

The Causes of Childhood Obesity:

Desk research for the Childhood Obesity Taskforce

Final report

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Conclusions and recommendations

Context

A strategy is now being developed to halt the growth in obesity amongst under 11 year olds. To inform the selection of the most effective interventions to halt the growth in obesity in children under the age of 11, this research was commissioned into the evidence for the causes of obesity in this age group.

Genes

Certain genes can pre-dispose children to obesity. However, in a genetically stable population, the recent increase in obesity prevalence in children is a result of an increasing proportion of children who consume a greater amount of energy through diet than they expend through physical activity. The evidence reviewed in this document suggests that the key causes of childhood obesity are as follows:

Energy intake:

1. High consumption of high in fat and sugar foods. Epidemiological studies show that :
 - the high energy levels that both these food contain can cause energy intake to exceed energy expenditure
 - fat can be passively over-consumed because of its effect on satiation
 - high glycaemic foods can stimulate hunger
2. High consumption of convenience foods, snacks, and carbonated drinks. These foods are high in fat and sugar. Surveys show that obese children disproportionately consume these types of food relative to ideal weight children.
3. In fact, all children eat a disproportionate amount of convenience foods, snacks and carbonates relative to the population. This pattern is simply more exaggerated in obese children.
4. A key reason for this is that children have a strong preference for food that are high in fat and sugar (in turn reflecting the diet they are given), and consequently demand these types of foods. A significant proportion of the parents are giving into these demands, and as a result, a proportion becomes overweight or even obese. In fact, certain types of parents have much weaker discipline than others, and put a very great weight on making their child happy by meeting their immediate needs. They consequently give into their children's demands. Surveys show that parents of obese children are more likely to behave in this way.
5. Consumption of convenience foods has increased in the population as a whole in the past decade. Aside from children's control over what they are

fed, the most powerful reasons for childhood consumption of convenience foods are lack of parents' time, the inability of some parents to conceive of a healthy menu that is not austere or bland, the low status of vegetables as a food, and the view that certain food types are "children's foods". Consumption of snacks and carbonated drinks has also increased in the population as a whole, though the drivers of these trends are not clear.

Energy expenditure

6. The epidemiological data does not unanimously agree that a lack of physical activity causes childhood obesity, but the balance of evidence at the moment suggests that it does. However, there is much more evidence that excessive TV watching leads to obesity in children.
7. Data does not exist showing us the physical activity characteristics of obese children in the UK relative to non-obese children.
8. Furthermore, trend data on levels of physical activity in the UK as a whole are patchy and do not correlate with the recent rise in obesity. Trend data on physical activity as a whole only goes back to 1997 and shows little change. Trend data on PE in school lessons shows a very small decline from 1994 to 2002, but an increase in extra-curricular sport. Trend data on sport outside school shows a marginal decline. The only trend that is significantly down is walking to school.
9. Nevertheless, the barriers to physical activity are clear. The volume and quality of PE in schools is not as great as it could be due to teachers' lack of expertise and inadequate facilities. The strongest predictor of participation in sport outside of school is parental attitudes. Significant proportions of parents do not value sport, see their child's participation in sport as taking them away from the family, and view providing their children with education and material goods as more important than encouraging physical activity. Parental fears of traffic and stranger danger also restrict the amount of unaccompanied active play that children can do outside of the garden.
10. The government already has a number of strategies to tackle some of the drivers of obesity, mostly through schools. These include PESSCL (school PE and sport), the 5 A Day campaign (promoting fruit and vegetables), Fruit in Schools, Safer Routes to Schools (to encourage walking to schools), Extended Schools (including after-school sport clubs), school breakfast clubs and forthcoming reforms to school meals. Most of these are very much concerned with removing practical barriers to healthy eating and physical activity. The analysis here, however, suggests that shifting parental attitudes is also key. Any strategy that attempts to stem the rise in childhood obesity should therefore explore ways to:
 - Show time-pressured parents how to provide children with a healthy diet, especially fruit and vegetables.

- Encourage parents to determine what their children eat, rather than allowing their children to dictate their diets.
- Recommend that parents limit the amount of time that children spend on sedentary activities.
- Show that providing your child with a healthy diet and the opportunity to do plenty of physical activity is as important as meeting their immediate material and emotional needs.

These conclusions clearly omit many other less powerful causes of childhood obesity (e.g. not walking to school, food promotion). However, the aim has been to identify the strongest drivers. The rest of this Executive Summary summarises the evidence for these conclusions.

Executive Summary

Genetic causes

Studies of both identical twins (who share all the genes) and fraternal twins (who on average share half the genes) have shown a much higher correlation of obesity among identical twins, than among fraternal twins. This provides strong evidence that obesity is strongly linked to genetic influences. Likewise, adoption studies show that there is a strong relationship between Body Mass Index (BMI) of biological parents and the adoptee, while there is no relationship shown between the adoptive parents and the adoptee.

Scientists now agree that possession of certain genes lowers the threshold for the development of the obesity, though they do not predestine an individual to become obese.

Nevertheless, the rising rates of obesity prevalence amongst our genetically stable population of children suggest that much of the growth in obesity is attributed to an imbalance in energy intake (diet) and energy expenditure (largely through physical activity).

Does diet cause obesity in children?

Are children eating more or less than they used to?

There has been much discussion around the fact that National Statistics show that average energy intake has fallen since the 1970s for UK households, and yet obesity prevalence has risen in both children and adults over this period. A considerable debate has revolved around whether or not the statistics are misleading because of under-reporting, and the omission of eating out in earlier surveys. Nevertheless, this is a red herring for the childhood obesity debate.

- First of all the data on household energy intake is for averages – average consumption could be declining at the same time as the intake of the, say, top twenty per cent of energy consumers has increased.
- Secondly, this data is for households. We have no recent trend data exclusively for children's energy intake.
- Furthermore, it must be remembered that obesity is caused by an energy imbalance. If energy intake really is declining then the question becomes – why has it not declined as fast as the decline in energy expenditure, especially given that the mechanisms of hunger and satiation have ensured that the overwhelming majority of the population up to the 1970s were able to maintain a healthy body weight.

Do foods that are high in fat and sugar cause obesity?

A considerable debate has also raged over whether the *proportion* of energy that adults and children derive from fat, carbohydrate or protein has fuelled the rise in obesity. A consensus seems to be emerging that high consumption of foods that are “energy-dense” (either in fat or high glycaemic carbohydrates) contributes to obesity because both of these types of nutrient can reduce appetite control and in themselves tip the energy balance. In contrast, fruit and vegetables are far less energy-dense than a similar weight in other foods, and fill up the stomach, creating satiation.

Do specific types of food cause obesity?

The analysis suggests that a diet which is heavily biased towards foods which are high in fat and sugars (such as convenience foods, carbonated drinks and snacks) is correlated to obesity. The only types of food that have been directly correlated with obesity through a controlled trial are carbonated drinks. There is no epidemiological data linking convenience foods or solid snacks such as crisps or confectionery to obesity.

Does “grazing” cause obesity?

There has been a trend in the UK for adults and children to shift away from eating three substantial meals a day to eating three meals a day as well as snacking in between meals. This is usually described as “grazing”.

On balance, the empirical evidence shows that if children eat more frequently, but overall eat the same amount of calories per day, then they are actually less likely to gain weight. However, if the effect of grazing is to overall eat more calories, then clearly this is likely to increase adiposity.

Has obesity been caused by larger portion sizes?

It has been suggested that the increase in obesity in children has been fuelled by an increase in portion sizes. Although many fast food outlets have been offering larger portions, and many confectionery items now come in king-sizes, there is no UK evidence either way to show that portions that children eat either at home or outside of the home have increased, or that children who become obese eat larger portions.

Do obese children simply have less self-constraint?

Research amongst adults in the 1960s and 1970s known as “externality theory” suggested that, compared with their ideal weight counterparts, obese people were more reactive to external cues (time, presence of food, and situational effects) and less sensitive to internal hunger and satiety signals. The evidence for this is not unanimous.

Do obese children just have more of a “sweet” (or fat?) tooth than ideal weight children?

