Report

Let them eat pizza - an investigation into the healthy eating patterns of primary school children using data from the NFER attitude surveys.

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Contents

1. Background

The NFER attitude surveys[1] have been offered to primary and secondary schools since early 2010. Information has been collected on pupil and parent attitudes to wellbeing issues and school satisfaction. Over 500 schools have taken part in the primary surveys which have involved more than 40,000 parents and 70,000 pupils in years 3 to 6. As part of the survey, parents were asked about their views of the school's approach to healthy eating and their opinions of the school dinners. Children were asked similar questions and also about their eating patterns.

There is currently a huge amount of interest surrounding the issue of healthy eating especially where it concerns children. The government's 5-a-day campaign and Jamie Oliver's campaign to improve school dinners are just two of many. More recently as part of its Change 4 Life public health programme the government launched its Supermeals campaign to encourage families to eat healthily on the cheap[2]. Although the NFER attitude surveys were not designed to look specifically at issues around healthy eating, they provide a rich data source which is nationally representative and allows us to investigate a range of issues around children's wellbeing and education at the regional level.

2. Main Findings

Our investigation found the following:

- Regional variations in healthy eating do exist for primary school pupils. Broadly speaking there appears to be a North-South divide with children in the South generally having a healthier diet. Frequency of eating five fruit and vegetables a day is significantly higher in the South East, London and the East Midlands. Crisps, sweets or chocolate are eaten less often in the South East, London and the South West and takeaway food is eaten more in the North East and less in the South West than other regions.
- Parents being more satisfied with the school canteen and dinner menu is associated with children eating less fruit and vegetables and more takeaway food. It is unclear whether this reflects lack of awareness of a healthy diet among this group of parents or a belief that the school is providing a healthy meal so they do not need to; however, it clearly shows the importance of parental attitudes. The implication is that children will eat more healthily in areas where parents' expectations of school food are higher so it is important that all parents are informed about the importance of healthy eating. If parents are relying on the school to provide a healthy diet education about the importance of a healthy diet throughout the day may be of value.
- There is evidence that healthy eating education could be working. Where pupils report that their school says it is important to eat healthy food there is a consistent link with the pupils eating patterns in all three of the food areas investigated; consumption of five fruit and vegetables a day, crisps, sweets and

[1] http://www.nfer.ac.uk/schools/nfer-attitude-surveys-pupils-and-parents/
[2] http://www.nhs.uk/Change4Life/Pages/supermeals-zone.aspx

chocolate and takeaway food. Schools have an important role to play in getting the healthy eating message across to both pupils and parents. The provision of healthy, affordable school meals and involvement in one of the many campaigns aimed to increase awareness of healthy eating and get people growing and cooking their own food, would help to achieve this.

- It was found that girls appear to have healthier eating patterns than boys. This was most evident in their consumption of fruit and vegetables.
- Younger pupils and in particular those in Year 3 eat fewer crisps, sweets and chocolate than older children. This may be because they have less control over purchasing these items. They also report eating more takeaway food though possible reasons for this are less obvious.

3. Methodology

Children were asked about their consumption of fruit and vegetables, crisps, sweets and chocolate and takeaway food. Children were asked to report how often they ate these three types of food, 'Most days (5 days or more)', 'Some days (less than 5 days)', 'Not very often (less than once a week)' or 'Never'. Their responses were converted into scores with 'Never' scoring 0 and 'Most days' scoring 3 and then used as the outcome variable in multilevel modelling.

An initial exploratory analysis of the data found some interesting variations in eating patterns between different groups of children such as boys and girls and the four primary year groups. Regional variations were also found in their responses (Figures 4-6 in the Appendix). It would appear that there may be a north/south divide in terms of children's eating patterns with more fruit and vegetables being consumed in the eastern and southern regions and more crisps, sweets, chocolate and takeaway food in the north. There are exceptions to this broad generalisation, notably the consumption of takeaway food in London, but there was enough evidence to warrant further investigation using multilevel modelling where background factors such as age, gender, deprivation and education are controlled for.

