Public Health Nutrition: 11(10), 1030–1036 doi:10.1017/S1368980007001401

A pilot survey of socio-economic differences in child-feeding behaviours among parents of primary-school children

Heather R Clark*, Elizabeth Goyder, Paul Bissell, Lindsay Blank, Stephen J Walters and Jean Peters

Public Health Section, School of Health and Related Research (ScHARR), University of Sheffield, Regent Court, 30 Regent Street, Sheffield S1 4DA, UK

Submitted 22 February 2007: Accepted 16 October 2007: First published online 20 December 2007

Abstract

Objective: Parents' child-feeding behaviours have been implicated in children's food choices and weight, but little is known about the social class distribution of parent's child-feeding behaviours in the UK. The present study compares parents' self-reported child-feeding behaviours in two socio-economically contrasting areas.

Design: A cross-sectional survey using the Parental Feeding Style Questionnaire. Mean scores were calculated for five child-feeding behaviours: control over eating, emotional feeding, encouragement/prompting, instrumental feeding and restriction. Parents' self-reported child-feeding behaviours were compared with their sociodemographic characteristics.

Setting: Three primary schools in two contrasting electoral wards of Sheffield, UK.

Subjects: Two hundred and ten parents of children aged 4 to 11 years, recruited from a convenience sample.

Results: Parents in the least deprived ward reported using all five types of child-feeding behaviour more frequently than parents in the most deprived ward. After adjusting for parent sex, parent age, single parent status, employment status and level of education, emotional feeding was the only behaviour showing any evidence of a difference between wards. The most frequently used behaviours were control, encouragement and restriction – behaviours that might be used to directly influence children's food intake and weight.

Conclusions: Child-feeding behaviours differ between areas within a single city and within a largely white population, and this distribution is related to socio-economic and educational factors. Experimental and longitudinal studies are needed to further investigate the potential role of child-feeding behaviours in childhood overweight and obesity.

Keywords
Child
Feeding
Behaviour
Parent
Weight

The link between socio-economic status and obesity is well established in the UK; working-class adults and children are more likely to be obese than their middle- or upper-class peers[1–4]. There are cultural and economic reasons for this inequality; behavioural factors may also contribute, including parents' child-feeding behaviours. Interventions to address overweight and obesity in childhood could prevent early onset of type 2 diabetes and cardiovascular conditions in later life[1]. If parental behaviour is a risk factor, this may be easier to address than some of the cultural or economic aspects.

Child-feeding behaviours, also known as 'parental feeding styles', is a collective term for the behaviours that parents use/demonstrate as they feed their children, either intentionally (as a strategy) or without consideration. The focus is on how, rather than what, parents feed their children; for example, do they reward good behaviour with food, do they restrict food intake, do they use food as a means of comfort, do they encourage dietary diversity?

There is a growing body of evidence from the USA suggesting that some child-feeding behaviours (e.g. restriction) are associated with weight gain in childhood[5]. There is also some evidence from Europe that mothers from different socio-economic groups (i.e. more *v.* less educated) use different child-feeding behaviours[6]. However, there is little supporting evidence from the UK and little is known about whether socio-economic variations in child weight are mediated by differences in parent behaviour. The present work is the first systematic study of socio-economic differences in parents' child-feeding behaviours in a UK population, comparing

**Corresponding author:* Email heatherclark22@hotmail.com

parents' self-reported child-feeding behaviours in two contrasting electoral wards of Sheffield.

We tested the hypothesis that socio-economic status, through its associations with education, family size, marital status and employment status, can influence parents' child-feeding behaviours.

Methods

Study population

Two socio-economically contrasting electoral wards in Sheffield were chosen using data from the Census (2001) and Housing Benefits System (2003). Ward 1 is in the most deprived quintile of Sheffield wards[7]; 37·4 % of households claim Income Support[7], 54·6 % of adults have no qualifications[8]. Ward 2 is in the least deprived quintile of Sheffield wards[7]; 5·7 % of households claim Income Support[7], 16·5 % of adults have no qualifications[8]. However, the wards are not ethnically contrasting because both are predominantly white (>90 %)[8].

