $U = 187$, $p < 0.6$.

201

202 *Time of day*

203

204 There were five categories of timing of the eating occasion (Table 3). Three categories were
205 eating at conventional meal times – Breakfast, Lunch and Dinner/evening meal. The
206 incidences of Breakfast and Lunch did not differ reliably between *unhealthy* and *healthy*
207 meals. The incidence of Dinner occasions was higher in *healthy* than in *unhealthy* eating.
208 Evening meals occurred at home. Relatives were mentioned in the accounts, indicating that
209 these were usually family occasions.

210

211 The fourth timing category was for meals that took place out of the home, mostly not at the
212 meal times that are usual in the UK. Participants did not use a particular term to name these
213 meals. Meals out were mentioned more often in unhealthy eating occasions.

214

215 The fifth category comprised episodes between meals, including what some reports called a
216 “snack.” The incidences of episodes between meals were not reliably different between

217 *unhealthy* and *healthy* eating. Nevertheless, occasions between meals in *unhealthy* eating
218 included the three food and drink classes Chocolate, Biscuits and Coke, whereas Fruit such as
219 apple and grapes were included in *healthy* eating.

220

221 *Location*

222

223 The locations at which the described eating occasions took place could be categorised into
224 Home, School or work and Out of the home (Table 3). Eating at home was a feature of
225 occasions reported as *healthy*. In contrast, eating out was a feature of *unhealthy* eating.
226 School or the workplace was equally divided between *unhealthy* and *healthy* eating.

227

228 *People present*

229

230 The answers regarding people present could be placed into the three categories: eating Alone;
231 With one other; With two or more. The number of people present in proportion to the total
232 did not differ appreciably between *unhealthy* and *healthy* eating (Table 3). Eating with
233 friends was characteristic of *unhealthy* meals, whereas eating with family typified *healthy*
234 meals.

235

236 *Foods and drinks*

237

238 The variety of particular foods and drinks reported in each condition formed 27 categories
239 (Table 4). The categories Fruit, Salad/vegetables and Water appeared only in descriptions of
240 *healthy* eating occasions. The categories Chocolate, Burger and chips, Pizza, Coke, Salt and
241 Alcohol occurred only in occasions of *unhealthy* eating. Two other categories that included
242 items from the starchy food group, such as bread or potato, and non-dairy sources of protein
243 group, such as meat or fish, appeared more in occasions of *unhealthy* eating. The other 16
244 categories did not differ in incidence between *unhealthy* and *healthy* meals.

245

246 *Relationships to public health education*

247

248 The assignments of foods to *healthy* and *unhealthy* occasions were in line with the UK
249 governmental guidance for intake of fruit and vegetables, foods high in fat and/or in sugar,
250 water, food high in salt and alcohol a day (Table 4). For the other food guidelines, there was

251 no evidence that mentions of the corresponding foods differed between occasions of *healthy*
252 and *unhealthy* eating.

253

254 **Discussion**

255

256 The difference of just two letters between the words “healthy” and “*unhealthy*” had an
257 enormous effect on the words that people wrote down. Good performance of participants at
258 reporting specific sorts of foods in their accounts of healthy or unhealthy meals was shown
259 by some perfect matches with the governmental dietary guidelines. Such a finding is not
260 unexpected because much of the guidance has been well disseminated in the British media,
261 and is supported by labelling on food packs.

262

263 Nevertheless, some of the sorts of food in meals reported as *unhealthy* or *healthy* could be
264 regarded as in conflict with the national guidance to the public. For instance, the
265 governmental website specifically stated that inclusion of some meat in the diet is part of
266 healthy eating (Table 1). Yet some cases of meals perceived as unhealthy included some
267 meat, as well as other cases where meat was reported under the concept of healthy eating.
268 Such semantic mismatches indicate that members of public have difficulties in fully
269 incorporating official food guidance to their diet. Indeed, the clarity to the hearer or reader of
270 the wording used to promote change is a key aspect of influencing behaviour (Myers, 2010).
271 In addition, any guidance in terms of foods or food groups is problematic because potential
272 detriment to health depends on excessive amounts of foods that can form part of a healthy
273 diet. Dietary messages need to be elaborated sufficiently to convey the idea of a food being
274 healthy in modest amounts, but unhealthy in large amounts.

