RESEARCH PAPER

Feeding strategies used by primary school meal staff and their impact on children's eating

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Abstract

Background: In parent–child interactions, feeding strategies including pressure, restriction, modelling, rewards, encouragement and repeated taste exposure have been reliably shown to influence children's eating. Because there is no evidence that the psychosocial interactions inherent in the strategies are context-dependent, the present study investigated their utilisation during primary school meal supervision.

Methods: A case study of one Local Authority in Wales was conducted involving eleven primary schools stratified into socio-economic quartiles. Focussed observations were carried out over two to three lunchtimes per school to explore the feeding strategies, outcomes and behaviours inherent in the dining hall context. These were supplemented by semi-structured interviews with catering staff and midday supervisors, which were carried out after the observation session.

Results: Most feeding strategies used by school meal staff reflected those reported in the literature (e.g. pressure, encouragement and rewards), although purposeful modelling of eating behaviours was not found and the imposition of food norms, such as eating dessert last, was common. Dining hall staff readily, if not consistently, used these strategies, although the constraints and opportunities of each dining hall context influenced their selection and implementation. However, even if children left the service point with nutritionally balanced meals, they often failed to eat them.

Conclusions: Because repeated taste exposure is known to increase liking for foods, further studies are recommended to investigate how the naturally occurring feeding strategies evident in primary school dining halls could be harnessed to encourage children to *taste* the nutritionally balanced schools meals that school meal transformation programmes will expose them to.

Introduction

School meal provision in the UK is the subject of several government improvement initiatives where the revision of nutritional standards is pivotal (Department of Health, 2004; Scottish Executive, 2002; Welsh Assembly Government, 2007). There is emerging evidence that children may neither select nor consume nutritionally balanced meals, even if they are available, thus compromising their overall nutrient intake (Gatenby, 2007). It is therefore important to understand potential influences on eating in the school meal setting, such as the feeding strategies adopted by school meal staff. Feeding strategies can be broadly classified as: (i) repeated taste exposure (RTE); (ii) modelling; (iii) restricting access to food; (iv) pressuring strategies, including rewards used in a coercive context; and (v) encouraging strategies, including rewards used to signify achievement.

The principles behind RTE originate from the 'mere exposure hypothesis', which states that repeatedly making a stimulus available enhances liking for that stimulus (Zajonc, 1968). With food stimuli, it has been shown that tasting, rather than just looking, is required (Birch *et al.*, 1987a). Outcomes of RTE strategies include increased consumption (Williams *et al.*, 2008) and increased liking for novel foods (Sullivan & Birch, 1990). In addition, the food choices of 2-year-old children have been shown to be the foods to which they are most frequently exposed (Birch & Marlin, 1982).

Modelling, meanwhile, is a process whereby human behaviour is learned by basing one's own actions on the observed acts of another (Bandura, 1986). Children's food choices have been shown to be socially modifiable by their peers (Birch, 1980). Modelling has also been shown to be effective in increasing food consumption and liking when the models are adults (Addessi *et al.*, 2005), peers (Hendy, 2002), teachers (Hendy & Raudenbush, 2000), and fictional cartoon heroes (Horne *et al.*, 2004).

Restrictive feeding practices involve limiting access to foods perceived as undesirable by controlling portion size or how frequently the food is offered (Fisher & Birch, 1999). Correlational studies suggest that parents' use of restrictive practices predicts higher intake (Birch *et al.*, 2003). Pressuring feeding strategies, meanwhile, involve attempts to get a child to eat against their will. Even low levels of pressure (i.e. mild requests to finish your food) have been shown to have a negative effect on consumption (Galloway *et al.*, 2006) and correlational studies have shown that pressure is negatively associated with fruit and vegetable intake (Fisher *et al.*, 2002). When rewards are used coercively, they can have undesirable outcomes. For example, in food-food reward scenarios ('If you eat *food A* you can have *food B*'), children's liking for (Newman & Taylor, 1992) and choices of, *food A* can reduce (Mikula, 1989).