Three primary schools were recruited to participate in the research: two from Ward 1 (total number of children on roll = 350 + 414) and one from Ward 2 (total number of children on roll = 356). With 100 parents from each ward, a total sample size of 200 would enable the survey to have 80 % power to detect a 15 % difference (say 10 % in one ward *v.* 25 % in the other) in child-feeding behaviours between the most and least deprived wards at a two-sided 5 % level of statistical significance[9]. Wardle *et al.* found statistically significant differences between obese and non-obese mothers' child-feeding behaviours using a total sample size of 200 (100 in each category)[10]. We originally intended to recruit two schools, one per ward. However, due to the lower than anticipated response rate to the survey in the more deprived ward (Ward 1), it was necessary to recruit a second school in Ward 1 to obtain the required number of parents. The sample size was approximately one-fifth of the total available population.

Questionnaire

The Parental Feeding Style Questionnaire (PFSQ) was developed and validated by Wardle *et al.* in the UK[10]. They used it to compare the feeding styles of overweight (*n* 100) and normal-weight (*n* 114) mothers with young children (3·8 to 5·3 years)[10]. To our knowledge, the final version has not previously been used with parents of primary-school children.

The PFSQ assesses four parental feeding styles: emotional feeding (five questions), instrumental feeding (four questions), prompting/encouragement to eat (eight questions) and control over eating (ten questions)[10]. Restriction of snack foods is part of the 'control over eating' category. Because restriction in particular is associated with child weight gain[5], we wanted to look specifically at questions that assessed restrictive behaviours. We judged that five questions specifically assessed this behaviour and so created an additional sub-category 'restriction', although control over eating still includes those five questions.

The PFSQ has a Likert scale format, so each question has five answers to choose from: never, rarely, sometimes, often, always. Answers were scored 1 (never) to 5 (always) in most cases, except for questions that asked about giving the child control over eating; for these questions the scoring was reversed, i.e. 5 (never) to 1 (always). For all questions, a score of 1 represents infrequent parent behaviour, whereas a score of 5 represents very frequent parent behaviour. The scores do not imply 'good' or 'bad' behaviour, but simply measure frequency of behaviour.

We added nine sociodemographic questions, including parent sex (male or female), parent age (in years), ethnic group (self-defined), single parent status (yes or no), number of dependant children (one, two, three, four, five or more), age of the youngest child in years (4, 5, 6, 7, 8, 9, 10, 11), employment status (employed full-time, employed part-time, not employed, other) and level of education (highest qualification achieved: none, GCSE or equivalent, BTEC/NVQ/Diploma, A level or equivalent, university degree, other).

The questionnaire was piloted by colleagues (parents of primary-school children) in order to optimise the layout and ensure that questions were clear and unambiguous. For example, parents with more than one child needed to understand that the questions related to their youngest school-aged child and understanding of this was confirmed in the pilot sample.

Data collection

The head teacher at each school gave the researcher (H.R.C.) permission to survey parents on the school premises. Data were collected in the autumn term (September to November) 2006. In order to maximise response rate, a convenience sample of parents attending school events was used. Parents were asked to complete the PFSQ during parents' evenings, coffee mornings, craft groups and assemblies, after reading an information sheet. Therefore, the only inclusion criteria were attendance at the event and having a child at the school. Some parents with several children attended several events, but they were asked not to complete more than one questionnaire. When both parents were present, only one questionnaire was given and the parents decided between them who would complete it. The researcher was available to answer any questions and collect completed questionnaires. Although no data were collected on the number of parents attending, the response rate from attending parents was excellent (>95 %) because parents were either waiting or had time to spare.

https://doi.org/10.1017/S1368980007001401 Published online by Cambridge University Press

Statistical analyses

The χ^2 test was used to compare the sociodemographic characteristics of the two wards. Mean scores were calculated for each behaviour category: control over eating, emotional feeding, prompting/encouragement, instrumental feeding and restriction. These scores were assumed to be continuous. The two independent samples *t* test has been shown to be very robust for ordinal, non-normally distributed data[11,12]. Therefore, we used this test to compare mean scores by ward (and by school) and to estimate 95% CI for the difference in mean scores between the wards, while taking into account the clustering of two schools in one ward and one school in the other ward. We also used the two independent samples *t* test to look for associations between sociodemographic variables and mean scores. Multiple linear regression analysis was used to show which sociodemographic factors contributed to the difference in mean scores between wards. A *P* value of less than or equal to 0·05 was regarded as statistically significant.