It is often suggested that obese children and adults have a greater preference for sweet foods which contributes to their obesity. This would then explain why they eat more foods that are high in sugar. However, studies have shown that obese and ideal weight individuals do not differ in their general sensitivity to, or perceptions of, intensity of sweetness, or in their liking for sweetness in foods and drinks. On the other hand, there is evidence to show that obese children and adults do have enhanced preferences for fat-containing stimuli.

Does it matter what time of the day you eat?

Some epidemiological investigations of the “circadian” distribution of energy intake have suggested that the obese consume a greater proportion of energy intake in the latter half of the day compared to ideal weight individuals. Overall, the current consensus is that evidence for a causal link between the patterns and circadian distribution of energy intake and obesity is weak.

Do the parents of obese children simply not realise that their children are fat?

One argument that is sometimes made is that such a significant proportion of the population is either overweight or obese that it is not seen as abnormal to be over-weight or obese. Surveys do show that obesity and overweight are now so commonplace that parents are failing to recognise that their children have a problem.

What are the characteristics of obese children’s diets compared to that of ideal weight children?

Surveys demonstrate that obese children eat more convenience foods, snacks, and carbonates (which are all high in fat and/or sugar) than ideal weight children, and less fruit and vegetables. However, these are merely correlations. Strictly speaking, we cannot infer that these diets cause obesity.

Why are children’s diets increasingly biased towards high in fat and sugar foods?

Obese children have a diet which is more biased towards high in fat and sugar convenience foods and snacks than all other children. Nevertheless, this dietary bias is not exclusive to obese children. On average, all children consume more convenience foods as well as sugar confectionery and squash concentrates than their share of the overall population. Obese children’s diets are simply worse than non-obese children’s. This reflects a number of trends in all children:

1. A shift towards convenience foods in the home, which tend to be high in fat and sugar
2. Continued low consumption levels of vegetables.
3. Children eating alone, rather than as a family. When eating alone, they tend to eat foods that are high in fat and sugar.
4. High levels of eating food outside of the home (e.g. in fast food restaurants) and take-aways, which again tend to be high in fat.

5. High levels of snacking (especially confectionary and carbonated drinks), which tend to be high in sugars.

Underlying all of this is children's increasing control over what they are given to eat. They prefer foods that are high in fat and sugar, and many of them have enough control to ensure their parents give them this.

Convenience foods

Has there been a shift in consumption towards convenience foods within families with children?

The demand for ready-meals in Britain grew by 44% between 1990 and 2002. Thirteen per cent of households with young children eat convenience food every day.

This shift to eating convenience foods is of significance to childhood obesity because:

- They are high in fat and added sugar
- Pre-prepared convenience foods limit the consumer's choice and control over what they eat compared to home prepared food.
- Convenient/pre-prepared meals are less likely to be eaten with fresh fruit and vegetables

Parents of obese children are also more likely to be motivated by convenience when making food choices than parents of non-obese children.

Why has there been a shift to buying convenience foods amongst families with children?

- Time: People spend less time cooking now than they did twenty years ago. Consumers in employment spend 40% less time cooking than those who are not in work. One of the key reasons behind this "lack of time" is the increase in the proportion of mothers who work (58.7% in 1991 compared to 65.4% in 2001).
- Many mothers are hampered by their lack of ability to conceptualise an attractive, affordable and healthy diet. In putting together their "ideal" diet for a child, these mothers are likely to feel they have to reject whole categories of foods: fats, dairy products, sugar and carbohydrates. Consequently their notion of the "ideal diet" is extremely austere and perceived to be unattainable.
- Cooking skills: Many commentators suggest that the present generation of mothers are unable to prepare and cook. This is often blamed on the demise of Home Economics as a subject in schools when these mothers were themselves at school. However, we have not been able to identify evidence for this either way.
- Do not enjoy cooking: A NOP survey showed that only one in five parents were enthusiastic about cooking. One in six parents (16%) actually disliked cooking.

- Availability of convenience foods: The food industry has developed products (many of which are high in fat and sugar) targeting these eating occasions and markets them heavily to mothers and children.
- Location of outlets: A common argument for the increase in consumption of convenience foods by lower socio-economic groups and those in inner city areas is that there are considerable barriers for them to reaching outlets such as large supermarkets that sell healthy foods. They are therefore more likely to shop for their food in local convenience stores. However, one piece of research shows that location of shops is not a decisive factor for food choice for these groups.

Low consumption of vegetables

The Health Survey of England shows that boys and girls aged 5 to 9, eat an average of 2.5 and 2.6 portions of fruit and vegetables. This is even lower for those children in poorer socio-economic groups.

However, the same survey shows that there were no significant differences in consumption of fruit and vegetables between ideal weight and obese children, though this could be due to over-reporting by parents of the obese. In contrast, analysis by TNS shows that obese and overweight children eat less fruit and vegetable portions than their ideal weight counterparts.

Why is consumption of fruit and vegetables low?

- Fresh fruit and vegetables are much less likely to form part of a meal where the main component of a meal is convenience food.
- Just as time pressure is cited as a reason for buying convenience foods, it is also cited as a reason for not buying and eating larger amounts of fruit and vegetables.
- Health is not an important reason for many parents when deciding which foods to buy for their children. The main reason for people to increase fruit and vegetable consumption is for health, but health is not an important consideration for most people. Parents of obese children attach less importance to eating fresh fruit and vegetables than parents of normal weight children.
- In the general population there is a high level of awareness that fruit and vegetables are good for health. Nevertheless, there is confusion about portion sizes. Many parents have an exaggerated view of what constitutes a portion size, are unaware that frozen, canned and dried fruit and vegetables count, and consequently see five portions as unattainable.
- Location of supermarkets. Consumers from poorer socio-economic groups frequently state that one of the barriers to buying more vegetables is the fact that they only do a “big shop” once a week and do not have a car. They can therefore only buy fresh food once a week. Fresh produce goes off quickly and also is very heavy. Fresh fruit and vegetables from convenience stores are seen as poor quality. Consequently, they under-purchase vegetables and fresh fruit. However, one study suggests that the location of supermarkets is one barrier, but not the decisive one for purchasing fruit and vegetables for low income groups in inner cities.

- Children are described as resistant to eating vegetables in a number of studies. Mothers do not want to throw food away that children refuse, nor do they want too much tension at meal times, so they give into rejection of vegetables.
- Fruit in particular is perceived as expensive. Healthy convenience foods are often premium priced and it is only the more affluent who can afford them. In contrast, convenience foods are heavily price-promoted and there are large numbers of special offers on these sorts of food in supermarkets.
- Meat is seen as a high status food, and foods such as fish fingers and baked beans are seen as “children’s food.”

Has CAP made unhealthy food more attractive?

The Common Agricultural Policy has sustained prices of most food products above the level that would otherwise apply, and does so in an uneven way. However, this unevenness has actually created incentives for a better, not worse, diet.

How important is the decline of the family meal?

Eating with the family is likely to result in children being exposed to a greater range of foods than would be the case if they eat in “child-only” situations. If children eat without adults, their own preferences are more likely to be considered and most children seem to have a taste for high in fat and sugar food. However, the evidence that there has been a decline in family meals is not conclusive. Furthermore, the only research that has been undertaken into the relationship between family eating and obesity (undertaken in Australia) suggests that having a healthy maternal attitude to family eating and diet was more important than the frequency of shared meals.

Food eaten outside of the home and take-aways that are high in fat and sugar

Eating out for children, compared with eating at home, is dominated by the consumption of chips and burgers, and a reduced consumption of fruit and vegetables. Eating outside of the home and take-aways reduce parents control over what goes into food, making it more difficult to monitor the amount of fat and sugar that are being consumed.

The National Food Survey (2000) showed that almost 40% of calories from foods and drink eaten outside the home are from fat, compared with less than 37% from foods and drinks eaten inside the home.

Data on the growth of food eaten outside of the home is somewhat contradictory, and focuses on the market as a whole, as opposed to the market for families with children.

What is the effect of snacking?

Does snacking cause obesity?

School-aged children increased their consumption of sugary drinks, crisps and confectionery by 63%, 21% and 11% respectively between 1983 and 1997.