Previous literature relating to feeding strategies has largely converged on three feeding outcomes: consumption (Galloway *et al.*, 2006), liking (Birch *et al.*, 1984) and choice (i.e. the selection of one food item over another (Birch *et al.*, 1987b). These three outcomes are inter-related. For example, the correlation between food likes/dislikes and consumption in 3–4-year-old children is 0.8 (Birch, 1979) and establishing liking for a range of healthy foods is essential for long-term, independent food choices (Cooke, 2007).

Published literature reviews give the impression that feeding strategies primarily fall within the remit of parents in the home (Savage *et al.*, 2007). However, there is no evidence that the psychosocial interactions inherent in the strategies are context-dependent. Indeed, a limited number of studies involving strategies associated with encouraging consumption have demonstrated positive outcomes. For example, in a US school study, a verbal prompt ('would you like fruit or juice?') delivered by service staff increased the consumption of fruit by approximately 50% (Schwartz, 2007). Therefore, the aims of the present study were: (i) to identify the eating behaviours of primary schoolchildren (aged 4–11 years) as displayed by pupils, and perceived by the school meal staff; (ii) to identify the feeding strategies implemented by school meal staff; and (iii) to identify the feeding outcomes sought by staff.

Materials and methods

Design

A case study of a single Local Education Authority (LEA) in Wales was undertaken to ensure uniformity within national and local policies. A qualitative mixed methods approach was used involving dining hall observations supplemented by interviews with school meal staff (i.e. caterers and midday supervisors). Ethical approval was obtained from Cardiff University School of Social Sciences ethical committee. Informed consent was obtained from all adult participants. For child participants, consent was sought from headteachers acting *in loco parentis,* supplemented by parental 'opt-out' consent whereby the child is included in the study *unless* their parents withdraw them by completing an 'opt-out' form (Severson & Biglan, 1989). Information sheets assured parents that children would be unobtrusively observed and that no children would be directly approached.

Sample

A stratified sampling frame was created from the 83 primary schools in the target LEA, subdivided into quartiles using percentage free school meal entitlement (FSM) as a proxy measure to render the sample representative of socio-economic spread (Hart *et al.*, 2002). Within the target LEA, mean FSM per school was 16.89% (range 0–77.9%) (Local Government Data Unit Wales, 2006). Within Wales, mean FSM per school was 13.77%. Recruitment order within each quartile was determined using a random number generator. Saturation of concepts (Bryman, 2001) occurred after data were obtained from nine schools. However, at this time, only one school in quartiles 1 and 4, where recruitment was more difficult, were included. Therefore, to reduce the risk of socio-economic imbalance, data were collected from one more school in quartiles 1 and 4, which did not result in the addition of further analytical concepts. The third school recruited in quartile 3 shared a dining hall with another school, which was allocated to quartile 2. Both were included in the study, even though data had already been

Table 1 Characteristics of schools in sample shown by socio-economic quartile

Quartile 1 FSM range 0–6.3			Quartile 2 FSM range 7–18.2			Quartile 3 FSM range 20.8–33.9			Quartile 4 FSM range 35–77.9		
FSM	Size	Meals[*]	FSM	Size	Meals[*]	FSM	Size	Meals[*]	FSM	Size	Meals[*]
1.54	325	52 (5)	8.11	370	61 (2)	27	267	46 (9)	38.4	284	44 (3)
1.1	208	48 (1)	15.65	230	48 (0)	22	104	45 (0)	43.6	183	50 (1)
			3.57	168	60 (1)	35.29	170	56 (1)			
			10.28	107	70 (0)						

FSM, percentage free school meal entitlement used as a proxy for socio-economic status.
[*]Number of meals served (figures in brackets represent the number of children excluded from the study by their parents).

collected from three schools in quartile 2 at the time. The final sample included 11 schools whose characteristics, together with the numbers of children opted out of the study by their parents, are shown in Table 1.