Results

Sample characteristics

The age range at all three primary schools was 4 to 11 years. In our sample, the age of the parents' youngest school-aged child ranged from 4 to 10 years (mean 6·8 years) in Ward 1 and from 4 to 10 years (mean 6·8 years) in Ward 2.

It appears that parents attending these school events were slightly more qualified than the ward-level data suggest[7]; but because the ward figures are not specific to parents of primary age children, it is not possible to say whether or not the sample is representative.

The two schools in Ward 1 (located less than one mile apart) were very similar in terms of parents' sociodemographic characteristics and child-feeding behaviours (Table 1). Therefore, all further analysis was done at ward level. Our data confirmed the socio-economic differences between Ward 1 (most deprived quintile) and Ward 2 (least deprived quintile) (Table 2). The Ward 1 sample contained more young parents, more single parents, more unemployed parents, more parents with no qualifications and more parents who left school at age 16 or younger.

Child-feeding behaviours

We found similar levels of internal reliability for the PFSQ scale in this age group as found by Wardle *et al.* in a pre-school population (Table 3)[10]. Nunnally suggests a minimum reliability of 0·70 when the scale is used for group decisions or research purposes[13]. The present study found acceptable levels of reliability comparable to those of Wardle *et al.*'s study except for the instrumental feeding scale, which appeared to lower the minimum level of reliability.

Parents in Ward 2 scored higher for each type of behaviour than parents in Ward 1 (Table 4). In other

Table 1 Sociodemographic characteristics and child-feeding behaviours of parents in Ward 1 (two schools)

	School 1 (*n* 53)	School 2 (*n* 55)	*P**
Parents aged 29 years or younger (%)	34·1	30·8	0·3
Single parents (%)	34·7	29·6	0·6
Parents not working (%)	41·7	55·6	0·2
Parents with no qualifications (%)	37·0	30·8	0·5
Parents who left school at age 16 or younger (%)	67·4	76·9	0·5
Control over eating (mean score)	3·6	3·7	0·7
Emotional feeding (mean score)	1·4	1·4	0·8
Prompting/encouragement (mean score)	4·0	4·0	1·0
Instrumental feeding (mean score)	1·8	1·7	0·5
Restriction (mean score)	3·7	3·7	0·8

Ward 1 is in the most deprived quintile of Sheffield wards.
The five behaviours are scored on a scale of 1 (parents report using the behaviour infrequently) to 5 (parents report using the behaviour frequently).
**P* value from the two independent samples *t* test.

Table 2 Sociodemographic characteristics of parents in Wards 1 and 2

	Ward 1 (*n* 108)		Ward 2 (*n* 102)		
	Mean	SD	Mean	SD	*P**
Parent's age (years)	33·1	6·6	38·4	5·1	**<0·001**†
Number of dependant children	2·5	1·0	2·2	0·8	**0·019**†
Single parents (%)	32·0		9·9		**<0·001**
Female parents (%)	75·0		89·0		**0·034**
Parents not working (%)	49·0		22·8		**<0·001**
Parents with no qualifications (%)	33·7		0		**<0·001**
Parents who left school at age 16 or younger (%)	72·4		37·8		**<0·001**

Ward 1 is in the most deprived quintile and Ward 2 is in the least deprived quintile of Sheffield wards.
**P* value from the χ^2 test, or †from the independent samples *t* test.

https://doi.org/10.1017/S1368980007001401 Published online by Cambridge University Press

words, they reported using the behaviours more frequently. For three out of four behaviours, this difference was statistically significant. The most frequently used behaviours were control and encouragement (Table 4). Restriction considered as a separate behaviour gave similar results to control.

Table 5 shows the results of a simple univariate analysis and how parents' sex and parents' level of education were associated with some of the child-feeding behaviours. Female parents reported using encouragement more than male parents; parents with voluntary (post 16) education reported using instrumental feeding more than parents with compulsory education (up to 16) only. Restriction considered as a separate behaviour gave similar results to control.