There are epidemiological studies correlating a high consumption of carbonated drinks to obesity, but there is no epidemiological evidence either way that snacks such as confectionery or crisps are correlated to obesity. However, snacks are high in sugars and fat which can contribute to over-eating and tip energy balance. Carbonated drinks, chocolate confectionery and sugar confectionery constitute 11%, 10.7% and 10.3% respectively of non-milk extrinsic sugars for children aged 4 to 10. Furthermore, obese children do eat slightly more snacks and carbonated drinks than non-obese children, eat them slightly more often, and are more likely to have a snack in the evening.

Who buys the snacks and from where?

For children aged 7 to 10, parents are the main purchasers of all types of snacks. The most important place for eating snacks is in the home, rather than at school or on the move.

This would imply that attempts to limit obesity in children up to the age of 11 by reducing snacking should focus on snacks bought by parents for their children's consumption in the home, rather than snacking at school or out of the home. In particular it suggests that a focus on how children spend their own pocket money is less worthwhile.

One of the reasons given for the increase in snacks eaten in the home is "compensation parenting" – parents providing children with snacks because they feel guilty that they do not give children enough time. However, there is no evidence publicly available that either confirms or negates this.

Are packed lunches and meals provided by schools contributing to a high intake of high in fat and sugar foods?

Research by the British Dietetic Association into the quality of School Lunch Boxes in 2004 found that packed lunches are high in saturated fats and sugars. A typical lunch box is made up of a sandwich, crisps or confectionery and a carbonated drink. In fact, a number of studies have shown that packed lunches are even worse than school meals.

Parents give their children packed lunches for two reasons:

- Some parents perceive meals provided by the school to be of poor quality.
- Children in particular are a strong influence on their parents to actually give them a packed lunch rather than have a school-provided meal. Children do this because they perceive school meals as being “greasy” and “soggy”, and because having a packed lunch has a higher status for children than having a school meal because it implies freedom and choice.

Despite nutritional guidelines introduced in 2001, the school meals that children currently eat are poor quality because caterers spend very little on ingredients and the guidelines allow children to choose unhealthy combinations of food. New guidelines will be introduced next year for school meals, but this could have the adverse effect of driving even more children to pressurise their parents to give them a packed lunch.

How do children influence their own diets?

It is argued that:

- Children prefer high in fat and sugar foods
- Some children have considerable control over what they are given
- They therefore ensure that they are given foods that are high in fat and sugars

Do children prefer high in fat and sugar foods?

In the NOP survey for Ofcom, children aged 5 to 7 were asked to describe their favourite meal. Over a third named fast food (36%), while almost two thirds (60%) mentioned at least one high in fat and sugar item and 51% mentioned foods that are not high in fat and sugar.

Why do children prefer high in fat and sugar foods?

- A number of studies suggest that parents can interfere with a child’s natural ability to regulate energy intake. Children are actually good regulators of energy balance. However, cues from parents (“eat up your

plate”) can lead to the loss or the weakening of these innate abilities in children. The effects of such parental orders are to focus on arbitrary cues (such as the size of the serving, threats, food rewards) as a guide to behaviour, rather than on internal signals of hunger. In particular, parents use high in fat and sugar foods as rewards, creating positive associations with these foods. Parents create negative associations with vegetables by bribing their children to eat them.

- Children tend to eat similar foods to their parents, and then develop a taste for these foods
- Most children attach a low importance to healthy eating. They consider that they are healthy anyway. Health considerations are difficult for young children to conceive of as they have cognitive difficulty in imagining themselves in the future. For slightly older children and teenagers, any negative effects from eating unhealthy foods are so far in the future as to be irrelevant.
- Children have a negative image of healthy food and therefore do not push their parents for fruit and vegetables.
- Some scientists purport that humans are pre-programmed to like energy-rich foods, which in our hunter-gatherer past conferred an evolutionary advantage. In the modern world this preference can lead to obesity.

Do children have increasing control over what foods they are given?

How does this cause obesity?

The argument here is that families are increasingly democratic. Parents’ roles are tending more towards influencing and encouraging to eat healthier food, rather than dictating what they should eat using bans and rules. However, since children base their food choices on instant and immediate needs, such as taste, rather than on long-term concern over their future health, this has led to parents giving their children high in fat and sugar foods.

Data from the NOP survey and TNS Food Panel for Ofcom show that parents of obese children do tend to have a more laissez faire attitude to mealtimes and are less confident than parents of normal weight children about their own ability to influence their children.

Why do children dictate what they are given?

- Parent's fear that their children are not eating enough: Because of this type of anxiety, some mothers provide their children with a diet of foods they enjoy, rather than giving them foods they are less keen on and may refuse to eat.
- Fear of conflict during family meals and dislike of throwing out food.
- Certain types of parents have much weaker discipline than others, and put a very great weight on making their child happy by meeting their immediate needs.

How much control do parents of obese children have over their children at meal times?

Parents of obese children on average have less control of their children during meal times than the parents of ideal weight children. Obese children are less likely to be required to:

- help cook and prepare food
- eat some vegetables
- have good table manners
- not fool around whilst eating
- help clear up
- not leave the table until everyone is finished

They are also more likely to report that their child asks them to buy something to eat or drink frequently.

What is the role of promotion of food and beverages in the rise of obesity?

Availability of high in fat and sugar foods

The advertised diet contrasts sharply with that recommended by public health advisors, and themes of fun and fantasy or taste, rather than health and nutrition, are used to promote it to children. Meanwhile, the recommended diet gets little promotional support.

Nonetheless, the industry argues that they provide food products, not "diets", and that advertising encourages brand switching, not an overall increase in consumption of types of foods or diets.

What is the effect of special offers?

Parents of obese children are more likely to be attracted by price cuts than the parents of children of normal weight (57% compared with 45%). Multi-buys and

extra free content offers also encourage extra consumption as those who buy in larger quantities also use products up more quickly.

What is the effect of food advertising on children?

The most wide-ranging review of the evidence of all aspects of this question is that provided by Hastings for the FSA. This in turn has been reviewed by Livingstone as part of the OfCom review. The Hastings's review found that:

- While there is considerable debate in this area, the weight of the evidence suggests that food advertising may have little influence on children's general perceptions of the make-up of a healthy diet.
- There is robust evidence that food advertising does influence children's preferences for eating unhealthy foods.
- A number of studies have also shown that food advertising can influence what parents choose to buy and subsequently what children choose to eat.
- A good number of studies provide modest evidence that food advertising does, in some contexts, exert an influence on consumption behaviour.
- There is evidence that food advertising causes both brand switching and an increase in overall sales of whole categories of foods.

Overall, the Hasting's review concluded that food promotion or television viewing significantly influences children's food behaviour and diet independently of other factors known to influence children's food behaviour and diet. However, there was little evidence to show whether the influence of food promotion on children's behaviour is greater or lesser than that of other factors.

Results from the quantitative survey by NOP for Ofcom appear to confirm that children do pester their parents for high in fat and sugar foods when they are out shopping and that parents are also very likely to buy particular foods for their children when they ask for them. However, this effect was not necessarily stronger in parents of obese children than parents of non-obese children.

When television advertising is put in the context of other influences, the NOP survey also showed that advertising and other promotions do have an impact on food choice among both parents and children, but it is small compared to other influences.

Putting together the evidence from Hastings, OfCom, and Livingstone, this suggests that advertising does have an effect on children's food choices at both brand and category level, but the size of this is effect is not known, both absolutely, and relative to other factors.

Does low level of physical activity cause obesity?

Do obese children in the UK do less physical activity than non-obese children?

Neither the Health Survey for England nor the National Diet and Nutrition Survey show that obese children do any more or less physical activity than non-obese children. However, obese children and their parents are notorious for under-reporting the amount of physical activity that they do. Secondly, this data merely shows us how much physical activity obese children claim to do once they are obese. It does not tell us how much physical activity they did in the run up to being obese.

Do epidemiological studies show that children with low levels of physical activity become obese?

A number of studies have detected significant relationships between physical activity levels and percentage of body fat or overweight/obesity amongst children. However, a number of other studies have not found any significant association. A meta-analysis of some fifty epidemiological studies covering the whole range of tools to measure activity concludes that those studies which use objective evidence (such as heart rate monitors) to collect physical activity are more likely to show that children who do more physical activity are less likely to become obese. They conclude there is a small to moderate relationship between body fat and activity in children.

Does watching television and playing computer games too much lead to obesity?