Parents were asked whether they were satisfied with school's facilities, including the canteen. They were also asked whether they agreed with the statement that the school provides a healthy dinner menu and whether the school encourages their child to eat healthily (Table 1 below). Again, significant differences were found across the nine regions. The South East had the lowest percentage of parents strongly agreeing that they were satisfied with the school's canteen, that the school provides a healthy dinner menu and that the school encouraged their child to eat healthily. In general the proportion of parents agreeing with these statements was higher in the north. This could reflect higher standards in school canteens in the north or higher expectations of parents in the south.

Table 1: Percentage of parents who strongly agree

	I am satisfied with the school's canteen	The school provides a healthy dinner menu	The school encourages my child to eat healthily
North East	20	23	39
North West/Merseyside	24	28	43
Yorkshire & The Humber	23	28	42
East Midlands	21	26	44
West Midlands	19	25	40
Eastern	23	24	37
London	22	29	39
South East	17	21	36
South West	20	25	42

Children were also asked whether their school says it is important to eat healthy food. They were able to respond as follows; 'Yes', 'No' or 'Not Sure'. We found a positive correlation[3] between pupils and parents reporting that the school encouraged the pupils to have a healthy diet.

In order to explore the relationship between these background factors and the eating behaviour of primary school children three[4] multilevel models were fitted to the data. It was possible to match the responses from parents and pupils at the same school where both surveys had been conducted (349 schools and 53,064 pupils). This allowed us to look at the relationship between parents views at the school level and individual children's eating patterns. The outcome variables were the children's reported consumption of fruit and vegetables, crisps, sweets and chocolate and takeaway food. The following background factors were included in each model:

- Year group
- Gender
- Government Office Region
- Extent of agreement from pupils that their school said it was important to eat healthy food[5]

[3] Pearson Correlation=0.453, sig level=0.001, N=349
[4] One for each outcome.
[5] These were scores of 0 for a response of "No", 1 for a response of "Not Sure" and 2 for a response of "Yes".

- The extent to which parents agreed with the statement that the school provides a healthy dinner menu[6]
- The extent to which parents agreed that the school encourages their child to eat healthily
- How satisfied the parents are with the school canteen
- The percentage of the pupils entitled to free school meals
- The overall attainment of the school at key stage two

The results of the three models are illustrated by the effect sizes[7] in Tables 3 to 5 and illustrated by Figures 1 to 3 in Section 6. Only statistically significant effects are shown in the charts and tables[8]. Any variables not shown in a particular chart or table were found not to be significantly associated with the outcome.

4. Eating Patterns

4.1 Region, Age and Gender.

The results of the analysis showed that having controlled for various background factors significant regional variations in children's' eating patterns still remain:

- Pupils' reported consumption of fruit and vegetables is significantly higher in the East Midlands, London and the South East than the other regions.
- Pupils in London, the South West and the South East eat crisps, sweets or chocolate significantly less often than children in other regions.
- Pupils in the North East reported that they ate takeaway food significantly more often than those in other regions and those in the South West significantly less often.

Very broadly these findings suggest a North/South divide in children's eating patterns. There is evidence from other studies that the North/South divide may exist. Craggs (2004) found that the North East had the lowest consumption of fruit and vegetables. The Health Survey for England (Craig *et al*., 2008) found significant regional variations in mean BMI (Body Mass Index) but not in obesity. Lower values of mean BMI were found in the South East Coast, South Central and the South West than in most other regions. The Office for National Statistics (2011) reported that

[6] Both this score and the next two were on a scale from 0 to 4 where 0 would indicate 100 per cent of parents indicating that they strongly disagree and 4 would indicate that 100 per cent of parents strongly agree.

[7] In this report effect sizes are defined for categorical variables (e.g regions) as the difference between groups in terms of the number of standard deviations of change in the outcome. For continuous variables (e.g. parental satisfaction with school canteen) they are the number of standard deviations of change in the outcome associated with a change of 1 standard deviation in the predictor.

[8] Variables that were not statistically significantly related to particular outcomes of interest were removed from the multilevel model using a backwards stepwise procedure.

although life expectancy had gone up overall, the gap between the North and South had widened with higher life expectancy seen in the South.

We found some differences in children's diets between the four year groups.

- No differences were found in the reported consumption of fruit and vegetables between the four year groups.
- Pupils in year groups 4, 5 and 6 eat sweets, crisps and chocolate more often than pupils in year 3.
- Interestingly older pupils reported that they had takeaway food less often than younger pupils. There is no obvious reason for this.

