PHN RESEARCH
Insight through evidence

ELAC2 Final report

The impact of Eat Like a Champ on Year 5 pupil eating habits

Second evaluation

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Summary

Pupils age 9-10 showed significant improvements in their eating habits 6 weeks after the implementation of Eat Like A Champ, a classroom-based healthy eating programme sponsored by Danone UK. Changes at 12 weeks were not evident.

- Eat Like A Champ (ELAC) is a six-week classroom intervention designed to help teachers deliver effective teaching about healthy eating to Year 5 pupils. It was delivered last year to over 2000 classes in the UK.
- 6 weeks after ELAC started, children ate 3.2% fewer "less healthy" items and 2.6% more "healthier" items – a net shift of 5.8% toward healthier eating.
    - Pupils ate more:
        - healthier cereals, bread, etc. (up 8%)
        - more lower fat meat and chicken, and more fish and vegetarian foods (up 11%)
        - fruit, especially fresh fruit (up 9%)
        - healthier drinks (up 9%)
    - They ate fewer:
        - take-aways (down 19%)
        - spreads of all types (down 13%)
        - biscuits, cakes, chocolate and sweets (down 9%)
- These changes equate, for example, to one chocolate bar less per week, and around two portions more of fruit and vegetables. Although small, these changes are important to children's nutritional health.
- Schools with greater numbers of pupils taking free school meals showed a bigger net shift toward healthier eating (7%) compared with schools with fewer pupils taking FSM (3%).
- At 12 weeks, reported diet showed 1.1% fewer "less healthy" items and 1.4% of the "healthier" items – a net shift of 2.5% toward healthier eating. The assessment at 12 weeks was after the Easter Break, when more "less healthy" and fewer "healthier" foods may have been available. Some of the observed changes may have been due to social desirability bias, based on data collected in a group of 20 "control" classes.
- The evaluation was carried out in January-May 2016. Almost 2000 children in 71 classes in 37 state primary schools in Greater London took part in the study at baseline. At 6 weeks, 80% of classes provided data, but at 12 weeks, that had dropped to 51%.
- To find out about their eating habits, pupils completed checklists in the classroom to show what food and drink they had had in the last two days. They did this three times: before the teaching intervention, after 6 weeks, and again after 12 weeks.
- Class teachers entered the checklist data. They were given feedback at 6 weeks on how their pupils' eating habits had changed.
- An evaluation is planned for 2017 to help us learn more about how ELAC affects pupils' eating habits, and to increase its effectiveness. Pupils will complete the checklist on-line, and feedback will be generated as soon as the data are entered. Teachers will not have to enter the data.

Eat Like A Champ provides an effective, curriculum-based programme to improve children's eating habits in the short to medium term. It provides a good model for corporate social responsibility by using a robust, objective evaluation of the benefits of the programme.

Introduction

Eat Like A Champ (ELAC) is a 6-week classroom-based healthy eating intervention for Year 5 children aged 9-10 in primary schools. It was developed by Danone in collaboration with the British Nutrition Foundation, the Children's Food Trust, and Public Health Nutrition Research Ltd. The aim was to provide teachers with support on healthy eating. The evaluation was designed to assess whether or not ELAC had an impact on pupils' eating habits.

The evaluation of the impact of ELAC was based on a simple food and drink checklist. The checklist was completed by pupils at baseline, at 6 weeks (short-term evaluation immediately after the teaching programme was completed) and at 12 weeks (medium-term evaluation).

In 2012, the programme was shown to have a positive impact on the eating habits of 9-11 year-old pupils.[1] Compared with baseline, food choices were 5% and 6% more healthy at 6 and 12 weeks, respectively.

While the first evaluation showed that ELAC was successful in improving pupils' overall eating habits in the short to medium-term, it raised some new questions. For example, would teachers value real-time feedback on their pupils' eating habits as a teaching aid to reinforce learning about healthy eating? If so, could school staff enter data themselves (rather than rely on research staff, as in the first evaluation) so that feedback could be provided quickly? Also, a control group (pupils in schools that did not have the ELAC intervention but who completed the checklist at baseline, 6 weeks and 12 weeks) would help to clarify if the observed changes in eating habits were due to the classroom intervention, and not to response bias (changes in response on repeat completion of the checklist caused by greater awareness about healthy eating because pupils were taking part in research).

Aims and objectives

The aims of the second evaluation were:

1. to gain further evidence of the impact of ELAC on children's eating habits
2. to determine if useful information on the impact of ELAC could be generated directly by teachers and schools with appropriate on-line support
3. to determine if user-friendly feedback on pupils' eating and drinking habits was of value to teachers when teaching the promotion of healthier lifestyles

The objective was to develop a system within ELAC that would:

- motivate classroom teachers to have their pupils complete the food and drink checklist at baseline (immediately before commencement of the ELAC classroom intervention) and at 6 weeks (immediately after the intervention), and at 12 weeks
- facilitate data entry by teachers, teaching assistants, or other school staff
- generate pupil-friendly feedback for teachers to use as part of their teaching about healthy lifestyles. This would include:
    - summaries of class results at each time point
    - comparisons of class results from data collected at baseline with averages from the first ELAC evaluation[1]
    - illustrations of the way in which eating habits in a class have changed following the ELAC intervention and data collections at subsequent time points

The evaluation is bracketed by two surveys of Year 5 teachers. The first survey explored promoters and barriers to participation in the evaluation. The findings were sufficiently positive to warrant continuation of the second evaluation.[2] The second teachers' survey will be undertaken in January 2017. It will explore views on the usefulness of the ELAC teaching materials, the on-line feedback to support teaching on healthy lifestyles, and the evaluation process itself, including issues relating to data entry. The results of the second teachers survey will be reported separately.

Methods

Recruitment and consent

Schools were recruited in November 2015 through January 2016 by Danone UK with the collaboration of Healthy Schools London. Invitation letters to schools and information sheets for schools, teachers, parents and pupils were prepared in collaboration with PHN Research and distributed to schools by Danone UK.[a] Ethical approval for the study was obtained from King's College London Research Ethics Committee.

Informed consent for participation was obtained from the head teacher. The parent information sheet included an opt-out form if they did not want their child to take part. Pupils could opt out at any point without having to give a reason.