There is plenty of evidence showing that excessive sedentary behaviour such as watching television or playing digital games is predictive of obesity and overweight. This could operate in any of four ways:

1. Watching television or playing computer games does not expend any energy
2. Watching television does not expend any energy, and even depresses the metabolic rate
3. Children watch television or play computer games instead of doing physical exercise
4. Children watch television whilst eating food and drinks that are high in fat and sugar

Little of the research distinguishes between these four mechanisms. Most research simply correlates obesity to both lack of physical activity and watching television, whilst other research just correlates it to watching television or playing computer games.

Only one study was identified which showed that children's metabolic rate was actually suppressed whilst they watched television, reducing energy expenditure even further. There was neither evidence for or against the view that sedentary activity like watching TV actually replaces physical activity.

Has television watching and playing of computer games increased significantly?

The amount of time 4 to 15 year olds spend watching television has doubled since the 1960s. However, the proportion of 12/13 year olds watching more than 2 hours of television per day (weekdays only) has not increased from 1991 to 2004 at a time when obesity has grown. This is in spite of the spread of multi-channel TV and the increasing proportion of children with TVs in their own rooms.

On the other hand, the proportion of 12/13 year olds that spend any time playing computer games after school on a weekday has increased dramatically over the past twenty years.

Do children currently do the recommended levels of physical activity, and has this been declining?

Seventy per cent of boys and 49% of girls aged 7 to 10 do meet the Chief Medical Officer's recommendation of doing one hour of moderate physical activity everyday. Ninety per cent of boys and 84% of girls aged 7 to 10 do at least thirty minutes of moderate physical activity each day.

Data does not exist showing us the physical activity characteristics of obese children in the UK relative to non-obese children. Crucially data does not exist on the attitudes of obese children towards sport (and preferably the attitudes they held before they became obese). This would tell us what the barriers are to increased participation in sport for children who become obese. Instead, we have to use data on the barriers to sport for all children as a proxy.

Furthermore, trend data on levels of physical activity in the UK as a whole are patchy and do not correlate easily with the recent rise in obesity. The Health Survey for England shows that between 1997 and 2002, there was a very small increase in the proportion of young people doing less than 60 minutes of physical activity each day. Splitting this out by type of activity, Sport England surveys show that:

- PE: The proportion of primary schools offering 2 hours per week of PE and sport to 6 to 8 year olds has declined from 32% in 1994 to 29% in 2002. The proportion offering this to 8 to 10 year olds declined from 46% to 32%. However, since 2003 this situation has improved slightly.
- Extra-curricular sport: The proportion of young people participating in any extra-curricular sport has increased from 31% in 1994 to 41% in 2002. The biggest increase has been in football.
- Sport outside of school: The proportion of 6 to 11 year olds that did not do sport (excluding walking) at least 10 times in the past year increased from 11% in 1994 to 12% in 2002.
- Walking to school: Between 1989/91 and 1999/2001, the proportion of children aged 5 to 10 who were driven to school increased from 28% to 39%.

However, one analysis of children's activity suggests that if children's activity is suppressed at one part of the day (e.g. school) they will compensate for it during another part of the day. For example, using accelerometers, they found that children who were driven to school expended the same amount of energy as those who walked because they compensated for this by being more active during other parts of the day. Likewise, children who did less PE at school than others were more active after school. This would suggest that encouraging more children to walk to school or expanding time for PE in school would not have an impact on total energy expenditure and therefore not prevent obesity.

PE, extra-curricular sport, sport out of school, walking to school, and other physical activity

PE and sport in school

Trends and existing levels

Currently all schools in England have to offer two hours of PE a week within or beyond the curriculum. The proportion of primary school offering this to 6 to 8 year olds has declined from 1994 to 2002 from 32% to 29%. The proportion offering it to 8 to 10 year olds declined from 46% to 32%.

In response to this sort of problem, the DfES set up the PE School Sport and Club Links Strategy (PESSCL) to improve school sport. However, by 2004/5, even in those primary schools participating in this scheme, only 64% of primary school pupils were doing 2 hours of sport per week.

Why do young people not do enough sport at school?

- Expertise: In 2002, only 9% of primary schools had a full time PE specialist. Many newly qualified teachers have had very limited training to teach PE in the National Curriculum, which is leaving many ill-prepared to meet the challenges of the subject.
- The focus on numeracy and literacy in primary schools since 1998 has also been said to put a squeeze on PE.
- The quality of sports facilities in many primary schools is still sub-standard.
- School playing fields: Before 1998, there were no barriers to school selling playing fields or building on playing fields in order to expand. Since 1998 the rules have been tightened.

The PESSCL strategy should help to redress the first three of these issues over the coming years by providing training to primary school teachers in PE, re-equipping playgrounds, and providing further support for swimming.

Extra-curricular sport

Trends and current levels

Extra-curricular sport refers to sport organised by a school, but taking place outside of lessons. Ninety one per cent of primary schools offered extra-curricula activities to pupils in 2002. The proportion of young people participating in any extra-curricular sport has increased from 1994-2002 from 31% to 41%.

This positive trend can only be expected to improve over the next five years as the Government's "Extended Schools" programme is rolled-out. This will expand provision of after-school clubs in primary schools in order to provide activities for pupils who are receiving "wrap-around" care.

It might be the case that children that become obese do not like or participate in extra-curricular sport, but there is no data to prove this.

Sport outside of school

Trends and current participation

In 2002, 12% of children aged 6 to 11 did not do any sport (excluding walking) at least 10 times in the past year. This has actually grown a very small amount from 11% in 1994. Encouragingly, there was a very slight increase in children aged 6 to 11 doing sports as a member of a sports club (not school) from 38% to 41% from 1994 to 2002.

It might be the case that children that become obese do not like or participate in sport outside of school, but there is no data to prove this.

Influence of parents on children's sport participation

Many studies have shown that children whose family members participate in sport are more likely to take part themselves, and that children's sports participation is particularly influenced by the participation status of their same-sex parent. Parents influence children's participation in a number of ways:

- By passing on a belief that sport is to be valued: Some parents believe physical activity contributes to children's rounded development and helps to provide a sense of self-identity. Other parents, however, do not make the connection between achievement in later life and involvement in physical activities and as such try to deliver a quality of life to their children through routes which are oriented towards education and material needs.
- By organising sporting occasions, from signing their child up to classes through to driving their child back and forth to the sporting events or classes.

Nevertheless there are a number of other barriers to parents' providing sports opportunities to their children:

- *Parents' time:* The increase in households with one parent and the increase in working hours in the UK mean that it is harder for many families to find time to organise sporting activities for their children.
- *Fear:* More traffic on the roads, perceptions that street crime is increasing, and high profile cases of child abductions are leading to concerns about safety.
- *Own competence:* Those parents who do not have a personal history of involvement in physical activity are further inhibited due to lack of confidence in their own skills in this area.
- *Awareness of guidelines:* Those parents who are less inclined to value sport also do not know what the appropriate level of sport is for children.
- *Access to local facilities?:* The amount of physical activities young people can take part in is reliant to some extent on the facilities they have available to them. However, this does not appear to be a decisive factor, even in local income families that must consider the cost of transport
- *Cost of sport and recreation?:* Again, this is a barrier, but is not a decisive influence on whether or not children participate in sport, even from families from poorer socio-economic groups. A review of the impact of entrance charges to leisure facilities in Scotland suggested that for those who do not put a value on sport, lowering entrance charges will have little impact.

Other reasons for a lack of sport outside of school

- *Reasons to do with being uncomfortable:* When asked what is off-putting about playing sport, the most common answers for pupils aged 6 to 10 are: being kicked/hit/falling over (55%), having to go outside in cold weather (39%), getting cold and wet (35%), and getting hot and sweaty (32%). Girls were significantly more likely to mind these things than boys.
- *Ability:* Forty six per cent of 6 to 10 year olds say they mind if they are “not as good as others” when they do a sport, 73% say they mind if they “get left out because they are not good enough”, and 38% say that they mind when “it takes you a long time to learn something in sport”.

