



Child nutrition and school life outcomes

Presenters: *Annik Sorhaindo and Ricardo Sabates*

In collaboration with Leon Feinstein and the ALSPAC team, Bristol

Centre for Research on the Wider Benefits of Learning

Institute of Education, University of London

Introduction and background

- Nutrition is important for health – 5 of 10 leading risks as causes of disease are related to nutrition.
- Diet of children at top of political agenda for health repercussions later in life and immediate effects on physical and mental health and overall well-being.
- Popular interest grew in 2005 with *Jamie's School Dinners*.
- Raised questions about the impact of unhealthy diets on the wellbeing of our children.
- Literature review commissioned by the Smith Institute followed by empirical research using ALSPAC data.
- Here, I will summarise the key findings on relationship between nutrition and educational and school outcomes for children.



Aim and research questions

The aim of this review was to draw together research across disciplines in medicine, psychology and sociology to construct an image of the complex relationships between nutrition and school outcomes.

1. How does nutrition impact upon health outcomes in children?
2. How can the health outcomes that manifest as a result of nutrition impact upon school life experiences and outcomes?



Methodology

- Titles were sourced through a snowballing method – searches of databases and websites, and advice from professionals working in the field.
- Not intended to be a systematic review.
- Was not limited to studies using experimental methods or to large sample sizes.
- Do not aim to measure specific effect sizes, nor provide an exhaustive account of the literature published in the area.
- Aim to provide a conceptual review of the relevant research in child nutrition that indicates potential for impacts on school outcomes.



Policy context

- £220 million new funding grants to schools and LEAs to improve school meals.
- School Meals Review Panel to advise revision of minimum nutrition standards.
- Minimum nutrition standards to be rolled out from September 2006.
- School Foods Trust set up to provide independent support to LEAs and schools to improve the standard of school meals.



Policy context

- Plans to enable parents to work with schools and the School Foods Trust to improve the quality of children's school meals.
- Ofsted to review a school's approach to healthy eating as part of regular inspections.
- New guidance for schools and LEAs on drawing up catering contracts to source healthy school meals' services and healthy food in vending machines and tuck shops, or breakfast clubs.
- New or upgraded school kitchen facilities where fresh produce can be prepared and served.