Gender differences were also found:

- Girls reported eating five fruit and vegetables more often than boys
- Girls eat crisps, sweets and chocolate less often than boys.
- Girls have takeaway food less often than boys.

The results from the models also showed that the consumption of fruit and vegetables was higher in primary schools with a higher level of attainment at key stage two. Higher attainment was also associated with a lower consumption of sweets, crisps and chocolate and takeaway food. Higher levels of deprivation as measured by the percentage of pupils in the school eligible for free school meals are significantly associated with an increase in consumption of takeaway food. No relationship was found between deprivation at the school level and the frequency of eating crisps, sweets and chocolate or five fruit and vegetables.

4.2 Role of the Parents

Parents' attitudes were found to be associated with some aspects of children's diets.

- Interestingly, in schools where parents reported higher levels of satisfaction with the school canteen this was associated with a significant reduction in fruit and vegetable consumption. This may suggest that some parents are satisfied that the canteen is giving their children a healthy diet and so are less conscientious about ensuring that their children eat the recommended amount of fruit and vegetables at home. Or, it could mean that some parents do not have strong beliefs about the importance of eating healthily so do not eat a lot of fruit and vegetables in the home and are satisfied with the school's provision, even where it may not include a large amount of fruit and vegetables.
- No association was found between parents' views and pupil's consumption of sweets, crisps and chocolate.
- Higher consumption of takeaway food was associated with parents being more likely to agree that the school provides a healthy dinner menu. The reasons for this are unclear, but may be similar to the reasons given for eating less fruit and vegetables above: where they are happy that the school provides a healthy lunch

they are less concerned with providing a healthy meal at home, or parents who are uncritical about school meals do not place high expectations on the food provided at home either. .

4.3 Role of the School

The role of the school was found to be consistently important to the children's diet. In schools where the pupils reported that the school said it was important to eat healthy food the children reported eating significantly more fruit and vegetables, fewer sweets, crisps and chocolate and had takeaway food less often.

5. Conclusion

It would seem that, having controlled for background factors such as gender, age, deprivation and education, regional variations in pupils' patterns of healthy eating do exist. Very broadly speaking pupils in the South eat more fruit and vegetables and fewer crisps, sweets, chocolate and takeaway food than those in the North. We also found that boys and pupils in schools with lower attainment levels and higher proportions of pupils eligible for free school meals had less healthy diets. It is important to be aware of these variations in diet in order that healthy eating campaigns aimed at parents and pupils can be effectively targeted.

The role of parents is critical in ensuring that children have a healthy diet in terms of what the children eat at home and the standards expected of the school canteen by parents. We found that pupils eating less fruit and vegetables and more takeaway food were associated with parents being more satisfied with meals provided by the school canteen. It may be that parents are relying on the schools to give their children a healthy meal or that they have less awareness of healthy eating. Given this it is important that schools provide healthy food during the school day. School food is no longer inspected by Ofsted so it is important that parents and school leaders maintain an interest in the quality of school dinners.

There is huge potential for schools to play an important role in improving children's diets with healthy school meals and targeted campaigns. There is evidence from the latest annual survey of school food that take up of school lunches in primary schools has gone up to 44.1% in 2010-2011 an increase of 2.5% from 2009-2010.(Nelson *et al*., 2011. The School Food Trust (2011) found that 58% of parents whose children did not eat school lunches would do so if they were cheaper but they have also reported that 15% of families entitled to free school meals were not taking them. From next year as a result of the 2011 Education Act schools will be able to offer cheap meal deals to certain groups of pupils such as siblings or new pupils. (DfE, 2012). There is evidence again from the Schools Food Trust that such promotions can be very successful but with school food no longer being inspected by Ofsted there may be a temptation in the future for schools to lower standards in order to cut prices.

We found consistent evidence to support educational campaigns; pupils who report that they are encouraged to eat healthy food by their school are more likely to eat more fruit and vegetables, less crisps, sweets and chocolate and fewer takeaway meals. Given the high correlation between pupils and parents reporting that the school encouraged the pupils to have a healthy diet the message from the school campaigns does seem to be reaching parents as well as pupils but are likely to be more effective if they are designed for both.