Parents' sex (male or female) and level of education (compulsory or voluntary) were included in the linear regression analyses, along with age (in years on a specified date; continuous variable), single parent status (single or not) and employment status (working or not working).

After adjusting for parent sex, parent age, single parent status, employment status and level of education, emotional feeding was the only behaviour showing any evidence of a difference between Wards 1 and 2 (Table 6), although this was not statistically significant ($P = 0{\cdot}06$). Encouragement was predicted by parent sex; instrumental feeding was predicted by parent age (Table 6).

Table 3 Cronbach's alpha scores of internal reliability for the Parental Feeding Style Questionnaire scale, comparing the present study (primary school) with a previous study (pre-school)

	Present study	Wardle *et al.* (2002)[10]
Control over eating (10 items)	0·76	0·77
Emotional feeding (5 items)	0·77	0·65
Prompting/encouragement (10 items)	0·75	0·69
Instrumental feeding (4 items)	0·55	0·85
Restriction (5 items)	0·70	N/A

N/A, not applicable.

Table 4 Child-feeding behaviours of parents in Wards 1 and 2

	Ward 1 (*n* 108)		Ward 2 (*n* 102)				
	Mean score	SD	Mean score	SD	Difference	95 % CI	*P**
Control over eating	3·7	0·9	4·0	0·8	0·3	0·1, 0·4	**0·012**
Emotional feeding	1·4	0·5	1·6	0·6	0·2	0·2, 0·3	**0·003**
Prompting/encouragement	4·0	0·7	4·2	0·5	0·2	0·2, 0·2	**0·001**
Instrumental feeding	1·7	0·7	1·9	0·6	0·1	−0·0, 0·3	0·074

Ward 1 is in the most deprived quintile and Ward 2 is in the least deprived quintile of Sheffield wards.
The five behaviours are scored on a scale of 1 (parents report using the behaviour infrequently) to 5 (parents report using the behaviour frequently).
**P* value and CI adjusted to take into account the clustering of schools within each ward.

Table 5 Associations between sociodemographic characteristics and child-feeding behaviours

	Male (*n* 34)		Female (*n* 168)				
(a) Parents' sex	Mean score	SD	Mean score	SD	Difference	95 % CI	*P**
Control over eating	3·8	0·86	3·8	0·81	−0·1	−0·4, 0·3	0·7
Emotional feeding	1·4	0·44	1·5	0·59	−0·1	−0·3, 0·0	0·1
Prompting/encouragement	3·8	0·83	4·2	0·56	−0·4	−0·7, −0·1	**0·02**
Instrumental feeding	1·6	0·63	1·8	0·66	−0·2	−0·4, 0·0	0·1
	1 or 2 children (*n* 136)		3 or more children (*n* 68)				
(b) Family size	Mean score	SD	Mean score	SD	Difference	95 % CI	*P**
Control over eating	3·9	0·78	3·9	0·82	0·0	−0·2, 0·4	1·0
Emotional feeding	1·5	0·59	1·6	0·54	−0·1	−0·2, 0·4	0·4
Prompting/encouragement	4·1	0·61	4.1	0·61	0·1	0·1, 0·5	0·3
Instrumental feeding	1·8	0·67	1·8	0·61	−0·0	−0·3, 0·3	1·0
	Compulsory up to 16 (*n* 89)		Voluntary post 16 (*n* 107)				
(c) Parents' level of education	Mean score	SD	Mean score	SD	Difference	95 % CI	*P**
Control over eating	3·7	0·85	3·9	0·82	−0·2	−0·4, 0·1	0·1
Emotional feeding	1·.5	0·60	1·6	0·56	−0·1	−0·3, 0·0	0·1
Prompting/encouragement	4·1	0·71	4·1	0·56	−0·1	−0·3, 0·1	0·4
Instrumental feeding	1·7	0·66	1·9	0·65	−0·2	−0·4, −0·0	**0·05**

The five behaviours are scored on a scale of 1 (parents report using the behaviour infrequently) to 5 (parents report using the behaviour frequently).
**P* value from the two independent samples *t* test.

https://doi.org/10.1017/S1368980007001401 Published online by Cambridge University Press

Table 6 Regression models for components of the Parental Feeding Style Questionnaire