Motivation to promote sign-up to and complete the evaluation included provision of a hard copy of the toolkit, and real-time feedback on the impact of ELAC on pupils' eating habits on completion of baseline and follow-up checklists. In addition, each school was given a £100 token of appreciation for each class completing the survey.

A wait-listed[b] group of a schools provided a control group for comparison of checklist performance without the ELAC intervention.

Training

Training sessions for teachers were held either at Danone offices or in the schools themselves. Presentations were given by Danone, British Nutrition Foundation, and Public Health Nutrition Research. The aims were to 1) provide a brief introduction to Eat Like A Champ, 2) instruct teachers in the use of the Eat Like A Champ toolkit, and 3) explain to teachers the purpose of the evaluation, how to administer the checklists, and how to enter checklist data in a specially designed module.

Administration of the checklist

The checklist is shown in Annex 1.

Printed copies of the checklists were delivered by courier to each participating school to ensure timely delivery. Checklists were then distributed by teachers in the classroom in accordance with an agreed timetable. Checklists were completed in 2016 between 15 January – 5 February (baseline); 15 – 23 March ("6 weeks", allowing for half-term); and 6 – 11 May ("12 weeks", allowing for Easter break).

Checklists took on average around 15 minutes to complete. The checklist was completed on paper individually by each pupil in the classroom.

[a] Invitation letters and information sheets are available from PHN Research.

[b] Wait-listed schools were asked to undertake checklist completion and data entry at baseline and 6 and 12 weeks, but delay classroom intervention until the 12-week checklist was completed.

Data entry

Pages on the ELAC website were modified to explain the purpose and logistics of the new evaluation. These included information and instructions on the logistics, timing, and administration of checklists, teaching sessions, data collection, and data entry.

A new standalone module was devised for school staff to enter data. Together with simple instructions for data entry, the on-line template was identical in format to the checklist itself. Staff compiled a list of pupils in each class (taking around 30 minutes). Checklist data for each pupil were then entered at baseline, 6 weeks and 12 weeks. Typically, it took around an hour to enter data for a class of 25-30 pupils.

The software module for data entry was designed by Brand New Media Ltd, Exeter, UK.

Food consumption profiles

Each food and drink item listed on the checklist was classified as "less healthy", "neutral" or "healthier". "Less healthy" foods were typically high in fat, salt, or sugar, and low in other nutrients. "Healthier" foods were typically high in fibre, or nutrient-dense, and low in fat, salt and sugar. The remaining items were classified as "Neutral".[c] Each food or drink was given a corresponding score for use in analysis: less healthy = -1; neutral = 0; healthier = +1. Four nutritionists at the Children's Food Trust were asked to assign scores to each of the foods on the checklist. These were compared with published values,[3] [4] and a mean value (rounded to +1, 0, or -1) was assigned to each food.

Statistical analysis

The changes in food choices over time were assessed by analysis of the percentages of reported healthier, neutral and less healthy foods consumed. School characteristics[5] (percentage of pupils taking free school meals, percentage of pupils for whom English was an additional language), and measures of deprivation[6] were provided by government sources and analyzed using normal statistics.

Checklists with 10 or more errors and classes that returned fewer than 10 checklists at any time point were excluded from the analysis.

A cut-off value of $p<0.05$ (5% level) was taken to indicate a statistically significant finding.

Feedback

Feedback to class teachers was generated by PHN Research within one week of data entry.

At baseline, for each class, a graph was prepared showing the percentages of less healthy, neutral and healthier food and drink consumed by the pupils. These were compared with average findings from the first evaluation, together with a brief text summary and information about differences between boys and girls (Annex 2).[d] At 6 weeks, feedback compared the results at 6 weeks with the results for the class at baseline.

Feedback was emailed as a pdf file to each participating class teacher.

[c] The full list of scores is available from PHN Research.
[d] Examples of the full feedback with supporting text are available from PHN Research.

Results

Cooperation rates and school characteristics

Table 1 shows the number of schools, classes and pupils that participated in the study, by intervention group (intervention or control), by stage (recruitment, baseline, 6 weeks, 12 weeks).

Initially, 20 intervention schools and 18 control schools were recruited into the study. Together, they provided 39 and 34 Year 5 classes, respectively. Initial completion of checklists at baseline was high (95% and 100%, respectively. At 6 weeks, most schools were still providing data, but by 12 weeks cooperation had fallen to 45% and 61%, respectively. Similar levels of cooperation were seen at class level (including classes who provided checklists at baseline but not subsequently). Pupil numbers relate to those who started the study in participating classes at baseline and who completed checklists at each time point. Some checklists were rejected (as explained in methods) if there were 10 or more errors, so final numbers are lower.

TABLE 1. PARTICIPATION IN THE STUDY, BY SCHOOL, CLASS AND COMPLETED CHECKLISTS, BY INTERVENTION GROUP

		Intervention group					
		Intervention		Control		Total	
		n	%	n	%	n	%
Schools	Recruitment	20	100.0%	18	100.0%	38	100.0%
	Baseline	19	95.0%	18	100.0%	37	97.4%
	6 weeks	15	75.0%	15	83.3%	30	78.9%
	12 weeks	9	45.0%	11	61.1%	20	52.6%
Classes	Recruitment	39	100.0%	34	100.0%	73	100.0%
	Baseline	38	97.4%	33	97.1%	71	97.3%
	6 weeks	30	76.9%	28	82.4%	58	79.5%
	12 weeks	17	43.6%	20	58.8%	37	50.7%
Pupils	Baseline	1048	100.0%	782	100.0%	1830	100.0%
	6 weeks	787	75.1%	619	79.2%	1406	76.8%
	12 weeks	524	50.0%	497	63.6%	1021	55.8%

Average measures of deprivation in schools by intervention group are shown in Table 2. Although the control schools were, on average, in more deprived areas (higher percentage of pupils taking free school meals; lower average ranking for IMD and IDACI, indicating greater deprivation), none of the measures of deprivation was statistically significantly different between intervention group and control schools ($p>0.05$ for all variables).