However, contrary to expectation, the following are not key reasons for a lack of participation in sport outside of school:

- *A negative attitude to sport?:* Surveys by Sport England show that most children aged 6 to 11 actually have a positive attitude to sport. 79% of boys and 65% of girls aged 6 to 11 agreed strongly that they enjoy sport and exercise in their leisure time. Negative attitudes to sport become much stronger in adolescence, especially amongst girls.
- *Competitiveness:* At this age, young people do not take sport too seriously and think that taking part is actually more important than winning. Seventy seven percent of young people say that they do not mind being in a competition where there will be winners and losers, and 67% say they do not mind being a loser. Being left out is more important. Between 60 and 80% of children aged 6 to 10 do mind it when they get left out because they are not good enough.

- Mixed sex sport: Another assumption often made is that young people do not enjoy taking part in sports with the opposite sex. In actual fact only 11% of young people aged 6 to 10 feel this way.
- Gender: A whole range of surveys consistently show that girls under the age of 11 do less sport and exercise than boys, and that this gap widens in the teenage years. Nevertheless, the gap with boys under the age of 11 is relatively small, and the overwhelming majority of girls at this age enjoy sport.

Socio-economic reasons

- Parental values: Studies in Australia and the UK suggest that middle class parents are more likely to organise structured, organised after-school sport for their children. Lower income parents are more concerned with keeping the family together through shared leisure activity rather than organising and facilitating the sport and leisure interests of individual family members.
- Cost: Sports' participation requires adequate disposable income to pay for fees, kit and equipment, and transport to training and competition venues. However, some sports are more accessible to children from some ethnic populations and lower social groups because of tradition and culture, and because they are available locally.

Does school PE put children off sport?

According to the 2002 Sport England survey, 73% and 65% of boys and girls respectively enjoy PE in schools. It might be the case that children that become obese do not like PE, but there is no data to prove this.

Active Play

The 2002 Health Survey for England showed that over 90% of boys and girls aged 2 to 10 participated in active play in the last week, where active play is defined as "active things like ride a bike, kick a ball around, run about, play active games, jump around". Research does suggest however, that children are restricted more than they used to be from playing in the street or visiting a playground independently.

Parents' fears for their child's safety because of traffic accidents and the risk of abduction are one of the strongest barriers to more active play for children of this age, though this would not apply to play in their own gardens where they have them. This is a far stronger limit on children's play than the proximity and quality of local play spaces.

Break time

Around 24% of the infant school day and 21% of the junior school day are taken up by break times. This provides opportunities both for sport and unstructured play. During this time, most children are physically active. Many primary schools

are taking steps towards increased activities at break time to help increase activity levels. The Sporting Playgrounds initiative (part of PESSCL) is also improving the facilities for active play in school playgrounds.

Walking to school

All surveys show that there has been a considerable rise in the proportion of children no longer walking or cycling to school. Despite initiatives such as the walking bus and “Safe Routes to Schools” organised by local councils, only 54% of children under the age of 11 walked to school in 2000, and only 1% cycled. This compared to 62% and 1% respectively in 1991.

Distance to school is not the main barrier for most children, except possibly for those in rural areas where there are no pavements:

- 16% of children who live less than a mile away from school are taken there by car
- over 90 per cent of 5-10 year olds and three-quarters of 11-15 year olds live within three miles of their school
- the average distance to school for a primary school child was 1.4 miles in 2001

The analysis suggests that the key barriers are fear of traffic, bullies and crime; parents’ time in the morning; and parents’ own aversion to walking.

However, one piece of research showed that overall physical activity of 5 year olds did not differ significantly according to the mode of transport used for the “school run”. This suggests that a rise in the proportion of children walking to schools would not necessarily have an impact on obesity.

Helping out around the house

The Health Survey for England in 2002 showed that 20-30% of boys and 30-40% of girls aged 8 to 11 did housework or gardening in the last week. However, there is no tracking data suggesting that young people in the past did more or less housework than those in recent years. Therefore it is not possible to make conclusions about changes in this sort of activity over time.

Do children who do a lot of physical activity eat differently?

Most epidemiological studies on childhood obesity focus either on energy intake or energy expenditure. Studies that look at both are rare. However, one study found that children from the obese/overweight families had a higher preference for fatty foods in a taste test, a decreased liking for vegetables, and an eating style that fell more into the “over-eating” type. They also had a stronger preference for sedentary activities, and spent more time in sedentary past-times. There were no differences in speed of eating or reported frequency of intake of high-fat foods.

Exercise may also normalise the appetite response because of an asymmetry in appetite control, in which the hunger drive operates more powerfully and precisely than the satiety drive. Active people whose energy needs generally exceed the societal norm for food intake will regulate by means of a more efficient physiological mechanism (hunger) than sedentary people, who have to regulate by means of satiety and restraint.

One study of French children has also shown that the most active children in a population of 10 year olds had the same BMI as their less active peers. However, they ate much more. The nutrient source that was significantly augmented in the most active children was carbohydrate. These children had larger breakfasts and afternoon snacks. They ate more cereal and dairy products. Since they consumed more carbohydrate, the percentage of fat in the diet was lower and, consequently, the proportion of fat, protein and carbohydrate in their diets was closer to recommendations.

Pregnancy and early childhood

A number of studies suggest that intrauterine life, infancy and the pre-school period are critical period during which the long term regulation of energy balance may be balanced. If this system is disrupted, it may lead to the body to permanently lay down excessive fat cells or permanently disrupt the operation of hunger and satiety. The body therefore becomes “programmed” incorrectly.

The factors that may cause mis-programming during pregnancy include over-nutrition by the mother during pregnancy, under-nutrition by the mother during pregnancy and smoking.

The factors that may cause mis-programming during infancy and early childhood include a lack of sleep, bottle feeding (rather than breast feeding), and high protein diets.

1. Context

1.1 Background

The government's Health White Paper *Choosing Health: making healthier choices easier*, sets out government commitments for action on obesity, including stemming the rise in obesity among children aged under 11. This reflects the Public Service Agreement shared by the DH, DfES and DCMS to halt the year-on-year rise in obesity among children aged under 11 by 2010 in the context of a broader strategy to tackle obesity in the population as a whole.

Put together, all three departments have initiatives that may contribute to a deceleration in the rate of growth of obesity amongst under 11 year olds. These include:

- 5 A Day, and the National School Fruit Scheme
- National Healthy Schools Standard
- Reforms to school meals
- Walking buses / Safer Routes to School
- PE, School Sports and Club Links Strategy

Other initiatives and reforms are being considered, including a mass media campaign targeted at families with children, changes to labelling, regulation of advertising, and making the teaching of food preparation compulsory at 11 to 14.

However, in the absence of a clear understanding of the relative importance of different drivers of childhood obesity, there is no clear understanding of how far these initiatives can work individually or collectively to halt the growth in childhood obesity.

1.2 Aims

A strategy is now being developed to halt the growth in obesity amongst under 11 year olds. To inform the selection of the most effective interventions to halt the growth in obesity in children, the DH have commissioned this research into the evidence for the causes of obesity in this age group. In particular, the DH wish to understand:

- Current hypotheses on the causes of obesity amongst children under the age of 11
- The evidence for the causes of obesity in this age group
- The strength of different factors in causing obesity, and consequently, those interventions that would be most appropriate for tackling the causes of obesity
- The characteristics of those children most at risk of becoming obese

1.3 Methodology

A set of initial hypotheses were suggested by the researcher for the causes of obesity at the start of this research project. These were then re-fined at a kick-off workshop on 4 November 2005. A synthesis of all these hypotheses is shown on the following page. The findings from this collective evidence are reported in this document.