275

276 A fundamentally different approach reliant on customary patterns of eating avoids such
277 difficulties (Booth & Booth, 2011). A specification of well understood eating patterns would
278 be both clearer and also more readily implemented than putting foods in groups that are or are
279 not part of a healthful diet. The use of locally validated descriptions of widespread habits also
280 sidesteps the arguably insoluble issues of determining the extent to which health is improved
281 by compliance with healthy eating messages that have been professionally implemented from
282 expert interpretations of epidemiological data. The effect on health-risk factors can be
283 measured from individuals’ changes in frequency and intensity of each pattern (Blair, Booth,
284 Lewis et al., 1989; Booth, Blair, Lewis, Baek et al., 2004).

285 An additional point to be made from this small study is that rich data can be obtained from
286 participants' structured reports about their recent eating episodes. In particular, factors in the
287 immediate context could be fundamental to eating either healthily or unhealthy (Cohen &
288 Babey, 2012). For instance, features of meals reported in this study were consistent with
289 eating at home and with family rather than out of the home and with friends which has been
290 claimed to be less healthy (Mesas, Pareja, López-García & Rodríguez-Artalejo, 2012).
291 Similarly, adolescents at school exposed to friends and food cues have been found to eat less
292 healthily (Grenard, Stacy, Shiffman et al. 2013).

293

294 *Potential limitations of this study*

295

296 Generalisations from the present quantitative findings would of course require a
297 representative and therefore large sample from a specified population. The data should be
298 analysed in ways that establish consensus on the uses of the elicited wordings.

299

300 Nevertheless, even the modest set of data presented here is sufficient to establish diverse
301 residents of an English city agree on categorising a considerable number of foods as healthy
302 or unhealthy. It is not essential to this conclusion to be sure that the meals as worded actually
303 occurred. Nonetheless, the data were dominated by occasions dated within a few days of
304 writing, well in the span of reliable recall. This finding also indicates that eating occasions
305 perceived as either healthy or unhealthy were both highly prevalent within this sample.

306

307 The setting where participants were recruited or other momentary factors, could have affected
308 self-allocation to *healthy* or *unhealthy* conditions. It is not obvious how that procedure could
309 have biased the choice of foods to mention. This possibility can only be established
310 empirically and suggests a possibly avenue for future research.

311

312 *Conclusions*

313

314 The clarity of the findings of this experiment substantiates the value of exchanging accounts
315 with the public in order to gain insights into the realities of their eating. A choice of foods,
316 even if regarded by experts as a benefit or a risk to health, may be an insufficient
317 specification of behaviour for research into the effects of familiar practices of eating or for
318 the communication of evidence on healthy or unhealthy diets. We need measurements of the

319 effects on health of widely occurring eating patterns, specified in wordings that have been
320 shown to be clearly recognised within the local culture (Booth & Booth, 2011; Laguna
321 Camacho, 2013).

322

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324

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330

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377 Table 1. **Messages about healthy eating from the UK Food Standards Agency (2010)**
378

Try to eat

- plenty of fruit and vegetables
- plenty of bread, rice, potatoes, pasta and other starchy foods
- some milk and dairy foods
- some meat, fish, eggs, beans and other non-dairy sources of protein
- just a small amount of foods and drinks high in fat and/or sugar

Try to eat less salt

- no more than 6g a day

Drink plenty of water

- about 6 to 8 glasses of water, or other fluids, every day

Cut down alcohol

- women: up to 2 to 3 units a day
 - men: up to 3 to 4 units a day
-

379 Source: <http://www.eatwell.gov.uk/healthydiet>; accessed on 15/05/2010

380

381 Table 2. **Counts of opting to describe *unhealthy* (UE) or *healthy* (HE) eating**

382

	Total		% shift from UE to HE	Younger group		Older group	
	UE	HE		UE	HE	UE	HE
Total	16	26	61	12	14	4	12
Females	10	20	67	7	13	3	7
Males	6	6	50	5	1	1	5

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385 Table 3. Counts of reported contexts of eating stated to be “unhealthy” or “healthy”