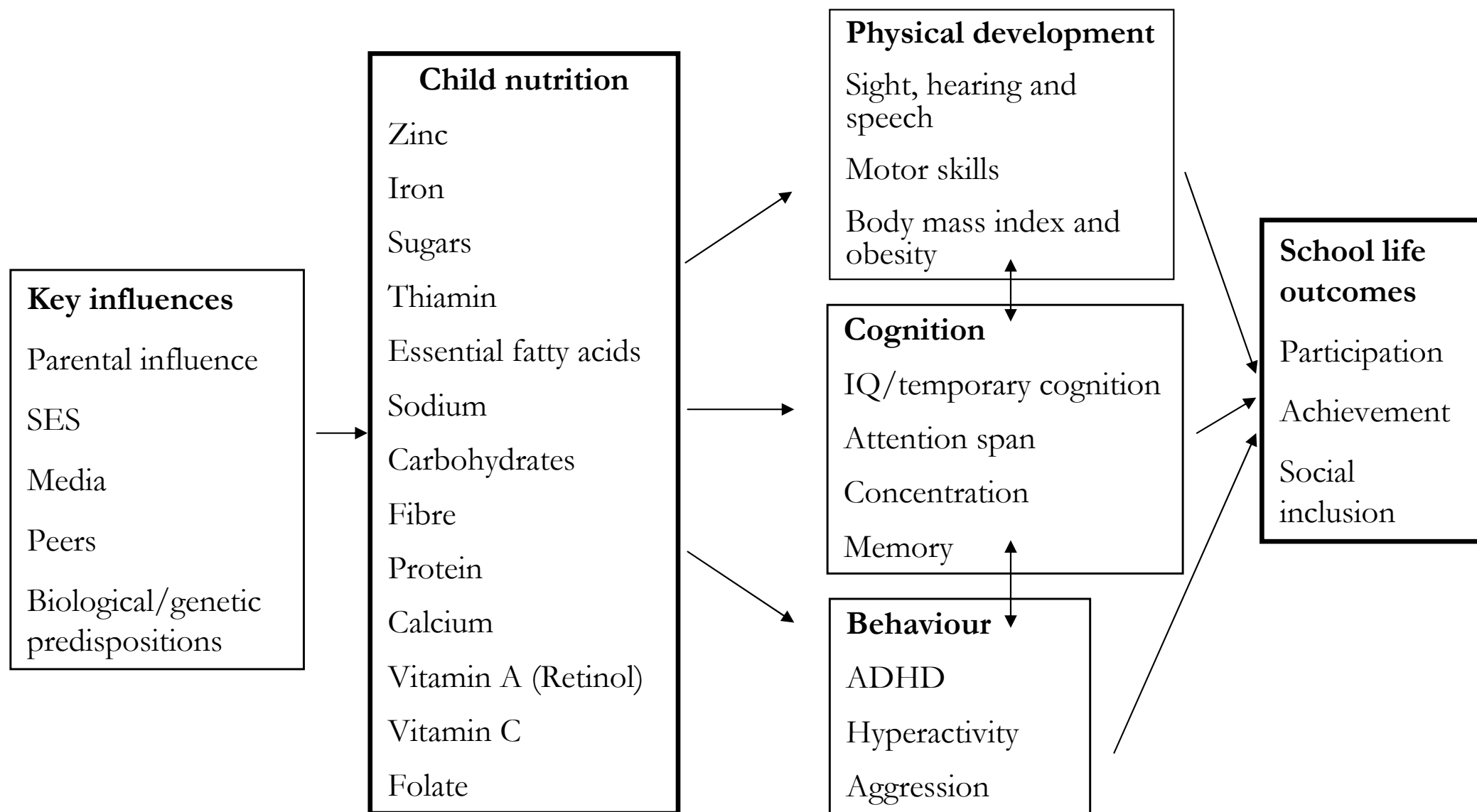


The range of outcomes for which nutrition matters.

- Developmental disorders *e.g.* dyslexia and dyspraxia
- Obesity
- Memory
- Concentration
- Intelligence
- Attention span
- Attention-Deficit-Hyperactivity Disorder
- Aggression
- Achievement



What are the influences on nutrition?



Key findings




Food preferences are affected by social and family factors such as the behaviour of parents and peers, advertising and marketing practices related to food consumption.




Therefore, interventions designed to promote healthy eating among children should address all of these factors.




Key findings


 Children with nutritional deficiencies are particularly susceptible to the moment-to-moment metabolic changes that impact upon cognitive ability and performance of the brain.

 Maintaining adequate levels of glucose throughout the day contributes to optimising cognition, suggesting that nutritional intake should be designed to sustain an adequate level of glucose and to minimise fluctuations between meals.



Key findings

 Nutrition is believed to impact upon behaviour, which has the potential to affect school performance and interaction with peers, and compromise self-esteem.

 Stigmatisation and exclusion in the school environment can often accompany overweight and obese status among children and can add further difficulty to the school experience and ultimately performance.



Key findings



Nutritional deficiencies prior to school entry have the potential to impact upon cognitive outcomes in school aged children.



Aims of the quantitative research

- Firstly, to examine the relationship between diets eaten by children and school test scores.
- Secondly, to test the hypothesis that high consumption of “junk food” (defined by consumption of foods/drinks with high proportions of sugar and/or fat) leads to poor school attainment in children.
- Finally, to investigate whether any differences in test scores exist between children who eat packed lunches versus those who eat school meals.



Data

- Empirical analysis using the *Avon Longitudinal Study of Parents and Children (ALSPAC)* data.
- We rely on the *ALSPAC* cohort since data has been collected prospectively with regard to both childhood diet and school attainment.
- The final sample contains 5,741 children with complete information on food frequencies and KS1 and KS2 results.