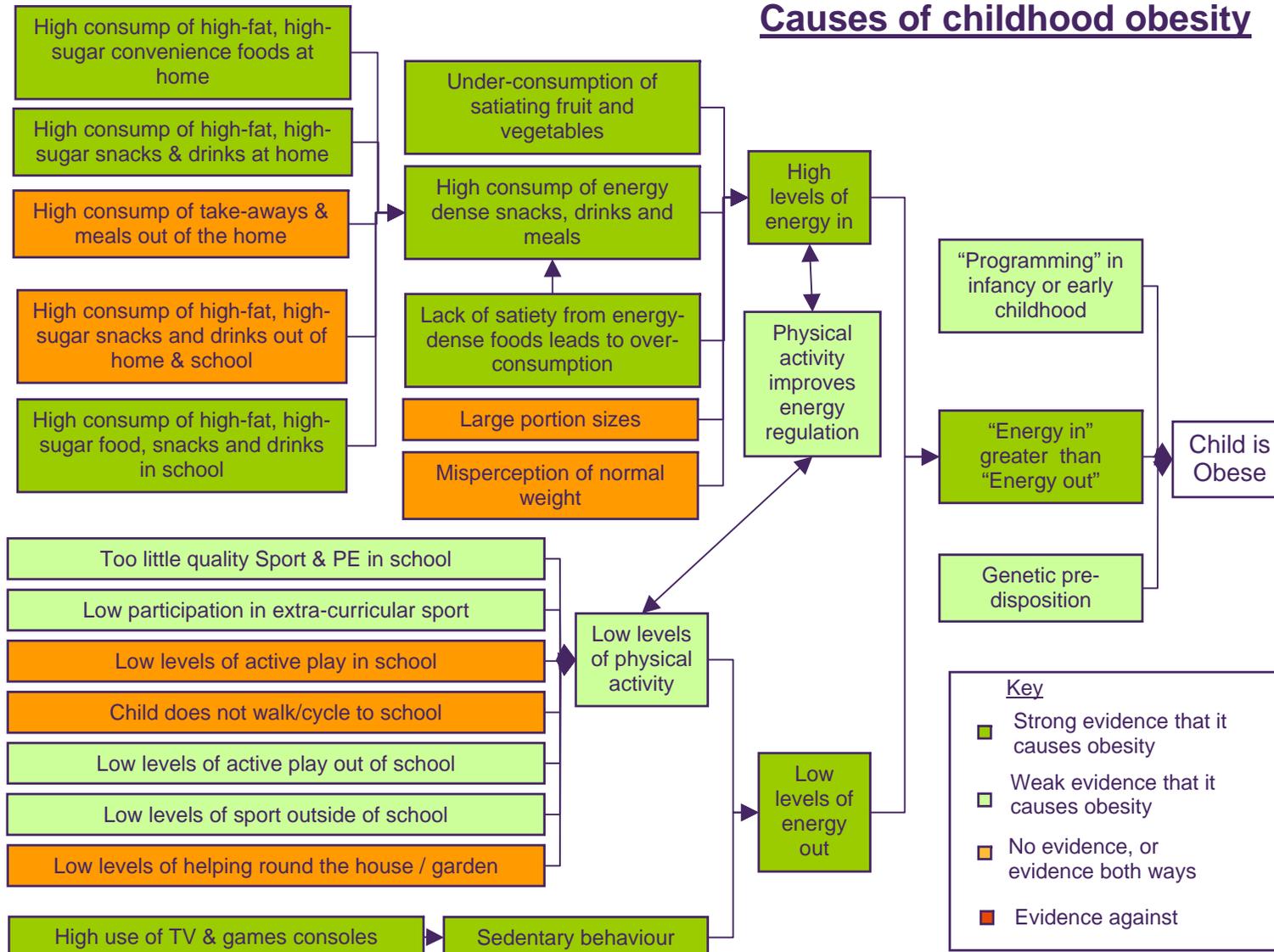
The evidence to prove or disprove these hypotheses was then reviewed. At the start of sections 4 and 5 on diet and physical activity, summaries are provided of the hypotheses tested and the outcome.

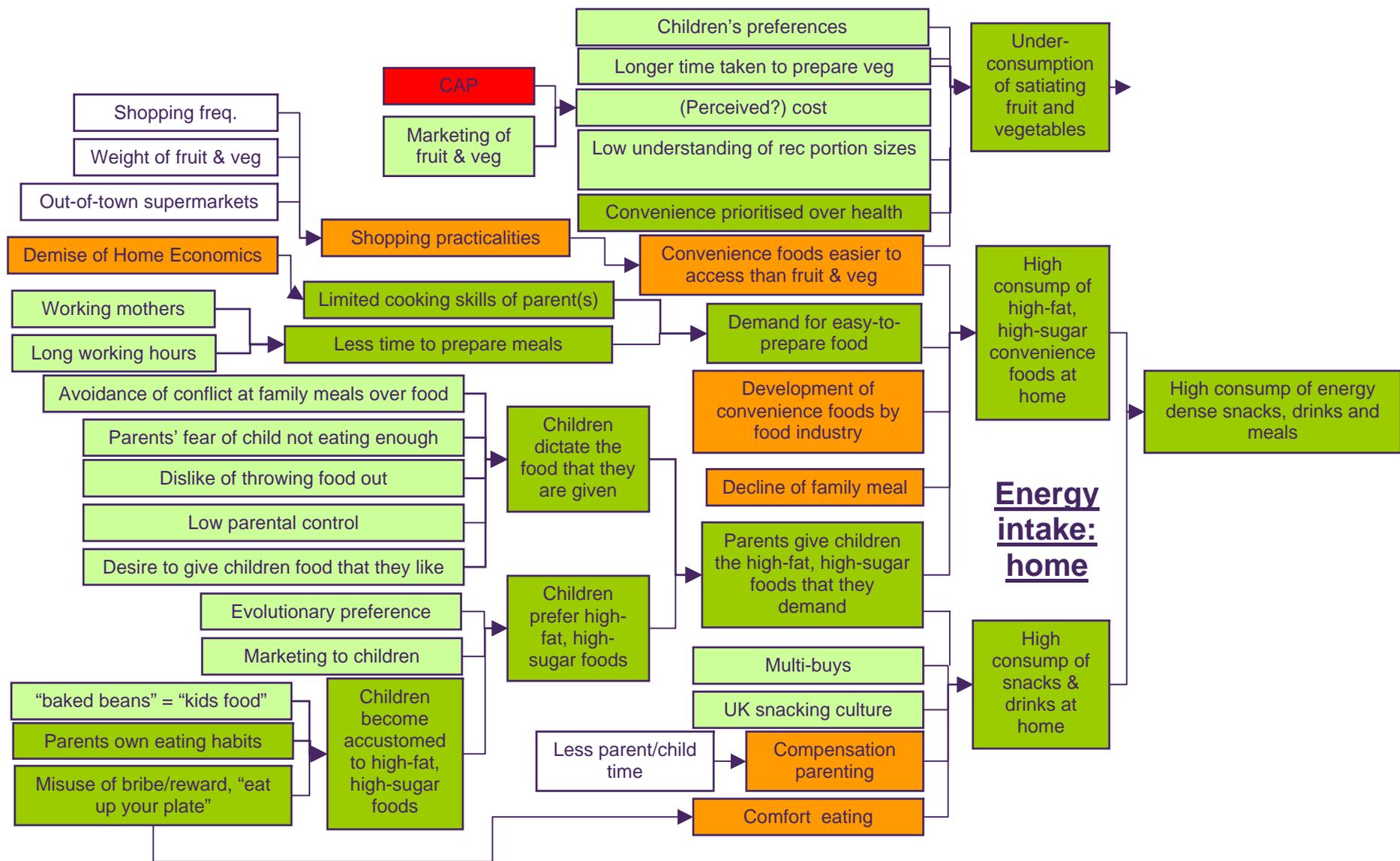
To ensure that all the evidence was included, we undertook a trawl of sources. Academic research was identified through specialist search engines, including Infotrieve (which includes MedLine) and Highbeam. Collections of academic essays in books by the British Nutrition Foundation¹ and Walter Burniat² were also invaluable. In addition, a considerable body of evidence from public sector organisations was used, in particular from the Food Standards Agency, the Department of Health and Ofcom.