Observation procedure

Focussed observations were carried out guided by a semi-structured schedule that reflected the research objectives and the feeding strategies, outcomes and behaviours identified by the literature and was informed by Spradley's 'Descriptive Question Matrix' (Spradley, 1980) upon which notes were taken and typed into detailed fieldnotes after the session. To facilitate a consistent approach during analysis, a fieldnote template was used whose structure was based upon the observation schedule. Over the course of the study (July 2007 to April 2008), observations were conducted on each day of the week to ensure that any idiosyncratic variations were captured (e.g. 'cooked dinner' days fell on Thursdays). During this period, two seasonal menu revisions occurred, which allowed observations to be conducted when foods that were potentially unfamiliar were offered. Following a procedural trial in a pilot school, observations were conducted by a single observer over 2–3 days per school. Observations involved unobtrusively moving around the dining hall, maintaining a balance between gathering data relating to the whole scene and to localised events. Opted out children were discretely identified by staff so that the observations/fieldnotes excluded them. In some schools, children eating packed lunches shared the dining hall with the school meal children. The observations excluded these children and any supervisors assigned to them.

Interview procedure

Semi-structured interviews were carried out after the observation sessions and included questions intended to clarify or probe observed acts. Although midday supervisors consented to being observed, they were reluctant to

extend their working day by being formally interviewed. Commencing with school 4, the study protocol was adjusted to conduct supervisor interviews by phone at a time more convenient to the participants. This increased participation levels but meant that, in three schools, verbal input from supervisors was confined to informal conversations during the observation sessions. Nevertheless, saturation of concepts from the formal supervisor interviews was achieved within the eight schools where they were conducted. Interviews were transcribed for subsequent analysis.

Statistical analysis

Data collection and analysis were carried in tandem (Foster, 1996) out using NVivo, version 2.0.163 (QSR International Pty Ltd, Doncaster, Australia) as a qualitative analysis tool. An initial set of codes was derived from the observation schedule. By systematically reviewing the interview/observation notes line by line, codes were added at the 'manifest' level of what was said or observed, and at the 'latent' level where meaning was inferred from the words spoken or actions perceived (Mason, 2002). Codes were organised into a hierarchical structure and were split, merged, renamed or reorganised as the analysis matured. Emerging themes were built up within NVivo using memos linked to codes adopting an 'expanding drop file' approach (Wolcott, 1990).

Results

Primary school children's eating behaviours
Table 2 illustrates the issues that affected the children's eating. Disliking food was the most common issue in all schools. Popular menu items varied both within and between schools, which had a bearing on the children's food choices and consumption:

'… here, they're not that good at eating vegetables at all compared to a lot of other schools. The same with the mashed potato, they don't like it … They either say no, you probably noticed today a lot of

Table 2 Incidence of children's eating issues reported or observed at school level

Issue	Observed	Reported by cook	Reported by supervisors
Dislikes	11/11	11/11	6/8
Poor choice	5/11	5/11	0
Reluctance to try 'strange' foods	3/11	6/11	4/8
Picky or fussy eating	4/11	4/11	3/8
Deliberate avoidance tactics	0	2/11	1/8
Preferring to be out to play	0	0	3/8
Gagging on food	1/11	1/11	1/8
Poor table skills/food knowledge	5/11	3/11	2/8

children had nothing on their plate and if they do have it, invariably it goes in the waste.' (*Cook*)

Nutritionally imbalanced meals (e.g. bread and chips; sausage and ice-cream) and/or small portions were frequently observed and also mentioned by cooks and could occur despite the best efforts of the servers. Plate content varied from full plates, pleasingly presented and representative of the nutritionally balanced menu, to plates with small portions, possibly containing only a subset of the menu. Levels of waste were not related to whether the children had a free choice, assisted choice or no choice over what food they were served.

A prominent feature of the observations was that the children would enact the lunchtime procedures particular to their school without constant direction. These included queuing at the service points; obtaining drinks and cutlery; sitting at designated tables; raising hands for attention; and disposing of food waste and dirty dishes. Mechanisms that perpetuated these norms included school rules, modelling by others and real-time instruction.

Feeding strategies used by school meal staff

Interactions took place in two physically distinct areas – the service point and the dining hall.

The service point was the domain of the catering staff who used numerous techniques to influence feeding (Table 3). The ratio of child:adult meals served was 125 : 1, presenting little opportunity for the modelling of food choices by adults. However, instances of peer influence were reported with respect to food choice.