In July 2010 the NFER undertook a qualitative evaluation of The Food for Life Partnership Programme (Teeman *et al*., 2011) This programme was based in schools but also aimed to get families and communities involved in encouraging healthy eating and food awareness. It was found to be successful in engaging parents and other organisations in the community and in many other areas including increasing the uptake of school meals and there was a perceived improvement in pupil attainment and behaviour. More recently a report by the NFER for Defra (Department for the Environment, Food and Rural Affairs) and Garden Organic found that growing food in schools improved the pupils' science results, their willingness to try new foods and their ability to identify a variety of fruit and vegetables (Nelson *et al*., 2012) These are examples of initiatives that provide robust evidence of the positive impact of education programmes on the eating habits of children.

6. Statistical details

The data presented in this report was based on responses from 70,724 pupils at 523 schools and 42,492 parents at 563 schools. In order to ensure that the schools taking part are representative of primary schools nationally and within each of the nine Government Office Regions the data was weighted by school type, region and percentage of pupils eligible for free school meals. In order to include parent's views at the school level in the multilevel models the pupil and parent data was matched and only pupils at school where parent surveys were also available were included in the analysis. The number of pupils remaining after this matching is shown in Table 2.

Table 2: Number of pupils in data set for multilevel modelling

Year Group	Boys	Girls	Total
Year 3	6522	6460	12982
Year 4	6484	6437	12921
Year 5	6850	6731	13581
Year 6	6902	6678	13580
Total	26758	26306	53064

Three level multilevel models were used to investigate whether there were any regional differences in pupil's diets in terms of three outcome measures; the frequency of eating 'five fruit and vegetables', 'crisps, sweets or chocolate' and 'takeaway food'. The data from pupils was nested within year groups and then within schools. This allowed us to account for other influencing factors and to allow for the fact that children were grouped within year groups and schools and may therefore have similar influences on their diet. A backwards stepwise technique was used to fit the multilevel models and the resulting coefficients are given in Tables 3 to 5 and illustrated by Figures 1 to 3 below.

Figure 1: Frequency of eating at least five fruit and vegetables

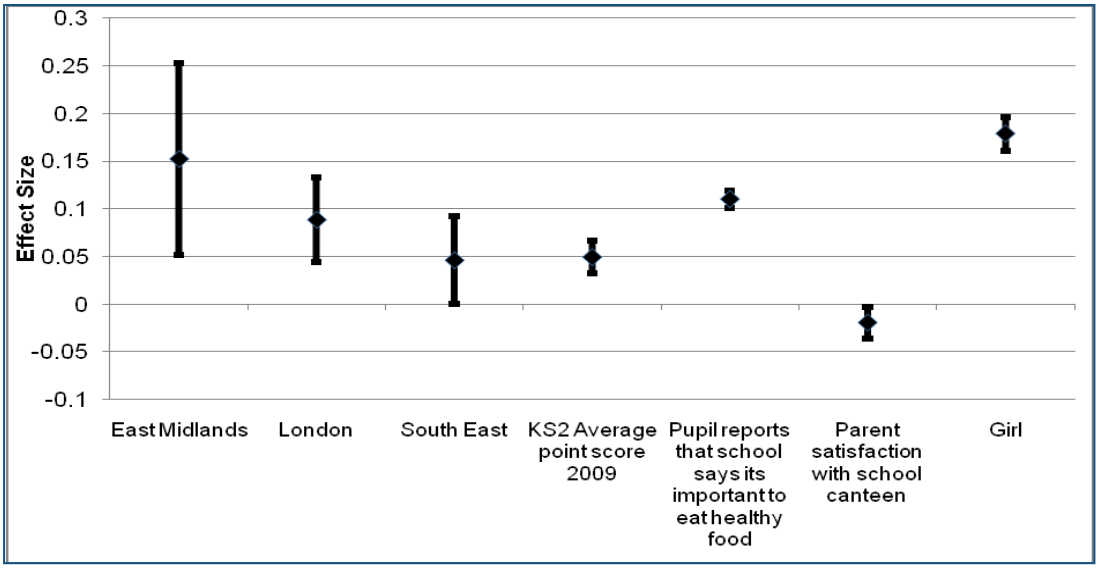

Table 3: Frequency of eating at least five fruit and vegetables

Variable	Effect Size	Standard Error
East Midlands	0.152	0.051
London	0.088	0.023
South East	0.046	0.023
KS2 Average point score	0.049	0.009
Pupil reports that school says it's important to eat healthy food	0.110	0.005
Parent satisfaction with school canteen	-0.019	0.008
Girl	0.179	0.009