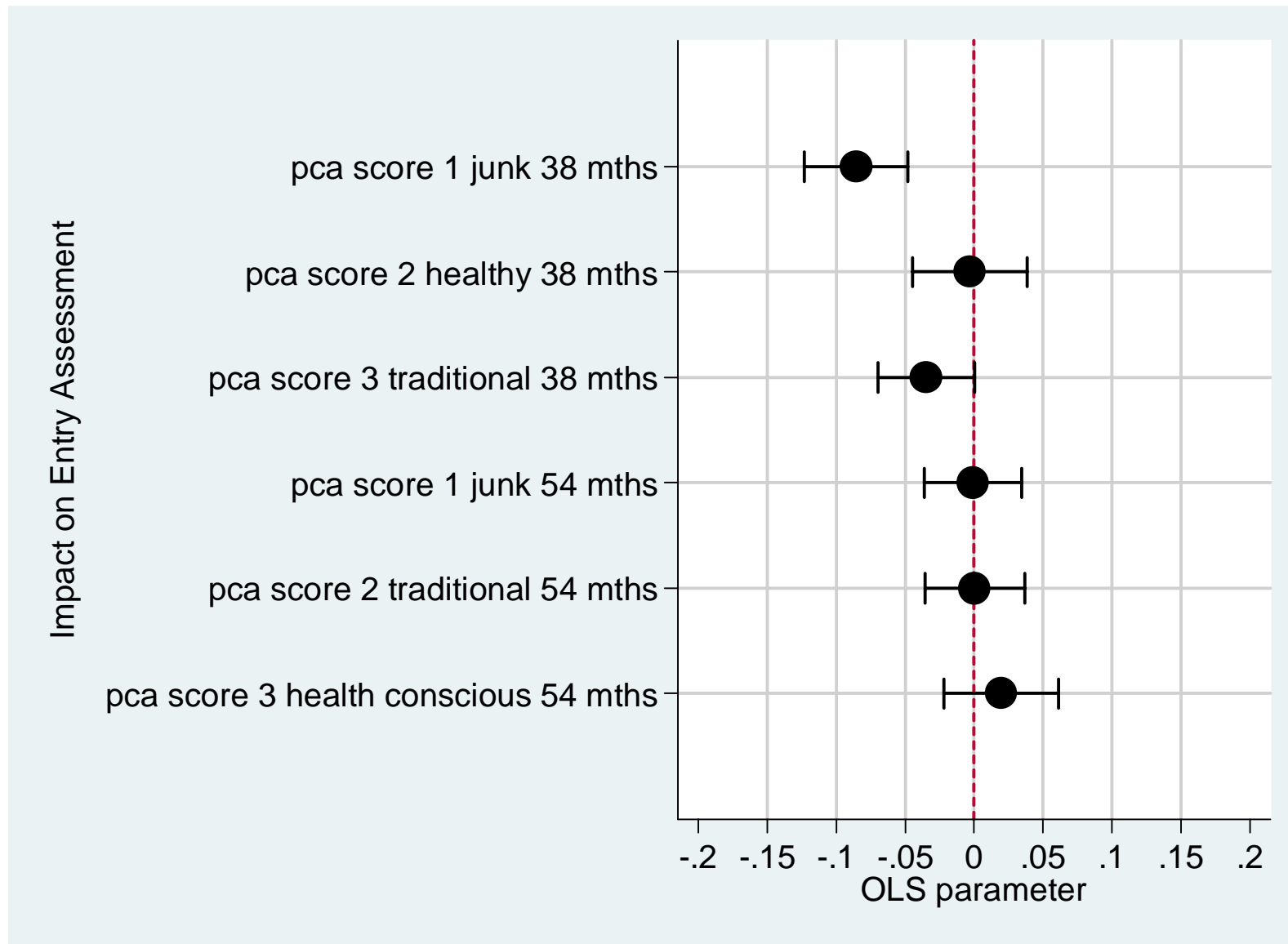


Main Variables

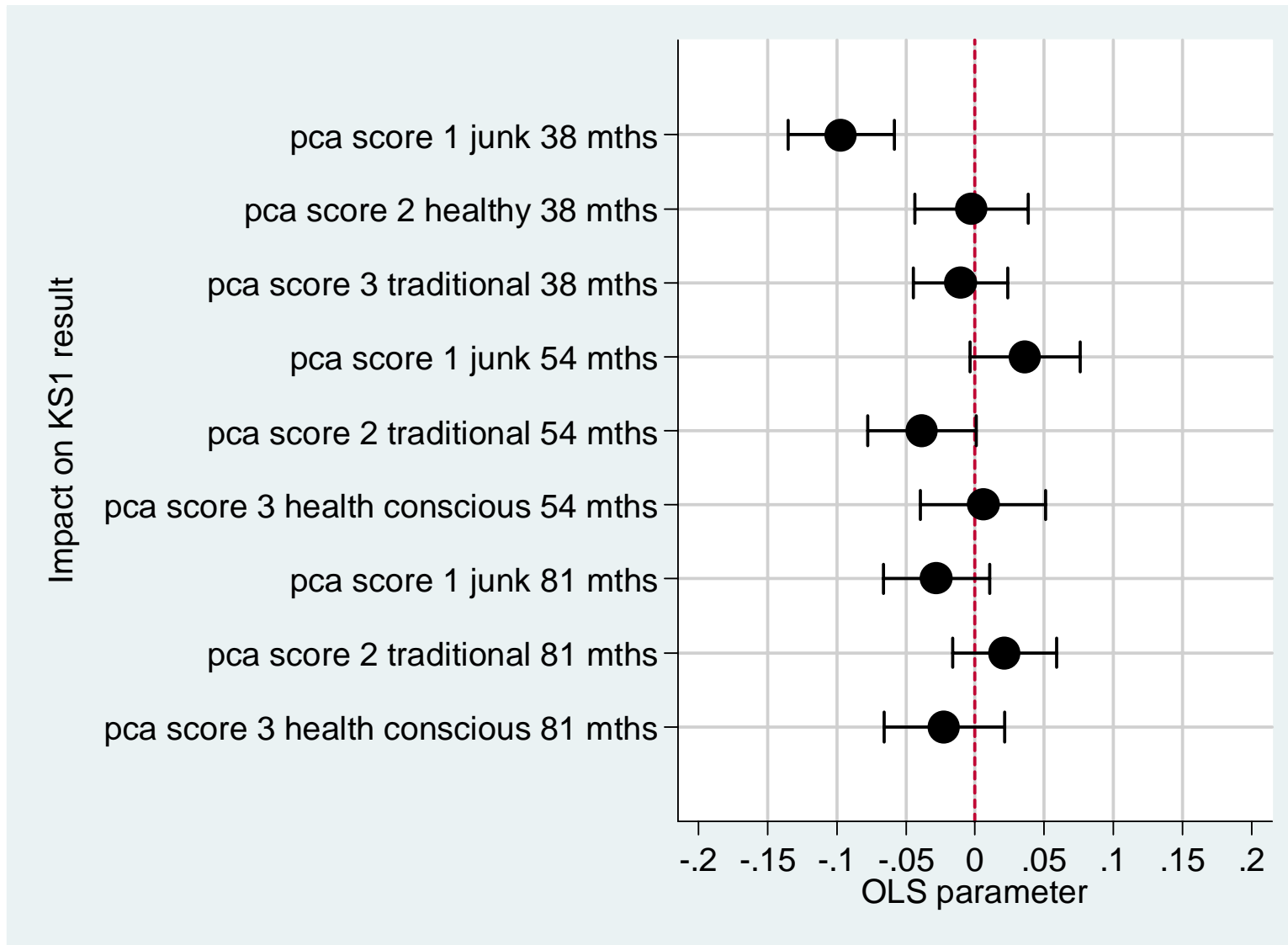
- Main outcome: school attainment (KS2, KS1 and entry assessments)
- Explanatory variables:
 - a food frequency questionnaire (FFQ) is used to generate dietary patterns (junk food, health conscious, traditional) at 38, 54 months and 81 months.
 - Junk food associated with high-fat processed foods and snack foods high in fat and/or sugar.