TABLE 2. SCHOOL CHARACTERISTICS AT BASELINE*, BY INTERVENTION GROUP

	Intervention group	n	Mean	SD	*p*
Percentage of pupils taking free school meals	Intervention	15	15.3	11.3	0.411
	Control	15	18.9	11.6	
Percentage of pupils whose first language is known or believed to be other than English	Intervention	15	50.0	31.3	0.461
	Control	14	43.6	24.5	
Index of Multiple Deprivation (rank**)	Intervention	15	16165	7421	0.242
	Control	15	13393	8031	
IDACI** (rank***)	Intervention	15	14238	5756	0.339
	Control	15	12049	8608	

* Only schools with additional checklists at 6 weeks or 12 weeks
** A rank of 1 corresponds to the most deprived
*** IDACI: Income Deprivation Affecting Children Index

Changes in eating habits

Table 3 shows the food consumption profiles for pupils in the 17 intervention classes that provided data at baseline, 6 weeks and 12 weeks.[e]

TABLE 3. NUMBER OF ITEMS CONSUMED AND PERCENTAGE OF TOTAL, BY TYPE OF FOOD OR DRINK, BY PHASE*, $N_{CLASSES}$=17

Phase	Type of food or drink			
	Less healthy	*Neutral*	*Healthier*	*% net improvement*
n of items				
Baseline	4263	3453	4045	
6 weeks	2968	2696	3323	
12 weeks	3198	2651	3262	
percentage				
Baseline	36.2%	29.4%	34.4%	
6 weeks	33.0%	30.0%	37.0%	
12 weeks	35.1%	29.1%	35.8%	
Change from baseline at 6 weeks	-3.2%	0.6%	2.6%	5.8%
Change from baseline at 12 weeks	-1.1%	-0.3%	1.4%	2.5%

* chi-squared statistic = 26.273, df=4, p<0.001

[e] Additional tables are given in Annex 3 for the 30 classes that provided data at baseline to 6 weeks only. The results are consistent, and the larger number of observations provides more statistical power for analysis by food group.

At 6 weeks, consumption of less healthy food and drink fell by 3.2% and healthier choices increased by 2.6%, a net change toward healthier eating of 5.8%. Between 6 weeks and 12 weeks, however, the consumption of less healthy items increased by 2.1% and the consumption of healthier items decreased by 1.2%, yielding a net shift in healthier eating from baseline to 12 weeks of 2.5%, less than at 6 weeks. The statistical significance of the association ($p<0.001$) derives mainly from the changes observed at 6 weeks.

Statistically significant changes[f] in consumption within specific food groups included the meat group (up 12% at 6 weeks and 8% at 12 weeks, $p=0.031$), but with a shift toward lower-fat meat and more chicken, fish and vegetarian foods; take-aways (down 19% at 6 weeks and 23% at 12 weeks, $p=0.011$); and biscuits, chocolates, sweets and snacks (down 9% at 6 weeks and 4% at 12 weeks, $p=0.026$).

When compared with baseline, other changes consistent with healthier eating were observed for several foods, but because of the up-and-down nature of the changes, and the small numbers of observations within food groups, the results did not reach statistical significance. Sweetened cereals consumption was down from baseline by 12% at 6 weeks and 6% at 12 weeks; healthier cereals and brown bread went up by 8% and 2%, respectively; healthier dairy products was up (4% and 9%, respectively); fresh fruit (up 9% and 7%, respectively); less healthy spreads (down 15% and 10%, respectively); and healthier drinks (up 9% and 13%, respectively). Consumption of vegetables increased by 6% at 6 weeks, but fell back to baseline levels at 12 weeks. Sweetened drinks consumption fell by 2% at 6 weeks but rose by 7% at 12 weeks.[g] [h]

Table 4 shows the food consumption profiles by sex at baseline, 6 weeks and 12 weeks. Boys and girls showed the same patterns of change, with the overall improvement in dietary choices being greater at 6 weeks (6.0% and 5.5%, respectively) than at 12 weeks (2.9% and 1.9%, respectively), and statistically significant for both groups ($p=0.006$ and $p=0.023$, respectively). The girls appeared to have marginally more healthy diets, but the differences were not statistically significant at any time point, or overall.

[f] The percentages relate to the change in consumption within a given food group.

[g] In a separate analysis, the results for changes from baseline to 6 weeks were analyzed using the larger data set derived from 30 classes, giving more statistical power for the food group analyses. The findings suggest that at 6 weeks, pupils ate significantly more healthier cereals and brown bread (up 10%, $p=0.043$), more fruit, especially fresh fruit (up 12%, $p=0.014$), and fewer spreads of all types (down 15%, $p=0.001$).

[h] A separate report on intake of fluids is available.

TABLE 4. PERCENTAGE OF ALL ITEMS CONSUMED, BY TYPE OF FOOD OR DRINK, BY PHASE, $N_{CLASSES}$=17

Phase	Type of food or drink			
	Less healthy	*Neutral*	*Healthier*	*% net improvement*
Boys[*]				
Baseline	37.0%	29.2%	33.8%	
6 weeks	33.7%	29.9%	36.5%	
12 weeks	35.6%	29.1%	35.3%	
Change from baseline at 6 weeks	-3.3%	0.7%	2.7%	6.0%
Change from baseline at 12 weeks	-1.4%	-0.1%	1.5%	2.9%
Girls[**]				
Baseline	35.4%	29.5%	35.1%	
6 weeks	32.3%	30.1%	37.5%	
12 weeks	34.6%	29.2%	36.2%	
Change from baseline at 6 weeks	-3.1%	0.6%	2.4%	5.5%
Change from baseline at 12 weeks	-0.8%	-0.3%	1.1%	1.9%

[*] chi-squared statistic = 14.622, df=4, p<0.006
[**] chi-squared statistic = 11.310, df=4, p<0.023

Changes in eating habits by socio-demographic factors

Schools were grouped into thirds by the percentage of pupils taking free school meals (% FSM), the IDACI rank for the school, and the percentage of pupils with English as an additional language. Changes in consumption by these factors are shown in Table 5.