	Regression coefficient β	SE	95 % CI	*P*	Adjusted R^2
(a) Parents' use of control					
Sex	−0·10	0·15	−0·39, 0·20	0·5	−0·02
Age	−0·01	0·01	−0·03, 0·01	0·5	
Single parent	−0·17	0·15	−0·47, 0·13	0·3	
Employed	−0·008	0·13	−0·27, 0·25	1·0	
Qualifications	0·04	0·13	−0·23, 0·30	0·8	
Ward	0·16	0·14	−0·12, 0·45	0·3	
(b) Parents' use of emotional feeding					
Sex	0·07	0·11	−0·15, 0·29	0·5	0·02
Age	0·002	0·01	−0·01, 0·02	0·8	
Single parent	−0·11	0·11	−0·32, 0·11	0·3	
Employed	0·14	0·10	−0·05, 0·33	0·1	
Qualifications	0·08	0·10	−0·11, 0·28	0·4	
Ward	0·20	0·11	−0·01, 0·41	0·06	
(c) Parents' use of encouragement					
Sex	0·25	0·12	0·02, 0·48	**0·03**	0·003
Age	−0·004	0·01	−0·02, 0·02	1·0	
Single parent	−0·08	0·12	−0·31, 0·15	0·5	
Employed	0·01	0·10	−0·19, 0·21	0·9	
Qualifications	0·03	0·10	−0·18, 0·23	0·8	
Ward	0·05	0·11	−0·17, 0·27	0·7	
(d) Parents' use of instrumental feeding					
Sex	0·15	0·13	−0·10, 0·39	0·2	0·03
Age	−0·02	0·01	−0·03, −0·002	**0·03**	
Single parent	−0·11	0·13	−0·35, 0·14	0·4	
Employed	0·05	0·11	−0·16, 0·27	0·6	
Qualifications	0·20	0·11	−0·02, 0·42	0·1	
Ward	0·16	0·12	−0·08, 0·39	0·2	

a, b, c and d were multiple linear regression analyses, with all variables (sex, age, single parent status, employment status, level of education and ward) entered simultaneously.

Again, restriction considered as a separate behaviour gave similar results to control.

In our analyses, we adjusted for family-level socio-economic variables. The 'ward' variable is likely to represent other environmental differences (e.g. public health information, health-care resources) which were not accounted for in our analyses. Table 6 shows the association between individual explanatory variables and feeding behaviours and highlights that, although these factors would be expected to be interrelated, some factors appear to be stronger predictors of specific types of behaviour than others.

Discussion

Main finding of the present study

Parents in the least deprived ward reported using all four types of child-feeding behaviour more frequently than parents in the most deprived ward. However, after adjusting for parent sex, parent age, single parent status, employment status and level of education, emotional feeding was the only behaviour showing any evidence of a difference between the wards. For encouragement and instrumental feeding, differences between wards were explained by specific sociodemographic factors assessed in the questionnaire. For emotional feeding, some other characteristic of local culture may explain the difference between wards. Emotional feeding means giving a child something to eat when the child is feeling upset, hurt, bored, worried or angry[10]. This behaviour may be associated with the parent's mood/mental health as well as the child's; both may be affected by the family's social or financial situation.

Control, restriction and encouragement were the most frequently used behaviours by parents in both wards. The same behaviours were also most frequently reported by mothers in a previous study using the same questionnaire[10]. Interestingly, these are the behaviours that might be used to directly influence children's food intake and weight.

What is already known on the topic

Research from the USA has highlighted associations between various child-feeding behaviours and child weight. In a review of twenty-two studies linking parental feeding style and child weight status, parental restriction was most frequently and consistently associated with child weight gain[14]. Furthermore, longitudinal and experimental studies support a causal relationship between parental restriction and child weight gain[15–20]. Restriction may increase the child's desire for restricted foods and opportunistic snacking may interfere with the child's natural ability to regulate food intake[19–21]. The subsequent eating behaviour, known as 'eating in the absence of hunger', is associated with weight gain over time[16,18].

https://doi.org/10.1017/S1368980007001401 Published online by Cambridge University Press

