



## Nudging adolescents towards plant-based food choices

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## Background – school nutrition & food choice

**School children** [8.6M; 4.6M Primary & 3.2M Secondary state schools England<sup>1</sup>]

Spend **190 days** of the year in school

### Childhood Obesity in England

Reception (4-5y) 9.3% obese »»»»»»»» Year 6 (10-11y) 19.8% obese<sup>2</sup>  
 Secondary schools : 1/3 of all 11-15 year olds overweight (including obese)<sup>3</sup>  
 Boys – 14% overweight & 20% obese  
 Girls – 17% overweight & 19% obese

### Eating Habits

↓ children's risk of health problems, both long & short term  
 establishing good eating habits that will be carried into adulthood

**school food environment is an obvious setting for a public health intervention**

school food is a way of addressing dietary disparities between children of different socio-economic backgrounds

<sup>1</sup>DfE 2016 Schools, Pupils and their Characteristics: January 2016  
<sup>2</sup>DH 2016 National Child Measurement Programme: England, 2015/16 school year.  
<sup>3</sup>Craig & Mindell 2015 Health Survey for England 2014: Health, social care and lifestyles. HSCIC

## Adolescents' diet & food choice

- Adolescents' diet falls short of dietary recommendations
- Excessive intakes of saturated fat and sugar, along with low fruit and vegetable consumption<sup>1</sup>
- Poor food choice; fast or grab-and-go foods; low intake of plant-based foods
- Mirrored in school canteens, where students commonly bypass freshly prepared nutrient rich meals<sup>2</sup>

*To assess the impact of behavioural nudge tactics on students' food choices*

**Impact** – daily food choice largely automatic; influenced by environmental nudge strategies

**Small changes** to the choice architecture to 'nudge' students towards certain food choices

**Exclusions:** informing individuals; eliminating choice

1. Bates et al. National Diet and Nutrition Survey: Results from Years 1 to 4 combined of the rolling programme for 2008 and 2009 to 2011 and 2012. London, 2014.  
 2. Ehsani et al Meeting school food standards - students' food choice and free school meals. Public Health Nutr. 2013; 16, 2162-2168.

## The Schools

2 inner city secondary schools  
Yorkshire  
11- 18 year old students

*Intervention school:*

~ 1100 students

Free School Meal\* 33% [National average 14.6%]

English Not as First Language 26% [National average 14.3%]

*Control school:* size, FSM, ENFL, same catering co.

*\*The Free School Meal programme is a national programme providing a free school meal for students of low income families*