Those in the bottom third of pupils taking FSM (those with the lowest percentage of pupils taking FSM) had statistically significantly more healthy diets at baseline. However, they showed the lowest overall improvement in dietary profile between baseline and 6 weeks (3.0%); at 12 weeks, any dietary benefits had disappeared. The changes were not statistically significant (p=0.355). In contrast, those in the middle and top thirds showed statistically significant greater improvement (7.3% and 6.8%, respectively), and the changes were statistically significant at 6 weeks,[i] and at 12 weeks in the middle third (p<0.001). The changes in percentage net improvement in food and drink choices between baseline and 6 weeks and at 12 weeks are summarized in Figure 1.

Similar differences were shown when schools were grouped by thirds of IDACI (Income Deprivation Affecting Children Index). The bottom third (more deprived) had the least healthy diets at baseline. The differences were statistically significant between thirds at baseline (p=0.048) but not at 6 weeks (p=0.964). Statistically significant changes were observed in all three thirds between baseline and 6 weeks.[h] Those in the top third (less deprived) showed smaller changes (3.6%, p=0.016) than those in the bottom and middle thirds (6.7% (p=0.006) and 6.4% (p<0.001), respectively). This suggests that ELAC had greater impact in those classes where levels of deprivation were higher.

[i] See Table 8, Annex 3, showing results for 30 classes at baseline and 6 weeks.

Schools with fewer pupils with English as an additional language (bottom and middle thirds of % EAL) had statistically significantly less healthy diets compared with schools in the top third of % EAL at all three time points (p<0.001, p<0.001, and p=0.023, respectively). Only in the middle third did the changes over 12 weeks reach statistical significance (p<0.001). Again, these echo the finding for the 30 school that completed checklists at baseline and 6 weeks.[h]

TABLE 5. PERCENTAGE OF ALL ITEMS CONSUMED, BY TYPE OF FOOD OR DRINK, BY PHASE, BY SEX, AND BY THIRDS OF PERCENTAGE TAKING FREE SCHOOL MEALS (% FSM), PERCENTAGE OF PUPILS WITH ENGLISH AS AN ADDITIONAL LANGUAGE (% EAL), AND IDACI RANK*, BY PHASE, $N_{CLASSES}$=15

		Type of food or drink				
	Phase	**Less healthy**	**Neutral**	**Healthier**		
					% net improvement	*p*
% FSM						
Bottom third	Baseline	32.3%	31.3%	36.4%		
	6 weeks	30.9%	31.2%	38.0%	3.0%	
	12 weeks	33.1%	29.9%	37.0%	-0.2%	0.355
Middle third	Baseline	38.5%	28.2%	33.4%		
	6 weeks	34.1%	29.7%	36.3%	7.3%	
	12 weeks	36.1%	28.9%	35.0%	4.0%	<0.001
Top third	Baseline	34.3%	31.2%	34.4%		
	6 weeks	33.0%	27.1%	39.9%	6.8%	
	12 weeks	34.2%	26.9%	38.8%	4.5%	0.171
*IDACI**						
Bottom third (more deprived)	Baseline	36.5%	30.1%	33.4%		
	6 weeks	32.8%	31.2%	36.0%	6.3%	
	12 weeks	35.7%	30.5%	33.7%	1.1%	0.131
Middle third	Baseline	36.1%	29.3%	34.6%		
	6 weeks	32.7%	29.8%	37.5%	6.3%	
	12 weeks	35.2%	28.8%	36.0%	2.3%	0.002
Top third (less deprived)	Baseline	36.2%	28.8%	34.9%		
	6 weeks	33.9%	29.4%	36.7%	4.1%	
	12 weeks	34.2%	28.4%	37.4%	4.5%	0.310
% EAL						
Bottom third	Baseline	38.9%	29.0%	32.1%		
	6 weeks	35.7%	29.0%	35.3%	6.4%	
	12 weeks	36.9%	28.4%	34.6%	4.5%	0.130
Middle third	Baseline	37.0%	28.3%	34.7%		
	6 weeks	32.1%	30.2%	37.8%	8.0%	
	12 weeks	34.3%	29.1%	36.6%	4.6%	<0.001
Top third	Baseline	34.0%	30.8%	35.3%		
	6 weeks	32.6%	30.4%	37.0%	3.1%	
	12 weeks	34.7%	29.7%	35.7%	-0.3%	0.405