Figure 2: Frequency of eating crisps, sweets or chocolate

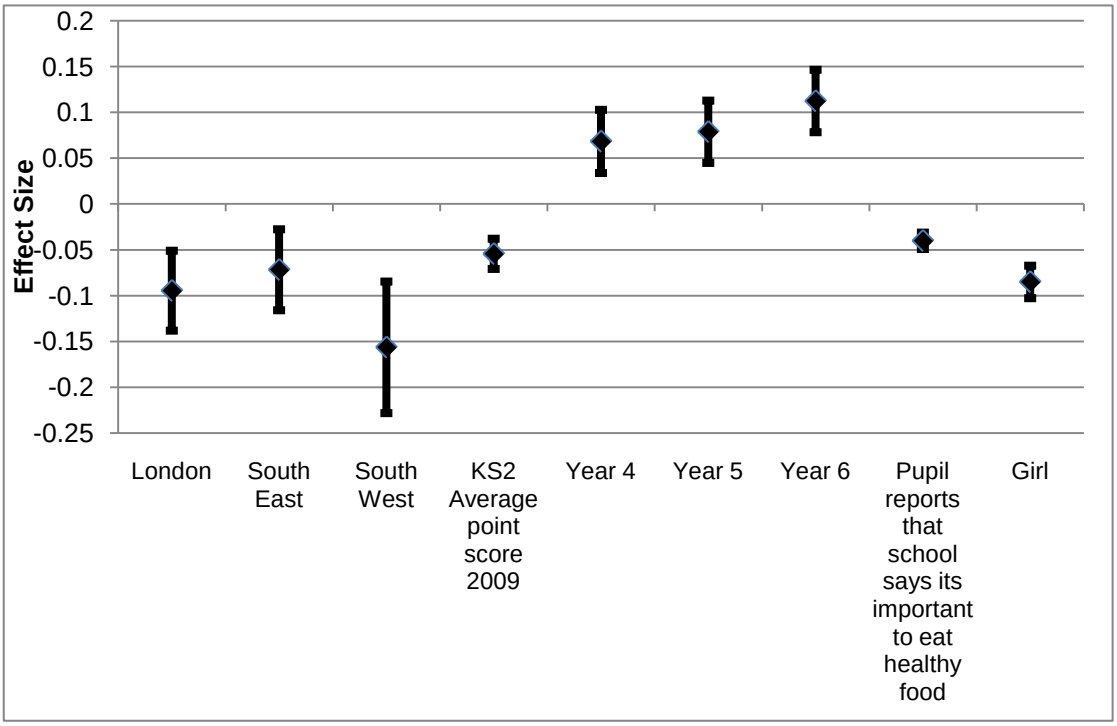

Table 4: Frequency of eating crisps, sweets or chocolate

Variable	Effect Size	Standard Error
London	-0.095	0.022
South East	-0.072	0.023
South West	-0.156	0.037
KS2 Average point score 2009	-0.054	0.008
Year 4	0.068	0.018
Year 5	0.079	0.017
Year 6	0.112	0.017
Pupil reports that school says it's important to eat healthy food	-0.040	0.005
Girl	-0.085	0.009