There is a lack of similar research from the UK. Wardle *et al.* compared the child-feeding behaviours of overweight and normal-weight mothers, matching families from different socio-economic backgrounds[10]. Overweight mothers reported using less control than normal-weight mothers ($P = 0{\cdot}01$); other behaviours were not significantly different. Recently, Carnell and Wardle found that pressure to eat was inversely associated with child weight ($P < 0{\cdot}01$); there was no relationship with other types of behaviour[22]. In Europe, Hupkens *et al.* compared the child-feeding behaviours of mothers living in lower- and middle-class districts in three cities[6]. Mothers' social class was determined by their level of education, which was positively correlated with occupational status and fathers' level of education in all three cities. Well-educated (high social class) mothers restricted significantly more foods than less-educated (low social class) mothers ($P < 0{\cdot}01$) but prescribed a similar number of foods.

What the present study adds

The present pilot study provides some evidence that child-feeding behaviours differ between areas within a single city and within a largely white population; and that these differences are, at least in part, related to socio-economic and educational differences. The advantage of using a mostly white sample is that socio-economic differences are not confounded by ethnic differences.

Because we did not measure child weight in the present study, we cannot comment on whether parents' child-feeding behaviours contribute to child weight gain. However, our results suggest that child-feeding behaviours (i.e. control, restriction, emotional feeding, encouragement and instrumental feeding) are used more in relatively affluent areas, where overweight is typically less common. It is possible that parents in more deprived areas use other child-feeding behaviours not assessed by this questionnaire, which may or may not influence child weight; or that they are less concerned about what and how much their children eat. In relation to emotional feeding, it may be that parents in more deprived areas are less inclined to comfort their child or have other (non-food) means of doing so.

Parents need to be made aware of how their child-feeding behaviours might influence children's dietary intake and weight[5]. However, the present study indicates that such interventions may need to be tailored to particular socio-economic groups, depending on the type and frequency of behaviours used.

This was an opportunity to extend the use of the PFSQ (previously validated in a UK population of pre-school children) to parents of older children. Experimental and longitudinal studies are needed to further investigate the potential role of child-feeding behaviours in childhood overweight and obesity. UK research is important due to possible cultural differences between the UK and USA in relation to concern about child weight and perception of overweight.

Limitations of the present study

Self-reported child-feeding behaviours may differ from actual behaviours, although some studies of other types of behaviour have shown that self-reporting is valid and does reflect actual behaviour[23–25]. Furthermore, parents who are less educated may be less likely to reflect on and accurately report their own behaviours. Therefore, an observational study of parents' child-feeding behaviours is needed to verify the results of the present survey. Ideally, this would be linked to longitudinal weight data, to show whether observed child-feeding behaviours are associated with child weight gain. Cross-sectional studies cannot determine the direction of causality and it is plausible that parental behaviour may influence weight but that weight may also influence parental behaviour[5]. We collected survey information directly from parents only and had not obtained ethical approval to collect any information from their children. To increase participation rates we kept the questionnaire simple and easy to complete. Therefore, in the present pilot study, we were not able to collect weight data.

The sample only included parents who attended school events, so that the survey could be explained and completed questionnaires could be collected by the researcher. A survey delivered to all parents would have had a more complete sampling frame but would not have obtained the same response rate. It is possible that child-feeding behaviours differ between those who attend and those who do not attend school events. However, it is unlikely that this would be systematically different in the two wards. The sociodemographic information collected provides evidence that the respondents from the two wards were significantly different in terms of level of education and employment status. Although we did not collect data on parent income, we know that income varies significantly between the two wards because the Income Support figures are significantly different[7].

Acknowledgements

We would like to thank the Leverhulme Trust for funding this study as part of the 'Changing Families, Changing Food' research programme. We would also like to thank Professor Jane Wardle for her helpful comments, access to papers in press and use of the PFSQ. Finally, we thank the parents and schools who participated in this study. We are not aware of any conflicts of interest. Author contributions: planning – J.P., E.G., H.R.C., L.B. and P.B.; data collection – H.R.C.; statistical analysis – H.R.C., S.J.W. and E.G.; manuscript preparation – H.R.C. and all co-authors.