 - Health conscious food consumption is associated with vegetarian type food, nuts, salad, rice, pasta, fruit, cheese and fish.
 - The traditional food pattern comprised the meal of meat plus two vegetables.
 - Socio-economic, demographic and lifestyle



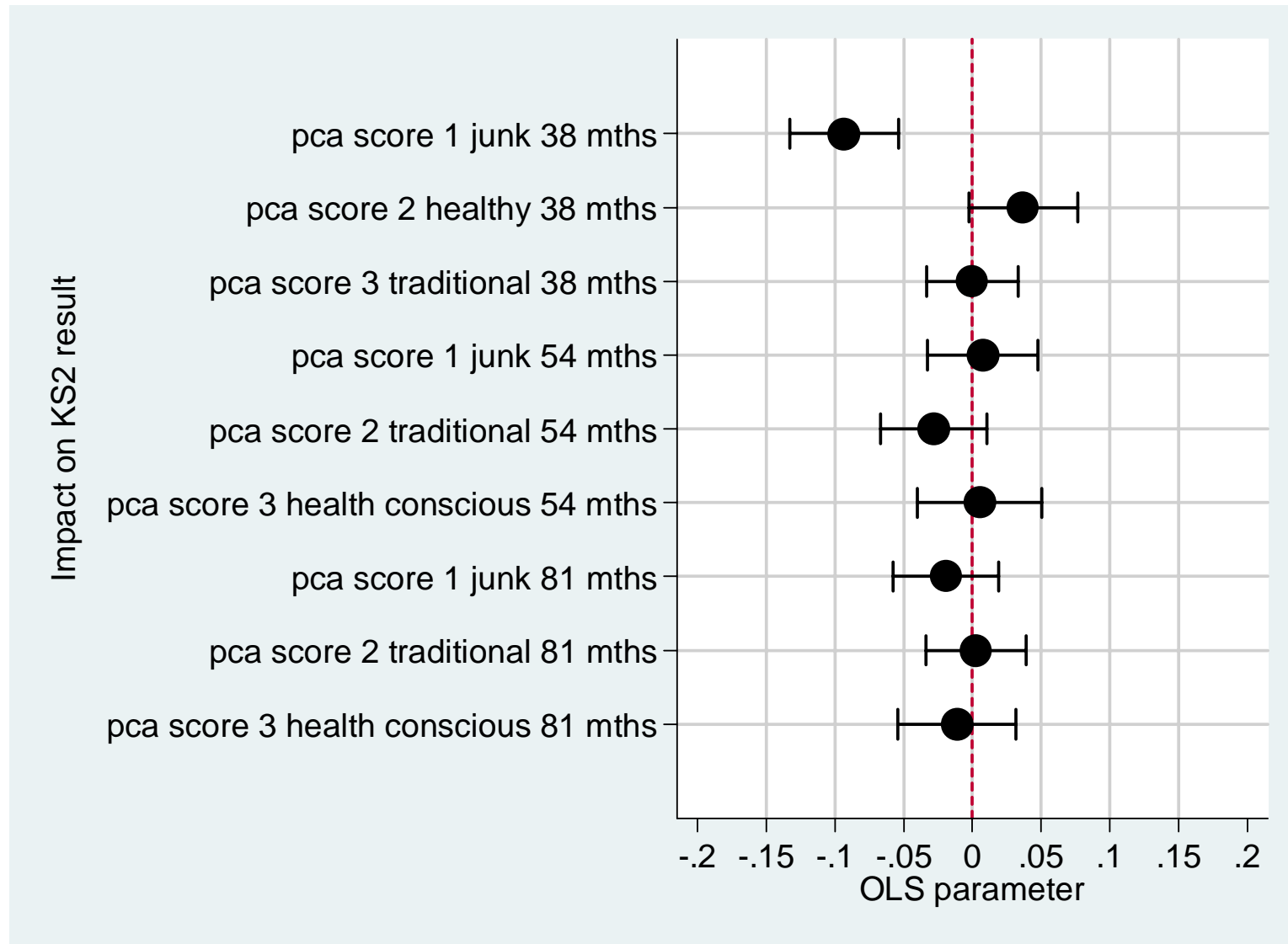
Results: Entry assessments and dietary patterns