Within the dining hall, interactions took place at the tables and the waste point. It was the domain of midday supervisors where caterers could not, or would not, seek to influence. Once the infants (reception class and years 1–2) finished eating, the supervisors accompanied them into the playground, leaving junior children (years 3–6) rarely supervised by more than one adult when they were eating. Without exception, actively influencing feeding was a lower priority than maintaining behaviour, clearing up and managing the throughput of children during what was a task-intensive and unpredictable period. Table 3 shows the techniques used to influence feeding at the table and waste point. Many opportunities to interact

Table 3 Number of schools (out of a total of 11) in which at least one member of staff employed a specific technique (either frequently or occasionally) to influence eating at the service point, tables and waste point

	Service point		Tables		Waste point	
	Used frequently	Used occasionally	Used frequently	Used occasionally	Used frequently	Used occasionally
Modelling	0	0	0	1	0	0
Rewards						
Stickers	0	0	1	3	0	2
Special award	0	0	3[*]	0	0	0
Praise	2	2	1	5	0	2
Restriction	0	1	0	0	0	0
Pressure						
'Must' have/eat	4	3	0	6	0	1
Encouragement						
Try/one more bit	2	5	1	10	0	2
Other verbal	9	2	1	8	0	0
Norms						
Food order	0	0	5	5	0	0
Table etiquette	0	0	1	2	0	0

[*]Certificates awarded during school assembly or a special table with a tablecloth and flowers.

with the children and encourage eating were not taken (e.g. during the routine cutting of younger children's food). There was little evidence of formalised training in encouraging children to eat and most relied on their experiences as mothers:

'I can relate to them far better than if I didn't have children. It must help yes. We're all mothers.' (Supervisor)

There were discernable informal protocols governing the feeding techniques selected. Anything perceived as force was considered inappropriate (e.g. persisting against a child's wishes). Attempts to influence a child would be aborted if they reacted physically (e.g. gagging/crying) or appeared to genuinely dislike the food or be satiated. Sometimes techniques were combined (e.g. verbal encouragement and immediate praise). Techniques were often targeted towards the younger children or poor/slow eaters and could be used reactively (e.g. if a child attempted to throw food away).

Feeding outcomes sought by school meal staff

Amongst serving staff, feeding outcomes concerning food choices were more common than all the others combined. Various approaches included allowing the child a free choice, not allowing them a choice or helping them to make their choice. These were often mediated by the type of food and/or age of the child:

'On Tuesday … we will actually give the salad out to the infants because, on that particular day, there is no vegetable so by us giving the salad out, each child gets a bit of everything, otherwise they have nothing on their plate'. (Cook).

Serving staff were keen for children to taste the food and would express concerns about children going hungry or wasting food. Whereas many staff mentioned the requirements for the food that they cooked to be nutritionally balanced, the need to ensure that the food actually served on the child's plate was nutritionally balanced was less evident. School meal uptake and increasing children's liking for foods were the least frequently mentioned feeding outcomes.

The feeding outcomes sought by supervisors were predominantly to encourage consumption. Less common objectives were to enhance liking for foods, to avoid the child going hungry and to avoid waste.

Discussion

The present study explored the role of feeding strategies within the context of primary school meal supervision. The children exhibited three main feeding outcomes (dislikes, low consumption and nutritionally poor food

choices) identified in the previous literature by Birch et al. (1984), Galloway et al. (2006) and Birch et al. (1987a), respectively. This suggests that even if a nutritionally balanced meal is made available as required by the ongoing school meal transformation programmes (e.g. Welsh Assembly Government, 2007), there is no guarantee children will eat it. A similar phenomenon has already been found in England (Gatenby, 2007). Furthermore, an opportunity existed for catering staff to modify the nutritionally poor choice behaviours evident at the service point, yet the enhanced training recommended within the transformation programmes focuses on cooking skills. Similarly, consumption could only be addressed by supervisory staff within the main dining hall but the transformation programmes make little reference to midday supervisors. School meal policy that focuses on improving children's eating behaviours in addition to food availability is recommended.