386

Categories	Contextual detail reported	“Unhealthy” (N = 16)		“Healthy” (N = 26)		Same counts
		Count	%	Count	%	<i>p</i>
<i>Meal time</i>						
Breakfast	breakfast	2	13	6	23	0.69
Lunch	lunch, workday lunch, lunch time	2	13	7	27	0.44
Evening/dinner	dinner, evening meal, family meal [evening], family meal, family occasion, formal ball	1	6	9	35	0.02
[between meals]	a snack, when I want to snack, break times	3	19	2	8	0.35
[meals mid-afternoon, night]	no occasion - just for fun [4:30 pm], miss lunch [3:30 pm], meal [3:00 pm], night out, out on Friday night, birthday party	8	50	2	8	0.05
<i>Place</i>						
Home	home, house	2	13	16	62	0.01
School/Work	collage, school, school canteen, Avanti, building, staff canteen	5	31	8	31	1.00
Out	McDonalds, Burger King, Pizza Hut, Silver Grill, kebab shop, cinema, birthday party, night out, Sudley castle [formal ball], meal out,	9	56	2	8	0.01
<i>People present</i>						
Alone	alone, on my own	2	13	6	23	0.69
One other	dad, wife, sister in law, son, daughter, cousins, family, whole family	2	13	4	15	1.00
Two or more	friends, work mates, country people	12	75	16	62	0.50
<i>Relation</i>						
Family members	-	1	6	11	42	0.01
Friends	-	13	81	9	35	0.01

387

388 N = total number of participants per condition. % = percent of total participants in a condition

389 reporting the contextual feature(s) for each category. *p* = exact probability test. Reliable differences

390 between UE and HE are indicated in bold font.

391

392 Table 4. Food and drink ingested on reported occasions of “unhealthy” or “healthy”
 393 eating, in counts of food groups listed in UK governmental guidelines

394

Food Group	Categories of reported foods and drinks	“Unhealthy” (k = 27)		“Healthy” (k = 80)		Same counts <i>p</i>
		Count	%	Count	%	
Fruit and vegetables	- [fresh] fruit, apple, grapes, pineapple, fruit juice	0	0	12	15	0.02
	- salad [with cheese and some pickles], vegetables, spinach	0	0	11	14	0.03
	- vegetable dish, vegetable stir fry, vegetarian casserole	0	0	3	4	0.41
	<i>All categories</i>	0	0	26	33	0.01
Bread, rice, potatoes, pasta and other starchy foods	- cereal, oat and porridge, Bran Flakes, muesli [with milk]	0	0	4	5	0.31
	- bread, bran bread, chapattis, toast [with raspberry], nutrigrain	0	0	7	9	0.12
	- pasta and pesto, cous cous, risotto [plus mushrooms]	0	0	3	4	0.41
	- potatoes, new potatoes, hash browns	1	4	2	3	0.84
	- [ham/ cheese] sandwich	0	0	2	3	0.56
	- pizza, burger and fries, [fish and] chips, crisps, [choc] biscuit	11	41	0	0	0.01
<i>All categories</i>	12	44	18	23	0.11	
Meat, fish, eggs, beans and other non-dairy sources of protein	- grilled fish, chicken breast, bacon, egg, sausages	1	4	6	8	0.47
	- beans, pulses, lentils	1	4	4	5	0.63
	- ham [sandwich]	0	0	1	1	0.75
	- burger [and fries], fish [and chips]	4	25	0	0	0.01
	- tofu	0	0	1	1	0.75
<i>All categories</i>	6	22	12	15	0.54	
Milk and dairy foods	- yogurt, low-fat yogurt, [Bran Flakes -] skimmed milk, [muesli with] milk, cheese [sandwich/pizza]	4	14	7	9	0.46
Foods and drinks high in fat and/or sugar	- bag of crisps	1	4	0	0	0.25
	- chocolate biscuit	1	4	0	0	0.25
	- fish and chips	2	7	0	0	0.06
	- [onion & cheese] pizza, regular pizza	3	11	0	0	0.02
	- [BigMac] burger and fries/chips	4	14	0	0	0.01
	- fizzy lemonade, Coca Cola, Diet Coke	4	14	0	0	0.01
	- bar of chocolate, chocolate Toblerone, Kit Kat	5	18	0	0	0.01
<i>All categories</i>	20	74	0	0	0.01	
6. Food high in salt	- cereal, soup, pasta, bread, pulses, bacon, sausages, crisps, pizza, burger and fries, fish and chips	13	48	14	18	0.03
7. Water	- glass of water, bottle of water, water	0	0	10	13	0.04
	- cup of tea, mug of tea, mug of coffee	1	4	4	5	0.63
	<i>All categories</i>	1	4	14	18	0.12
8. Alcohol a day: ≤ 2-3 units women, 3-4 units men	- one glass of white wine, two glasses of red wine	1	4	2	3	0.56
	- drink some alcohol, lots of alcohol, eight pints of beer	5	18	0	0	0.01
	<i>All categories</i>	6	22	2	3	0.01

395

396 k: number of foods in the eating condition. %: percent of total foods reported in each food group

397 category. p: exact probability. All the reliable differences (in bold font) were in the direction

398 consistent with the national guidelines.