* IDACI: Income Deprivation Affecting Children Index

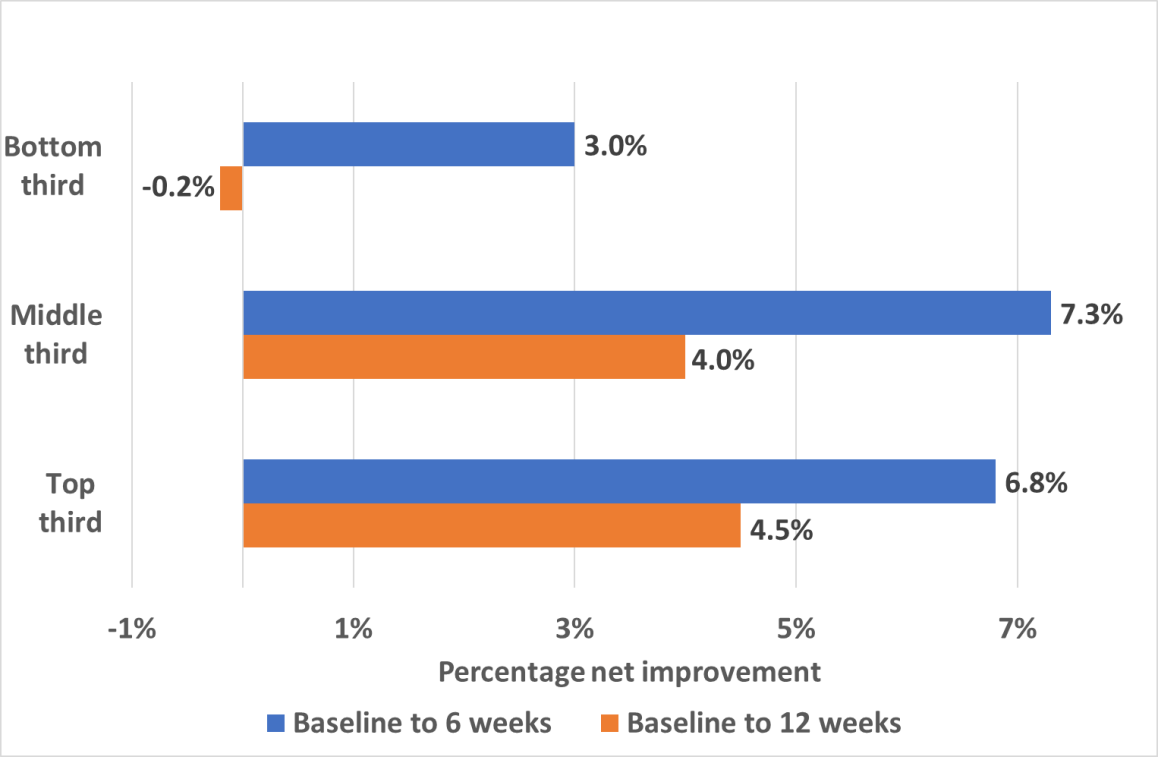

FIGURE 1. CHANGES IN PERCENTAGE NET IMPROVEMENT FROM BASELINE TO 6 WEEKS AND FROM BASELINE TO 12 WEEKS, BY THIRDS OF FSM TAKE UP, $N_{CLASSES}$=17

There is no clear explanation for the "backsliding" at 12 weeks, given that the evaluation carried out in 2012 also spanned the Easter break but showed little change in food consumption profiles between 6 weeks and 12 weeks. There is a possibility that in this much smaller sample (17 classes in 2016 versus 42 classes in 2012), increased availability and consumption of food such as biscuits, chocolates and sweets, and sweet drinks, all of which had fallen from baseline levels at 6 weeks, rose again at 12 weeks. An increase in consumption of the less healthy meat options, and a fall in vegetable consumption at 12 weeks also contributed to the observed shift. Nonetheless, healthier choices of milk (e.g. reduced fat milks), higher levels of fruit consumption, and higher levels of water and healthier drinks persisted at 12 weeks.

Intervention versus control

In the present evaluation, a group of control schools was wait-listed and asked to complete the checklists at the same time points as the intervention group schools (baseline, 6 weeks and 12 weeks), but to delay the classroom intervention. The expectation was that over time, there would be no statistically significant change in the proportions of less healthy and healthier choices in the control group. If true, this would rule out the likelihood that improvements seen in the intervention group were the result of repeat completion of the food and drink checklist. If food choices in the control group were more healthy over time, it could suggest that bringing pupils' attention to issues around healthy eating resulted in social desirability bias on repeat completion of the checklists.

Table 6 shows the percentages of items consumed by type of food and drink, by intervention group, by phase, in the 17 intervention and 20 control classes that provided data at all three time points. At baseline, the control group had a marginally worse diet compared with the intervention group (p=0.025). Most of the statistical difference between intervention and control schools at baseline

can be assigned to the differences in the reported consumption of neutral foods rather than the differences in less healthy or healthier foods. Part of the difference may also be attributable to the difference in school profiles (Table 2) which, although not statistically significant, suggest that control schools were on average in more deprived areas, associated with less healthy diets (Table 5). At 6 weeks, the changes in food profiles from baseline in the intervention group were statistically significantly greater than in the control group (percentage net improvement = 5.8% and 1.4%, respectively, p<0.001). By 12 weeks, the difference between the two groups (percentage net improvement = 2.5% and 3.4%, respectively) had disappeared (p=0.481).

Further analyses suggest that changes in dietary profiles were statistically significant in the intervention group between baseline and 6 weeks (p<0.001) and between 6 weeks and 12 weeks (p<0.001). In contrast, in the control group, the differences between baseline and 6 weeks failed to reach statistical significance (p=0.136) but were different between 6 weeks and 12 weeks (p=0.037).

These findings suggest that at 6 weeks, there was little social desirability bias in the recording of consumption, and that the observed differences in the intervention group reflect real changes in diet. At 12 weeks, however, an element of social desirability bias may have influenced recording in favour of healthier diets on third completion of the checklists.

TABLE 6. NUMBER OF ITEMS CONSUMED AND PERCENTAGE OF TOTAL, BY TYPE OF FOOD OR DRINK, BY INTERVENTION GROUP, BY PHASE

Intervention group		**Type of food or drink**				
	Phase	Less healthy	Neutral	Healthier		
	n				*% net improvement*	*p*
Intervention	Baseline	36.2%	29.4%	34.4%		
	6 weeks	33.0%	30.0%	37.0%		
	12 weeks	35.1%	29.1%	35.8%		
Change from baseline at 6 weeks		-3.2%	0.6%	2.6%	5.8%	*<0.001*
Change from baseline at 12 weeks		-1.1%	-0.3%	1.4%	2.5%	*<0.001*
Control group	Baseline	35.8%	31.0%	33.2%		
	6 weeks	35.2%	30.9%	34.0%		
	12 weeks	34.6%	29.9%	35.4%		
Change from baseline at 6 weeks		-0.6%	-0.1%	0.8%	1.4%	*0.136*
Change from baseline at 12 weeks		-1.2%	-1.1%	2.2%	3.4%	*0.006*

Discussion

Evidence of the impact of ELAC

The first aim of the second evaluation of ELAC was to gain further evidence of the impact of ELAC on children's eating habits. The results in Table 3 suggest that the findings from the first evaluation at 6 weeks are robust. The percentage improvement in healthy food choices at 6 weeks was very near to the finding from 2012.[1] Coupled with the observation that there was little change in diet in the control group at 6 weeks (Table 6 and Table 9), this reinforces the view that ELAC is a useful tool in the short term to bring about healthier changes in the food and drink choices of children aged 9-10 years.