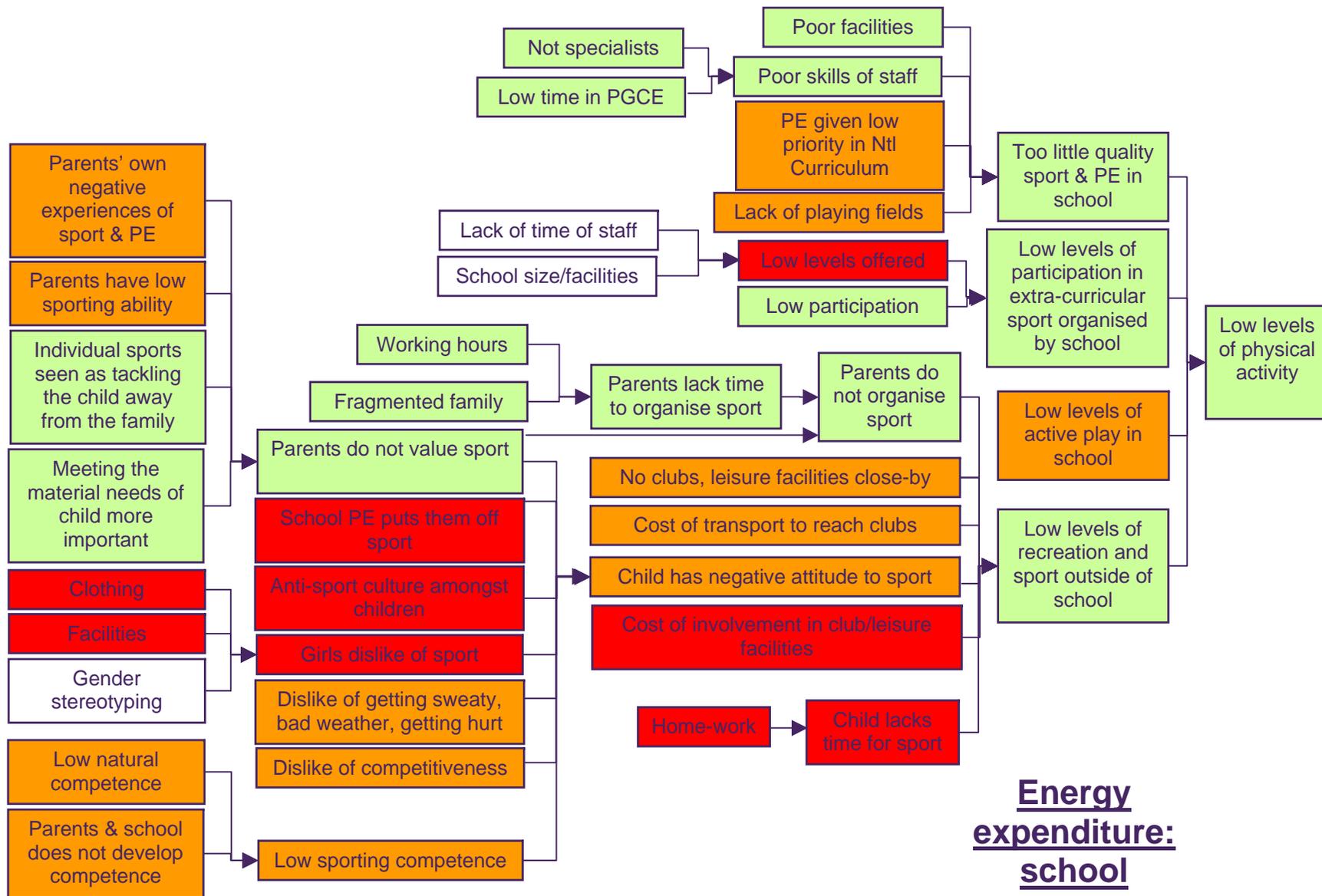
¹ British Nutrition Foundation (1999) Obesity, Blackwell Science

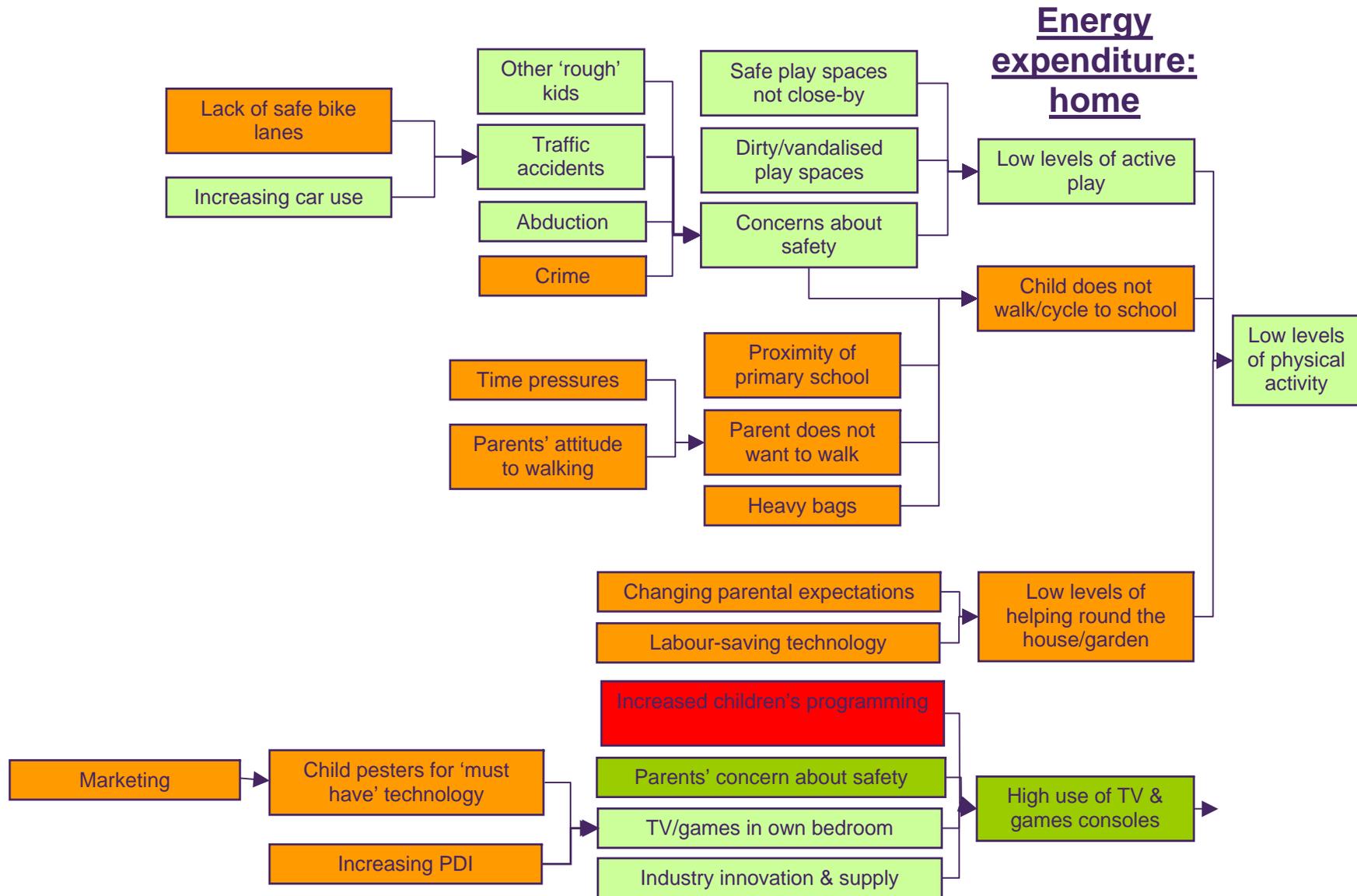
² Burniat W. (ed) et al. (2002) Child and adolescent obesity, causes, consequences, prevention and management, CUP

Causes of childhood obesity









2. The scale of the problem

2.1 Overweight and obesity prevalence in children in England

Obesity amongst children first began to be tracked properly by the National Study of Health and Growth in 1974. This showed a gradual increase in overweight and obesity prevalence from 6.4% of 4 to 11 year old boys in 1974 to 9.0% in 1994. The corresponding rise for girls was from 9.1% to 13.5%.

Prevalence of overweight in children in 1974, 1984, and 1994 in England

	1974	1984	1994
<i>Boys</i>			
4 to 6	6.8%	4.6%	5.4%
7 to 8	6.2%	5.7%	9.0%
9 to 11	6.2%	5.8%	12.7%
All 4 to 11	6.4%	5.4%	9.0%
<i>Girls</i>			
4 to 6	9.5%	7.5%	10.9%
7 to 8	7.6%	10.6%	12.5%
9 to 11	9.9%	9.9%	16.7%
All 4 to 11	9.1%	9.3%	13.5%

Source: Chinn, S. and Rona, R.J. (2001) Prevalence and trends in overweight and obesity in three cross sectional studies of British children, 1974-94, BMJ

Prevalence in obesity in 4 to 11 year olds rose from 1.4% and 1.5% for boys and girls in 1974 to 1.7% and 2.6% in boys and girls in 1994.