References

1. National Audit Office (2001) *Tackling Obesity in England*. London: The Stationery Office.
2. Wardle J, Waller J & Jarvis MJ (2002) Sex differences in the association of socioeconomic status with obesity. *Am J Public Health* **92**, 1299–1304.
3. Marmot M & Wilkinson RG (2006) *Social Determinants of Health*, 2nd ed. Oxford: Oxford University Press.
4. Wardle J, Brodersen NH, Cole TJ, Jarvis MJ & Boniface DR (2006) Development of adiposity in adolescence: five year longitudinal study of an ethnically and socioeconomically diverse sample of young people in Britain. *BMJ* **332**, 1130–1135.
5. Clark HR, Goyder E, Bissell P, Blank L & Peters J (2007) How do parents' child-feeding behaviours influence child weight? Implications for childhood obesity policy. *J Public Health* **29**, 132–141.
6. Hupkens CLH, Knibbe RA, Van Otterloo AH & Drop MJ (1998) Class differences in the food rules mothers impose on their children: a cross-national study. *Soc Sci Med* **47**, 1331–1339.
7. NHS Sheffield (undated) Neighbourhood profiles. Data source: Housing Benefits System, Sheffield City Council, 2003. http://www.sheffield.nhs.uk/healthdata/4-1.php (accessed March 2006).
8. NHS Sheffield (undated) Neighbourhood profiles. Data source: 2001 Census, Office for National Statistics. http://www.sheffield.nhs.uk/healthdata/4-1.php (accessed March 2006).
9. Machin D, Campbell MJ, Fayers PM & Pinol APY (1997) *Sample Size Tables for Clinical Studies*, 2nd ed.. Oxford: Blackwell.
10. Wardle J, Sanderson S, Guthrie CA, Rapoport L & Plomin R (2002) Parental feeding style and the inter-generational transmission of obesity risk. *Obes Res* **10**, 453–462.
11. Heeren T & D'Agostino R (1987) Robustness of the two independent samples *t*-test when applied to ordinal scaled data. *Stat Med* **6**, 79–90.
12. Sullivan LM & D'Agostino Sr RB (2003) Robustness and power of analysis of covariance applied to ordinal scaled data as arising in randomized controlled trials. *Stat Med* **22**, 1317–1334.
13. Nunnally JC (1978) *Psychometric Theory*. New York: McGraw-Hill.
14. Faith MS, Scanlon KS, Birch LL, Francis LA & Sherry B (2004) Parent–child feeding strategies and their relationships to child eating and weight status. *Obes Res* **12**, 1711–1722.
15. Lee Y, Mitchell DC, Smiciklas-Wright H & Birch LL (2001) Diet quality, nutrient intake, weight status, and feeding environments of girls meeting or exceeding recommendations for total dietary fat of the American Academy of Pediatrics. *Pediatrics* **107** (6), E95.
16. Fisher JO & Birch LL (2002) Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *Am J Clin Nutr* **76**, 226–231.
17. Faith MS, Berkowitz RI, Stallings VA, Kerns J, Storey M & Stunkard AJ (2004) Parental feeding attitudes and styles and child body mass index: prospective analysis of a gene–environment interaction. *Pediatrics* **114**, e429–e436.
18. Francis LA & Birch LL (2005) Maternal weight status modulates the effects of restriction on daughters' eating and weight. *Int J Obes (Lond)* **29**, 942–949.
19. Fisher JO & Birch LL (1999) Restricting access to palatable foods affects children's behavioural response, food selection and intake. *Am J Clin Nutr* **69**, 1264–1272.
20. Fisher JO & Birch LL (1999) Restricting access to foods and children's eating. *Appetite* **32**, 405–419.
21. Ritchie LD, Welk G, Styne D, Gerstein DE & Crawford PB (2005) Family environment and pediatric overweight: what is a parent to do? *J Am Diet Assoc* **105**, S70–S79.
22. Carnell S & Wardle J (2007) Associations between multiple measures of parental feeding and children's adiposity in United Kingdom preschoolers. *Obesity* **15**, 137–144.
23. Curry L & Purkis IE (1986) Validity of self-reports of behavior changes by participants after a CME course. *J Med Educ* **61**, 579–584.
24. Brener ND, Billy JOG & Grady WR (2003) Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *J Adolesc Health* **33**, 436–457.
25. Midanik L (1982) The validity of self-reported alcohol consumption and alcohol problems: a literature review. *Addiction* **77**, 357–382.