The results at 12 weeks are less clear. In the first evaluation in 2012, there appeared to be a medium-term benefit; the changes reported at 6 weeks were maintained at 12 weeks. In the present study, the changes toward healthier eating at 12 weeks were less than at 6 weeks. This element of "backsliding" in the present evaluation may be due to three factors. First, the checklists were completed within 4-6 weeks after Easter; consumption of chocolates and sweets, especially, were reported more often than at 6 weeks, which was before Easter. Why this might have been an influence in the present study but not in the first (2012) evaluation (which also spanned the Easter holidays) is not clear. Second, many of the 17 classes that completed the checklists were in more deprived areas compared with the larger group who completed the evaluation at baseline and 6 weeks; the families may have found it financially more challenging to maintain some aspects of dietary improvement, such as increased vegetable consumption. Third, only 17 classes completed checklists at all three time points in 2016, compared with 42 in 2012. The smaller number of classes may mean that the findings are likely to be less representative compared with the larger number in the 2012 evaluation.

Data collection and data entry

The second aim of the present evaluation was to determine if useful information on the impact of ELAC on pupils' eating habits could be generated directly by teachers with appropriate external support. To this end, teachers were required to:

1. Ensure that checklists were distributed, completed and collected within defined time periods
2. Register the schools and classes using new software designed for the evaluation
3. Create a list of all pupils in the class using the new software
4. Enter the checklist data at baseline, 6 weeks and 12 weeks for each pupil who had completed the checklist, using the new software

These tasks were within the technical grasp of all staff involved in the evaluation. They had all received face-to-face training using the software. They had clear instructions on how to use the entry modules for class, pupil, and checklist data. Instructions were also available on-line.

Burden, motivation and cooperation

Many of the teachers entered the data themselves, or used a classroom assistant to help them. Some teachers, however, found the task too burdensome. For these classes, the paper checklists were returned to Danone UK for data entry by admin staff. At baseline, 20% of checklists were entered manually. At 6 weeks, 30% were entered manually by trained Danone clerical staff, suggesting that fewer teachers were willing or able to spend the time to enter data. At 12 weeks, in contrast, only 6% of checklists were entered using the online software. This suggests that only a very small percentage of teachers were willing to spend the time to enter data on the third occasion.

Logistical delays were created when returning the paper checklists to Danone UK offices and entering the data manually using admin staff. This, in turn, delayed the preparation of feedback for these classes, reducing the value of the feedback for teaching purposes. Because of teaching demands and holidays in the summer term, most school staff were not able or willing to make the time to enter the week 12 checklist data. Because of these delays, it was not possible to generate the feedback at 12 weeks in a timely way.

In the 2012 evaluation, data entry was carried out by research and Children's Food Trust admin staff. Verbal feedback from teachers in the present evaluation suggested that although the school staff

could do the work, they found it burdensome. While the feedback was well-received, the fall-off in response at 12 weeks and the delays in entering data suggests that the feedback may not have provided sufficient motivation to continue with the study in the face of the burden of data entry. More on this topic will be explored in the teacher survey to be undertaken in January 2017. The survey will also explore the value that teachers placed on the feedback for teaching about healthy lifestyles at baseline and 6 weeks, and whether the feedback at 12 weeks would have had the same value as the feedback at 6 weeks.

Generating timely feedback

A key objective in this study was to generate pupil-friendly feedback for teachers to use as part of their teaching about healthy lifestyles. This included:

- summaries of all class results at each time point
- comparison of individual class results from data collected at baseline with averages from the first ELAC evaluation,[1] and comparison of baseline with findings at 6 weeks
- commentary about how eating habits in a class could be improved from baseline, or how they had changed at subsequent time points

In practice, feedback was generated by PHN Research once or twice per week as data were uploaded from the software company that had designed the data entry module, or direct from Danone where the checklist data were entered manually. While the system for generating feedback worked well, it was not as streamlined as envisaged at the outset of the project. In consequence, there were delays in generating feedback in a timely way for some classes.

One of the purposes of providing feedback on eating habits at 6 weeks was to encourage teachers to review with their class the impact of ELAC. The expectation was that this would help to reinforce the healthy eating messages, and that the changes towards healthy eating would be as great or greater at 12 weeks than those observed at 6 weeks. That this was not the case raises two possibilities. First, the feedback may potentially have been of value, but it was not received quickly enough to make it useful to reinforce learning at 12 weeks, in part because of the Easter break. Second, the small sample size meant that there was not sufficient statistical power to test its impact.

Limitations

Small sample size

In the original proposal, the intention was to have 50 classes in the intervention group and 50 classes in the control group. Due to time and staff limitations, it was not possible to recruit this number. Also, the burden of data entry may have proved to be a barrier to continue with the study. While 38 of the 39 registered intervention classes and 33 of the 34 registered control classes returned data at baseline, by six weeks only 30 and 28 classes, respectively, continued to provide data, and by 12 weeks the overall cooperation rate was 51%. In consequence, for some analyses, the study lacked statistical power. Again, because of small numbers, the findings at 12 weeks especially may have lacked generalizability.

The results from larger sample at 6 weeks were similar to those from the smaller sample that completed the study at all three time points (Table 3 versus Table 7; Table 5 versus Table 8; and Table 6 versus Table 9), suggesting that the smaller sample has some generalizability.

Preparation of data entry module

The original plan for the data entry module included error trapping (when a pupil had not entered data correctly, or had left a line blank). This was intended to improve the quality of the data entered

and to speed the return of feedback. There was also an intention to generate feedback automatically, the aim being to provide teachers with virtually instant feedback for use in teaching. Again, given time and staff limitations, the data entry module was limited to the creation of class lists and checklist data entry. Error trapping and generation of feedback became separate activities, which introduced a delay in the preparation and dissemination of feedback to teachers.

Future objectives

The present evaluation raises several ideas regarding the way in which the value of ELAC could be enhanced.