Results: KS1 and dietary patterns



Results: KS2 and dietary patterns



Food consumption & change in attainment

Variable	KS2		KS1	
	(coefficient)	(s.e.)	(coefficient)	(s.e.)
Prior attainment scores	0.687	(0.013)***	0.533	(0.016)***
Junk food at 3 yrs.	-0.027	(0.014)**	-0.065	(0.019)***
Health food at 3 yrs.	0.039	(0.015)***	-0.002	(0.020)
Traditional at 3 yrs.	0.007	(0.012)	0.004	(0.017)
Junk food at 4 yrs.	-0.017	(0.014)	0.036	(0.020)
Health food at 4 yrs.	0.001	(0.017)	0.014	(0.023)
Traditional at 4 yrs.	-0.002	(0.014)	-0.039	(0.019)**
Junk food at 7 yrs.	0.000	(0.014)	-0.005	(0.019)
Health food at 7 yrs.	0.004	(0.015)	-0.022	(0.022)
Traditional at 7 yrs.	-0.012	(0.013)	0.018	(0.018)



School meals versus packed lunches & KS2 growth

Variables	(1)	(2)
KS1 scores	0.706	0.686
	(73.34)***	(51.58)***
Mixed consumption of school meals & lunches	-0.019	0.009
	(0.73)	(0.29)
Packed lunches only	0.012	0.039
	(0.51)	(1.33)
Junk food score at 38 months(low to high)	-0.089	-0.032
	(9.40)***	(2.52)**
FSM indicator for children	-0.147	-0.061
	(3.73)***	(1.00)
Child variables	NO	YES
Mother variables	NO	YES
Child-mother interaction	NO	YES

Source: ALSPAC. Notes: Robust t statistics in parentheses. Asterisks indicate significant at 10% (*), 5% (**); and 1% (***) Categories for comparison: for mixed consumption and packed lunches: (school meals)



Discussion of findings

- Across different indicators of attainment, nutrition prior to school entry seems to be the most important predictor of attainment.
- Only early junk food dietary pattern (at age 3) remains a risk factor to school attainment, even when factors such as gender, ethnicity, mother's education, family, health and eating habits, parenting and income were taken into account.
- Early consumption of junk food is also associated with attainment growth, from entry to KS1 and from KS1 to KS2.



Discussion of findings cont.

- It is important to highlight that the estimated effect decreases over time, but still significant for KS2.
- A one SD increase in junk food at age three results in a 0.065 SD decrease in KS1 results and in 0.027 SD decrease in KS2 results.
- There appears to be no relationship between whether a child eats school meals or brings a packed lunch and later attainment once food consumption prior to school entry is taken into account.