Figure 3: Frequency of eating takeaway food

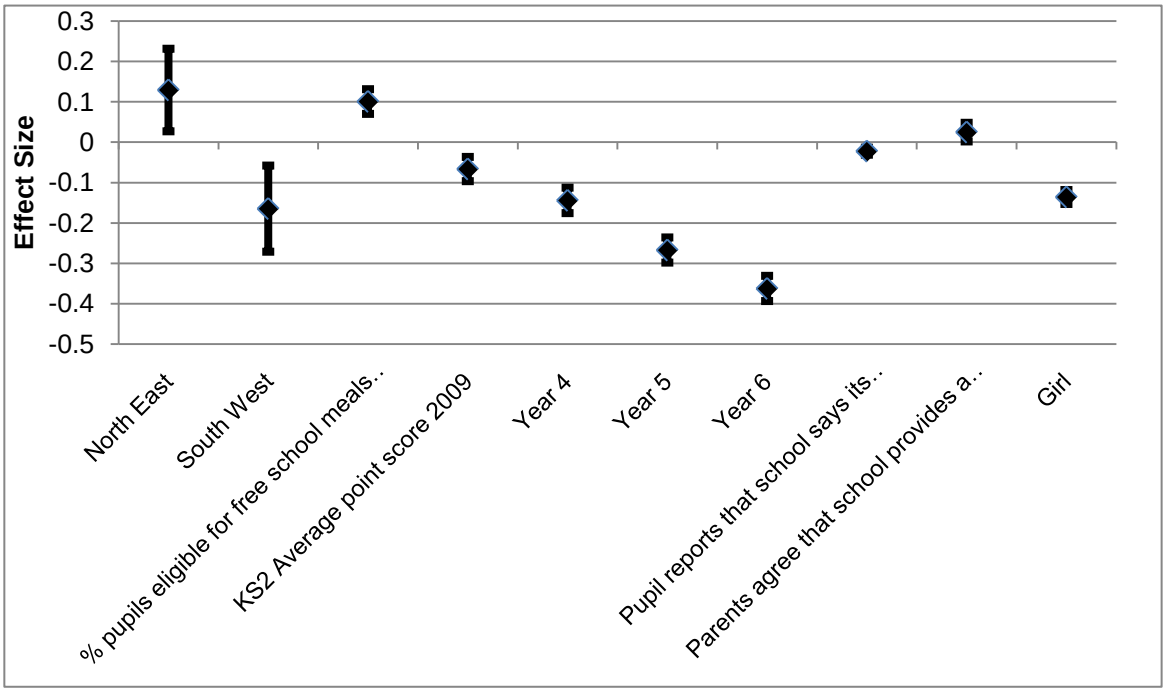

Table 5: Frequency of eating takeaway food

Variable	Effect Size	Standard Error
North East	0.129	0.052
South West	-0.165	0.054
% pupils eligible for free school meals	0.100	0.016
KS2 Average point score	-0.067	0.015
Year 4	-0.144	0.016
Year 5	-0.267	0.016
Year 6	-0.362	0.016
Pupil reports that school says it's important to eat healthy food	-0.023	0.004
Parents agree that school provides a healthy dinner menu	0.025	0.012
Girl	-0.136	0.009

7. References

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Appendix 1

Figure 4: I eat 5 pieces of fruit or vegetables most days (5 days or more)

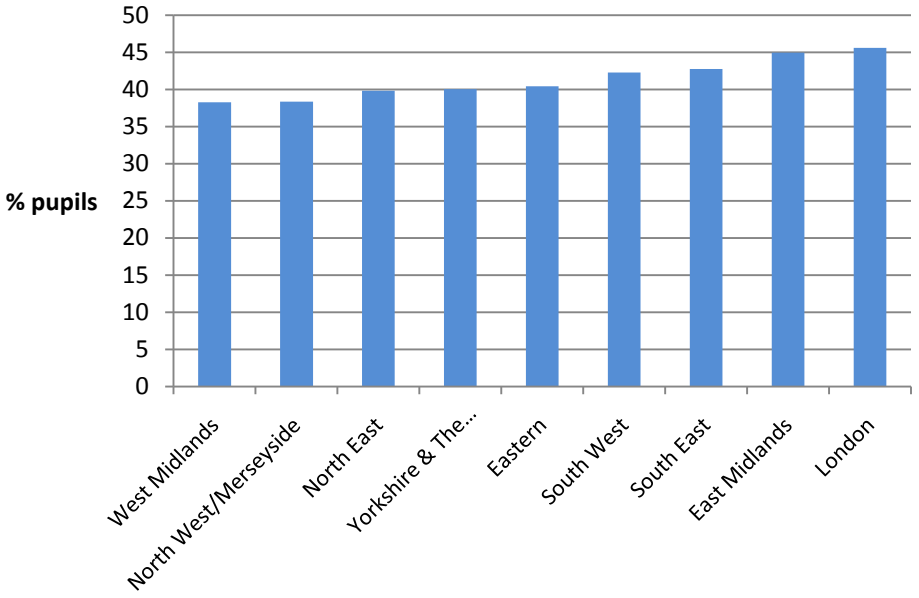


Figure 5: I eat crisps, sweets or chocolate most days (5 days or more)