1. ***Collect further evidence of the impact of ELAC on pupils' eating habits.*** Additional data from schools would provide opportunities for more detailed examination of the ways in which ELAC influences pupils' eating habit.
2. ***Consider introducing a "top up" session at 12 weeks.*** The "backsliding" at 12 weeks suggests that reinforcement of the healthy eating messages could be of value. A top-up session could utilize the existing classroom materials, and suggest specific activities relating to the 6-week feedback on class eating habits.
3. ***Improve methods to collect data on pupils' eating habits.*** Most primary schools in England now have IT suites for pupils. This means that pupils can complete their checklists on-line. This would overcome issues for teaching staff regarding the burden of data entry.
4. ***Develop software to create feedback automatically.*** On-line data entry lays the foundation for automated creation of feedback of the type produced in the present evaluation. This would make the feedback more timely for teaching purposes, enhancing the value of ELAC in the classroom. It would also provide opportunities to create varied tools for teachers in other disciplines (e.g. Maths, English, History, Cultural Studies) using the data available.
5. ***Investigate social desirability bias in checklist completion.*** Within the context of the present study, control schools were aware of the need to delay discussion of healthy eating issues. Contamination may have occurred in the present study; teachers may have spoken in class about healthy eating despite the request not to. A better designed study, independent of ELAC itself, would provide clearer data about issues relating to repeat-completion of the checklists.
6. ***Create and evaluate the impact of a longer-term top-up module.*** The impact of teaching about healthy lifestyle needs to be reinforced at regular intervals. ELAC provides an excellent foundation on which to build further modules on healthy lifestyle for pupils in Years 6 and 7, including diet and physical activity.

Conclusions

The ability of ELAC to improve pupils' eating habits in the short term has been confirmed. The control school data shows that at 6 weeks, the observed improvements are not the result of measurement bias based on repeat administration of the checklist. Coupled with data from the evaluation carried out in 2012, the present findings suggest that wider dissemination of ELAC to support the school curriculum on healthy eating is warranted.

Development of ELAC to include online data collection and automated feedback would enhance its value and make the findings accessible to a greater number of schools.

Acknowledgements

We would like to thank the teachers and staff who gave up their time to come to training sessions and enter data, and the pupils who filled in the checklists.

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Annex 1: Food and Drink checklist

First page of food and drink checklist.[j]

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CHILDREN'S FOOD TRUST Eat better be better

Food Checklist

How to fill in this form

- Complete box on right →

School..... Class..... Pupil initials..... ID .....

Age: □9 □10 □11 *(tick one box)* Sex: □Boy □Girl *(tick one box)* Date.....Time.....

- Please tick the boxes in the form below to tell us about the food and drink you had today and yesterday:
  - Tick the **"Today"** box if you had the food or drink today.
  - Tick the **"Yesterday"** box if you had the food or drink yesterday.
  - If you had the food or drink on both days, tick **both boxes**.
  - If you did not have the food or drink on either day, tick the **"Did not eat or drink"** box.
- Please put at least one tick in every row. Do not put more than two ticks in any row.
- If you make a mistake or you want to change your answer, just cross it out and tick the box you think seems right.
- If you are not sure which box to tick, just make your best guess.
- The foods are divided into sections to make it easier for you to fill out. There is a separate section for take-away meals and ready meals.
- If you had a sandwich, tick a box for the bread (like a brown roll or white sliced bread), another box for the filling (like tuna or peanut butter) and the salad box if you had salad in it.

Thank you!

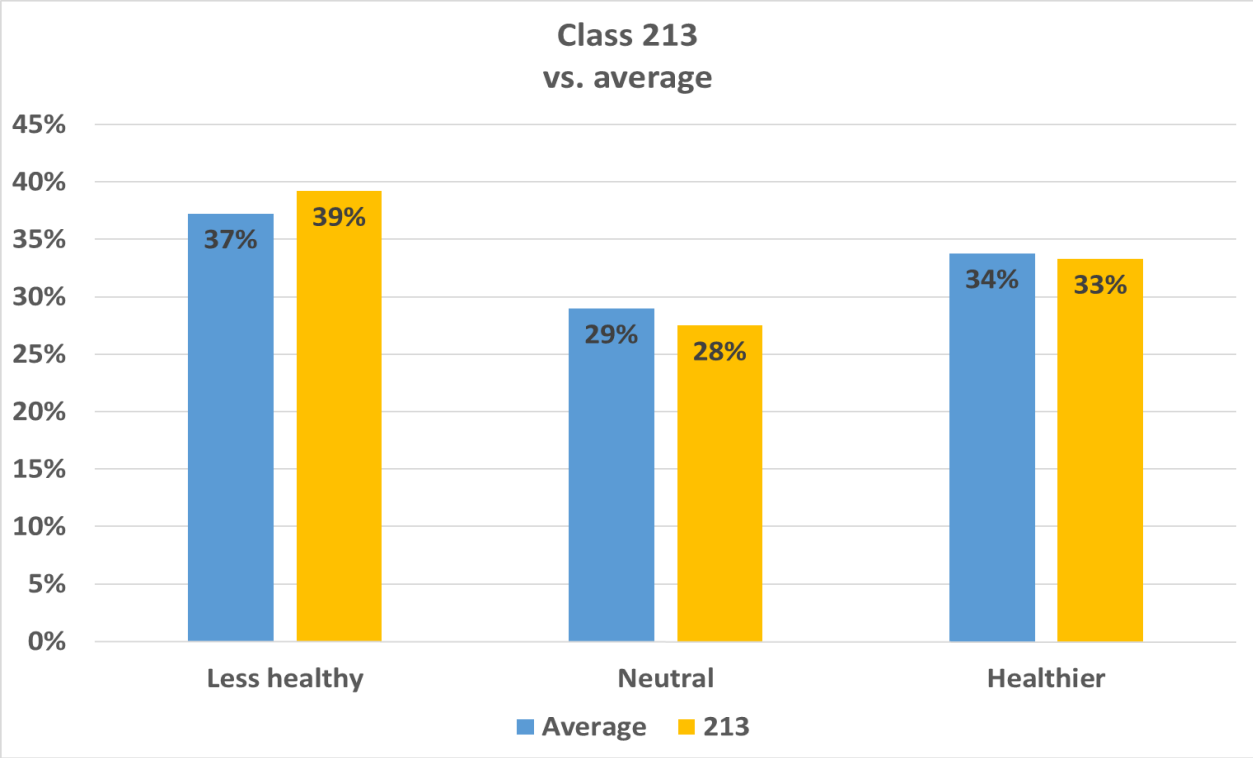
Make sure you put at least one tick in every row