## 3 week menu cycle

Dish of the day  
Nutritionally valuable

| WEEK 3              | MONDAY  | TUESDAY   | WEDNESDAY   | THURSDAY  | FRIDAY  |
|---------------------|---|---|---|---|---|
| MAIN MEAL           | Mince Lamb & Vegetable Pie With Baby Boiled Potatoes.   | Roast Turkey and Stuffing with Gravy Oven Roast and Creamy Mash   | Beef Casserole & Dumplings With Savoury Wedges  | Roast Pork with Apple Sauce And Creamy Mash   | Savoury Mince & Yorkshire Pudding Baby Boiled Potatoes  |
|                     | Chicken Curry and Rice  | Quorn Shepherd's Pie  | Salmon & Broccoli Bake or Homemade Salmon Fishcakes   | Beef Lasagne  | Fish in Crispy Batter with Parsley Sauce and Chipped Potatoes   |
| VEGETARIAN          | Homemade Pizza  | Corn & Leek Quiche  | Cheese Pie  | Pasta Bake  | Vegetable Curry & Rice  |
| VEGETABLES          | Broccoli/Cauliflower  | Sweetcorn   | Sliced Carrots  | Spring Cabbage  | Mushy peas  |
|                     | Mixed Salads  | Mixed Salads  | Mixed Salads  | Mixed Salads  | Mixed Salads  |
| HOT DESSERTS        | Apple & Lemon Roll & Custard  | Orange Sponge & Chocolate Sauce   | Flan Jeanette & Custard   | Chocolate Sponge & Vanilla Sauce  | Farmhouse Bake & Custard  |
| ADDITIONAL DESSERTS | Fresh Fruit Mixed Fruit Bags<br>Fresh Fruit Salad<br>Fruit Yoghurt<br>Anged Delight<br>Fruit Flapjack | Fresh Fruit Mixed Fruit Bags<br>Fresh Fruit Salad<br>Fruit Yoghurt<br>Fruit Jelly<br>Fruit Muffins                        | Fresh Fruit Mixed Fruit Bags<br>Fresh Fruit Salad<br>Fruit Yoghurt<br>Chocolate Dream<br>Fruit Flapjack                   | Fresh Fruit Mixed Fruit Bags<br>Fresh Fruit Salad<br>Fruit Yoghurt<br>Jelly Whip<br>Fruit Muffins                         | Fresh Fruit Mixed Fruit Bags<br>Fresh Fruit Salad<br>Fruit Yoghurt<br>Chocolate Velvet<br>Fruit Flapjack                  |
| DRINKS              | Fruit Smoothies<br>Aqua Juice<br>Semi Skimmed Milk<br>Fresh Fruit Juices<br>Hot Drinks                | Fruit Smoothies<br>Aqua Juice<br>Semi Skimmed Milk<br>Fresh Fruit Juices<br>Hot Drinks                                    | Fruit Smoothies<br>Aqua Juice<br>Semi Skimmed Milk<br>Fresh Fruit Juices<br>Hot Drinks                                    | Fruit Smoothies<br>Aqua Juice<br>Semi Skimmed Milk<br>Fresh Fruit Juices<br>Hot Drinks                                    | Fruit Smoothies<br>Aqua Juice<br>Semi Skimmed Milk<br>Fresh Fruit Juices<br>Hot Drinks                                    |
| HOT 'Lite Bites'    | Chicken Joes's  | Chicken Joes's  | Chicken Joes's  | Chicken Joes's  | Chicken Joes's  |
|                     | Variety Pizza   | Variety Pizza   | Variety Pizza   | Variety Pizza   | Variety Pizza   |
| Pasta               | Pinetru bakecu  | Pinetru bakecu  | Pinetru bakecu  | Pinetru bakecu  | Pinetru bakecu  |
|                     | Pasta King  | Pasta King  | Pasta King  | Pasta King  | Pasta King  |
| Grab & Go items     | Baguettes<br>*Homemade Beef Patties in bun  | Filled Baguettes<br>*Chicken Breast Filled in bun   | Filled Baguettes<br>*Spicy Chicken Drumsticks   | Filled Baguettes<br>*Homemade Beef Pattie in bun  | Filled Baguettes<br>*Chicken Breast Filled in bun.  |
|                     | COLD 'Lite Bites' & Salads  | Tortilla Wraps/Pitta Assorted Sandwiches<br>Speciality Sandwiches<br>Filled Baguettes<br>Mixed Salad Tubs<br>Pasta Salads | Tortilla Wraps/Pitta Assorted Sandwiches<br>Speciality Sandwiches<br>Filled Baguettes<br>Mixed Salad Tubs<br>Pasta Salads | Tortilla Wraps/Pitta Assorted Sandwiches<br>Speciality Sandwiches<br>Filled Baguettes<br>Mixed Salad Tubs<br>Pasta Salads | Tortilla Wraps/Pitta Assorted Sandwiches<br>Speciality Sandwiches<br>Filled Baguettes<br>Mixed Salad Tubs<br>Pasta Salads |

## Design, implementation & test of nudges

### Designated food items to be promoted – our plant-based foods

- Menu cycles for the schools
- Recipes from the catering company
- Specificity of the codes used in the point of sale data

#### Foods selected:

- *Freshly prepared daily specials – vegetarian*
- *Sandwiches containing salad*
- *Whole fruit*
- *Fruit pots*

## Design, implementation & test of nudges

### Nudge strategies:

- Observation visits: mapping out the canteen, photographing food on offer (layout, presentation), canteen in action
- Focus groups with students
- Review of previous studies
- Initial list of potential strategies
- Close consultation / discussion with catering staff, catering company & school leadership