Schools often required the child to eat their entrée before their dessert, and it was clear that the children were aware of this and mostly complied with it. Previous research has shown that where children are asked to 'eat food A then food B' as opposed to being presented with a contingent food reward ('if you eat food A, you can have food B'), the decrease in liking for food A associated with the reward scenario does not occur (Newman & Taylor, 1992). As other nondirected behavioural practices were also evident (e.g. queuing, seating), children in school dining halls may readily accept and comply with school-imposed norms to such an extent that the phenomenon could be used to positive effect with respect to eating behaviours.

Purposeful modelling of eating behaviours was almost wholly absent in all schools, despite evidence of its effectiveness (Hendy & Raudenbush, 2000). As the children were in the dining hall to eat, and the staff/adults were primarily in the hall to work, the absence of adult–child modelling could be attributable to there being no commonality of actions upon which to base nutritional social learning. Other types of feeding strategies defined in the literature include restriction, pressure and encouragement (Savage et al., 2007). These were found across the sample, albeit in varying frequencies per school/individual. Pressuring strategies were typically verbal 'must' have/eat directives and anything perceived as 'force' was rejected. This differs in form and intensity from the pressuring strategies defined in the Child Feeding Questionnaire which assesses parental feeding practices (e.g. eat 'all', eat after satiety) (Birch et al., 2001). Whereas restricting access to food is a common strategy adopted by parents (Moore et al., 2007), restrictive practices were not common in schools. Encouraging strategies converged on three main types: (i) 'try' or 'eat one more bit'

requests; (ii) other verbal encouragements such as health incentives; and (iii) rewards for achievement. Rewards often took the form of verbal praise. Tangible rewards for consumption (e.g. stickers) were occasionally used by supervisory staff. Therefore, although the feeding strategies used could be categorised as per the literature, their implementation reflected the constraints and opportunities of the context in which they were used.

A further type of feeding strategy is RTE (Birch *et al.*, 1987a). During analysis, none of the strategies were categorised as RTE, even though they could be construed as attempts to achieve tasting (e.g. 'try it'/'eat one more bit'). This was a considered decision because there was no evidence that such techniques were knowingly, or repeatedly and consistently used as the literature describes. The absence of RTE is a concern because it modifies liking, which strongly correlates with consumption (Birch, 1979) and is important for longer-term, independent food choices (Cooke, 2007). However, there may be a case to re-conceptualise RTE as the desired *objective* of a feeding strategy rather than as an independent category. The dining halls readily offered opportunities for children to socialise with each other and with school meal staff who naturally used feeding strategies, primarily in the form of verbal encouragements, praise and rewards. These could be viewed as attempts to achieve *tasting*, situated within a menu system that ensured that children were *repeatedly exposed* to nutritional foods. Therefore, more rigorous investigation of the effects of consistently delivering verbal encouragements and praise in dining halls is recommended. An intervention based on promoting such pre-existing staff behaviours may be cost-effective, practical and sustainable, albeit, subject to any constraints inherent in the individual school context.

Conducting a case study of one LEA within Wales was a methodological decision intended to ensure consistency with respect to national and local school food policy. The limitation of this is that the findings may not generalise to primary schools outside this LEA and/ or Wales/the UK. However, the theoretical framework that guided the data collection and analysis was drawn from literature primarily originating from the USA and the UK. Furthermore, the study demonstrated how context shaped the implementation of feeding strategies. Therefore, policy and practice based on the appropriate use of feeding strategies within school dining halls may be widely relevant provided it is tailored to synergise with the context/culture of the host country as well as the host school. In addition, inter-observer reliability could not be assessed because data collection was undertaken by one observer, albeit observing each school on multiple days. An alternative approach for future studies may be to use multiple observers, although, in some schools, extremely cramped dining hall conditions may make this infeasible.

In conclusion, school meal staff utilised feeding strategies that matched categories found in the literature, although the implementations differed. The most commonly used techniques were verbal encouragements and praise, and it was common to impose a norm such as 'an entrée must be eaten before a dessert'. These naturally occurring techniques could be harnessed to encourage children to *taste* the nutritionally balanced schools meals that government initiatives will *expose* them to because repeated taste exposure is known to increase liking for foods, and liking is associated with consumption. Therefore, further studies are recommended to investigate how school meal staff could utilise appropriate feeding strategies to address issues whereby children fail to consume nutritionally balanced meals even if they are available.

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