Food or drink item	Did you eat or drink this?		
	Today	Yesterday	Did not eat or drink
Bread, rice, potatoes, pasta and cereals			
Sweet or chocolate breakfast cereals (like Coco Pops, Frosties, honey nut)			
Wholegrain breakfast cereals (like Weetabix, original Cheerios, muesli)			
Other breakfast cereals (like cornflakes, original Special K)			
Porridge or Ready Brek			
White bread, toast, rolls, pita, wraps, bagels, naan, chapatti etc.			
Wholemeal, multi-grain or brown bread, toast, rolls, pita, wraps, bagels etc.			
Crackers			
Pasta, white rice (boiled), couscous			
Wholemeal pasta, brown rice (boiled)			
Tinned spaghetti or tinned pasta			
Instant noodles (like super noodles, pot noodles)			
Fried noodles or rice			
Potatoes - boiled, mashed, jacket			
Potatoes - chips, roast, wedges, smiley faces, etc. (**NOT** take-away – see "take-away" section)			
Pizza made at home or school (**NOT** take-away – see "take-away" section)			

Make sure you put at least one tick in every row before you go on to the next page

[j] Full copy of checklist is available from PHN Research

Annex 2: Class feedback, baseline



Class 213. Well done filling in your baseline data.

This graph compares your class results with the average results for all classes. The percentages shown at the top of each bar are based on the number of items ticked in each category – less healthy, neutral, and healthier – as a percentage of all items ticked.

The eating and drinking habits in your class are slightly less healthy than the average. You chose to eat more of the less healthy items, and fewer of the healthier items.

Think about the ways in which you can make your choices of food and drink more healthy.

In your class, who is eating more healthily, boys or girls? How does this compare with the average for all boys and girls?

Class number	Your class			Average for all boys or girls		
213	Less healthy	Neutral	Healthier	Less healthy	Neutral	Healthier
Boys	41%	27%	32%	38%	29%	33%
Girls	35%	29%	36%	36%	29%	35%

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Annex 3. Supplementary tables

Based on data from 30 intervention classes that completed checklists at baseline and 6 weeks

The changes in eating habits in the 30 classes that provided data at baseline and 6 weeks (Table 7) (percentage net improvement = 5.5%) was statistically significant (p<0.001), and similar to the finding at 6 weeks for the 17 schools that provided data at all three time points (percentage net improvement = 5.8%).

The changes in food and drink choices by socio-demographic factors for the 30 schools that provided data at baseline and 6 weeks showed similar results at 6 weeks to the 17 schools that provided data at all three time points (Table 5). The changes at 6 weeks were statistically significant for all groups except in the bottom third of schools of pupils taking a free school meal.

These supplementary tables support the generalizability of the findings based on the smaller sample of 17 classes presented in the main body of the report.

TABLE 7. NUMBER OF ITEMS CONSUMED AND PERCENTAGE OF TOTAL, BY TYPE OF FOOD OR DRINK, BY PHASE, $N_{CLASSES}$=30

Phase	Type of food or drink			
	Less healthy	*Neutral*	*Healthier*	*% net improvement*
n of items				
Baseline	7340	5875	6789	
6 weeks	5115	4659	5527	
percentage				
Baseline	36.7%	29.4%	33.9%	
6 weeks	33.4%	30.4%	36.1%	
Change	-3.3%	1.0%	2.2%	5.5%

* chi-squared statistic = 38.74, df=2, p<0.001

TABLE 8. PERCENTAGE OF ALL ITEMS CONSUMED, BY TYPE OF FOOD OR DRINK, BY PHASE, BY SEX, AND BY THIRDS OF PERCENTAGE TAKING FREE SCHOOL MEALS (% FSM), PERCENTAGE OF PUPILS WITH ENGLISH AS AN ADDITIONAL LANGUAGE (% EAL), AND IDACI RANK*, BY PHASE, $N_{CLASSES}$=30

		Type of food or drink				
	Phase	**Less healthy**	**Neutral**	**Healthier**		
					% net improvement	*p*
% FSM						
Bottom third	Baseline	33.3%	30.4%	36.3%		
	6 weeks	31.5%	31.0%	37.5%	3.0%	0.114
Middle third	Baseline	38.5%	28.8%	32.8%		
	6 weeks	34.3%	30.5%	35.2%	6.6%	<0.001
Top third	Baseline	37.0%	29.7%	33.3%		
	6 weeks	34.6%	27.6%	37.9%	7.0%	0.030
IDACI						
Bottom third (more deprived)	Baseline	37.3%	29.6%	33.1%		
	6 weeks	33.6%	30.2%	36.1%	6.7%	0.006
Middle third	Baseline	35.9%	29.8%	34.3%		
	6 weeks	37.5%	29.1%	33.4%	6.4%	<0.001
Top third (less deprived)	Baseline	33.7%	30.3%	36.0%		
	6 weeks	35.8%	29.7%	34.6%	3.6%	0.016
% EAL						
Bottom third	Baseline	39.3%	28.7%	31.9%		
	6 weeks	35.2%	30.2%	34.6%	6.8%	0.000
Middle third	Baseline	37.0%	28.3%	34.7%		
	6 weeks	32.1%	30.2%	37.8%	8.0%	0.000
Top third	Baseline	35.1%	30.3%	34.6%		
	6 weeks	33.1%	30.8%	36.1%	3.5%	0.023

* IDACI: Income Deprivation Affecting Children Index

TABLE 9. NUMBER OF ITEMS CONSUMED AND PERCENTAGE OF TOTAL, BY TYPE OF FOOD OR DRINK, BY INTERVENTION GROUP, BY PHASE. $N_{INTERVENTION\ CLASSES}$=30; $N_{CONTROL\ CLASSES}$=28

Intervention group		**Type of food or drink**				
	Phase	Less healthy	Neutral	Healthier		
	n				*% net improvement*	*p*
Intervention	Baseline	6844	5503	6375		
	6 weeks	4848	4456	5258		
Control group	Baseline	4159	3593	3768		
	6 weeks	3317	2891	3174		
	%					
Intervention	Baseline	36.6%	29.4%	34.1%		
	6 weeks	33.3%	30.6%	36.1%	*5.3%*	*<0.001*
Control group	Baseline	36.1%	31.2%	32.7%		
	6 weeks	35.4%	30.8%	33.8%	*1.8%*	*0.223*