## Nudge strategies

| Freshly prepared daily specials – vegetarian | Sandwiches containing salad  | Fruit pots                            | Whole fruit                  |
|--|------------------------------|---------------------------------------|------------------------------|
| <i>Disposable pots/trays</i>                 | <i>Stickers on packaging</i> |                                       | <i>Pyramid display stand</i> |
| <i>Prefilled pots/trays</i>                  | <i>End of shelf label</i>    |                                       | <i>Prominent position</i>    |
| <i>Poster displayed in holder</i>            |                              | <i>Window sticker in display unit</i> |                              |
| <i>Increased numbers on display</i>          |                              |                                       |                              |

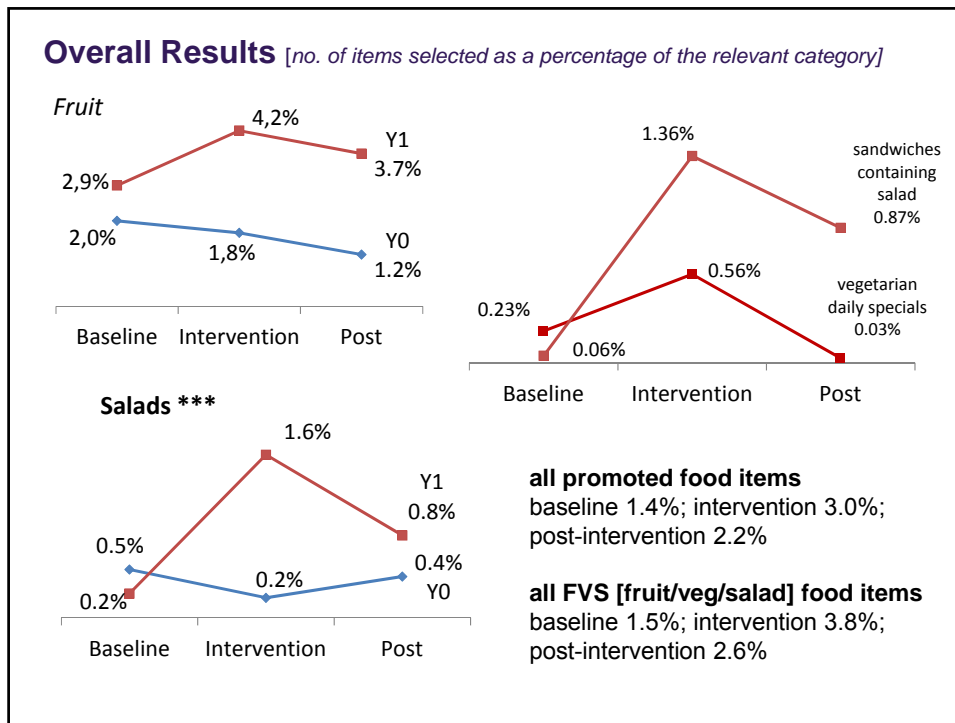
*Intervention did not involve any changes to the food on offer to students, and the changes were not publicised overtly to students*

Intervention for 6 weeks in Summer term

- Baseline: 29 weeks
- Intervention: 6 weeks - students made choices within the adjusted choice architecture
- Post-intervention: 3 weeks – choice architecture reinstated to its baseline state for the remainder of the summer term

## Data analysis

- Data for complete academic year and previous year
- All food & drink choices throughout the day
- >200 000 transactions
- Data analysis:
  - Food choice patterns** [between year and within year]
  - Selection of food items** % of all items within relevant categories
  - Independent effect of the intervention** on the uptake of promoted food items



## Logistic Regression Analysis

**Logistic regression models** to see if various food items could be predicted [covariates of FSM entitlement, year group, price, day of week, time (baseline, intervention, post intervention)]

**Independent effect of the intervention:** controlling for everything else (FSM, price, day of the week, year group) students are *2.5 times more likely to choose a 'nudged' food during the intervention* (relative to baseline)

**Independent effect of the intervention:** controlling for everything else (FSM, price, day of the week, year group) students are *3 times more likely to choose a FVS [Fruit/Veg/Salad] item during intervention* (relative to baseline)

## Further work

- Low starting point for plant-based foods  
[daily average of 3 fruit pots & 6 pieces of fruit – compared to 236 cookies & traybakes]
- Pilot study – larger trial recommended
- Nudge strategies promoted designated foods; further nudges to demote other items
- The different nudge strategies' relative contributions to the effects observed
- Spillover effect seen in salads

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