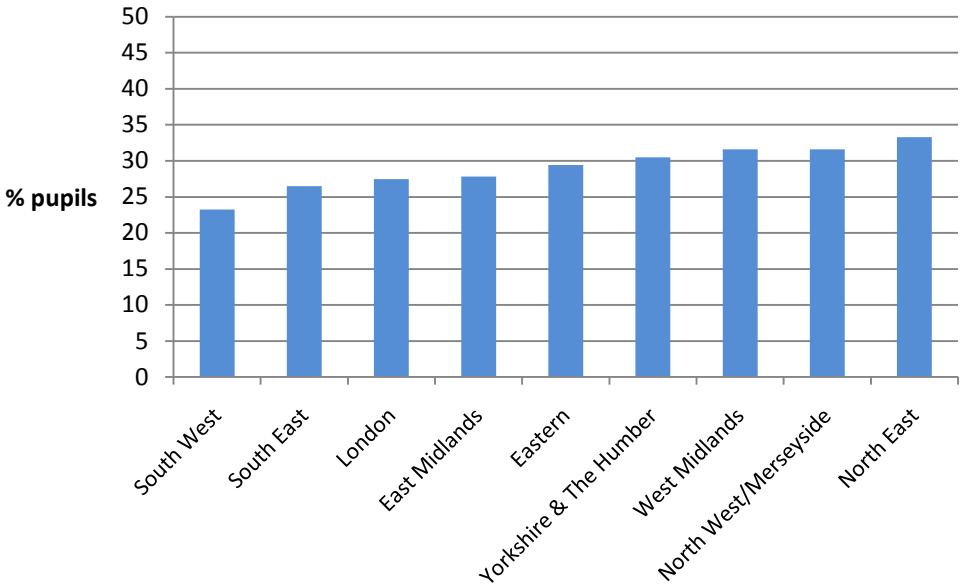
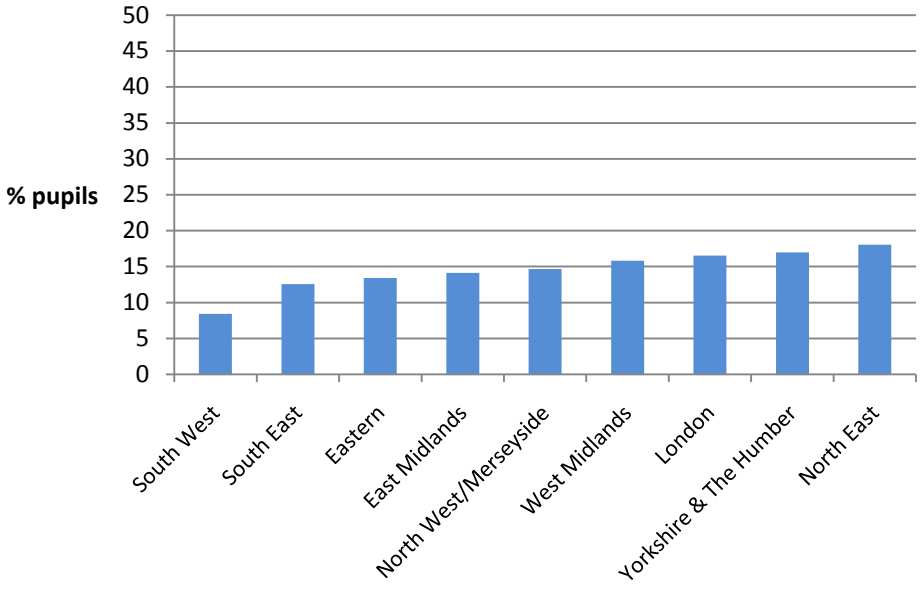


Figure 6: I eat takeaway food most days (5 days or more)



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