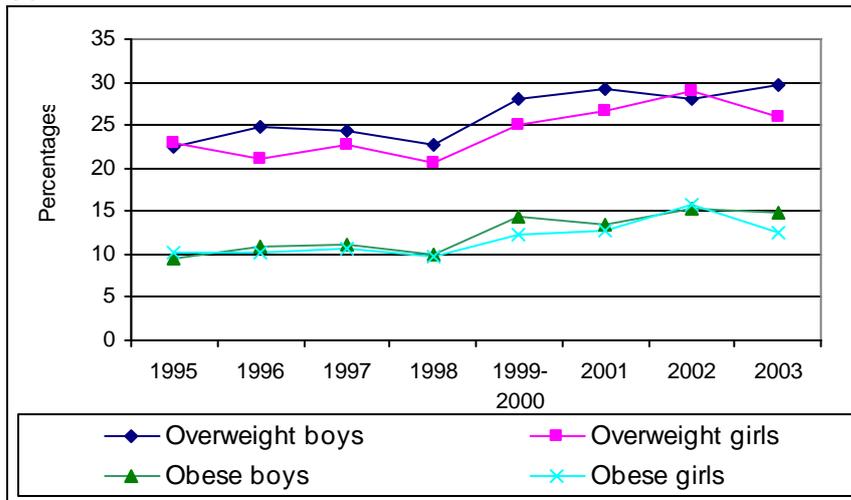
Prevalence of obesity in children in 1974, 1984, and 1994 in England

	1974	1984	1994
Boys	1.4%	0.6%	1.7%
Girls	1.5%	1.3%	2.6%

Source: Chinn, S. and Rona, R.J. (2001) Prevalence and trends in overweight and obesity in three cross sectional studies of British children, 1974-94, BMJ

Thereafter, obesity was measured by the Health Survey for England, using a different methodology. This survey showed that the prevalence of obesity amongst children aged 2 to 10 rose from 9.9% to 13.7% from 1995 to 2003.

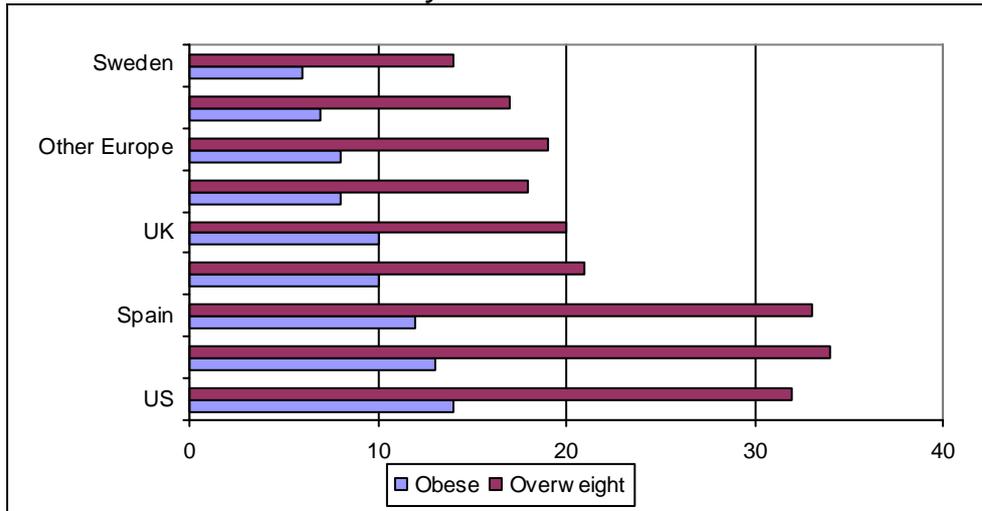
Trends in overweight and obesity prevalence, by survey year (1995-2003) and sex



Source: Wardle, H. et al. (2005) Obesity among children under 11, National Statistics

The only good news is that the UK is not the worst. In fact, the UK is in the mid-range internationally for obese and overweight children.

International childhood obesity rates



Source: Summary of Datamonitor analysis for European Task Force on Pediatric Obesity and CDC, Dec 2003; cited in Ofcom (2004) Childhood Obesity: Food Advertising in Context, July 2004

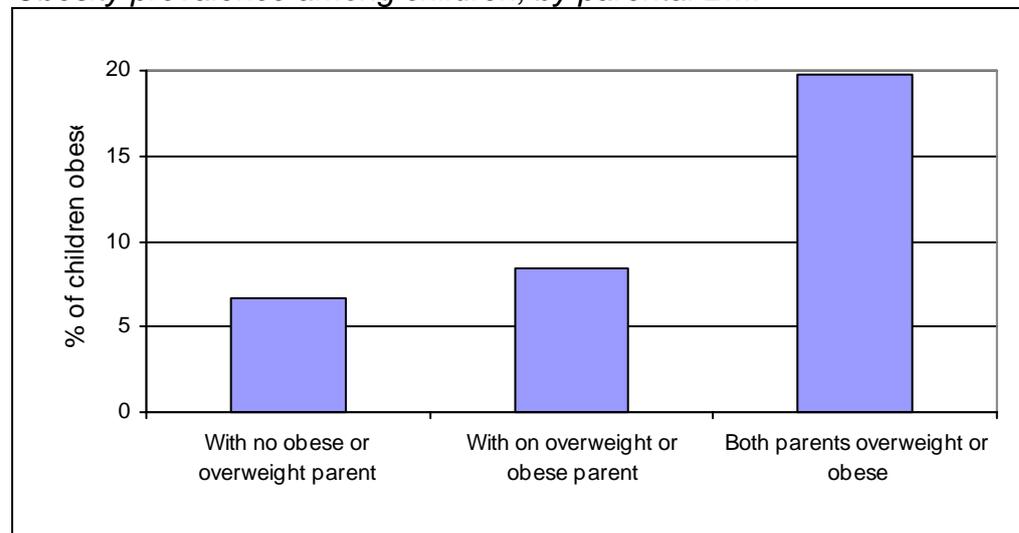
Parents

As the analysis in subsequent sections shows, the biggest influence on children’s diet and activity levels is parents. It is little surprise therefore that children are more likely to be obese if their parents are obese. Clearly this could have genetic causes, but the rise in obesity since the early 1970s suggests that environmental factors are key.

The Health Survey for England shows that 19.8% of children living in households where both parents are either overweight or obese were

themselves obese compared with 6.7% of children living in households where neither parents were overweight or obese.

Obesity prevalence among children, by parental BMI



Source: Wardle, H. (ed), Obesity among children under 11, ONS

A number of longitudinal studies have also shown that parental obesity is a strong predictor of childhood obesity. Analysis of data from the 1958 British Birth cohort³ found that higher risks of adult obesity were evident among children with overweight or obese parents – the odds for sons and daughters with two obese parents (compared with those with both parents of normal BMI) were 8.4:1 and 6.8:1 respectively. The children of two obese parents showed the strongest child to adult tracking of BMI as indicated by the correlations between the ages of 7 and 33.

The *Avon Longitudinal Study of Parents and Children*⁴ follows the health and development of 14,000 children born in 1990 in the South West of England. It is also more commonly known as *Children of the 90s*. This has found that a history of parental obesity was a strong predictor of childhood.

Socio-economic indicators

The Health Survey for England also suggests that the drivers of childhood obesity are stronger amongst socio-economic groups. For example:

- Obesity is higher among children living in inner city areas (19.3%) than among children living in all other types of area (14.3%-14.9%).
- Children in the most (top quintile) deprived areas are more likely to be obese (16.4%) than those in the least (bottom quintile) deprived areas (11.2%).

³ Lake, J.K., Power C., Cole, T.J. (1997) Child to adult body mass index in the 1958 British birth cohort: associations with parental obesity, *Arch Dis Child* 1997, Nov;77(5)

⁴ Ness, A.R. (2004) The Avon Longitudinal Study of Parents and Children (ALSPAC) – a resource for the study of the environmental determinants of childhood obesity, *European Journal of Endocrinology*, 2004, 151

- Children with parents who are manual workers are more likely to be obese (16%) than those with parents who are non-manual workers (12.4%).

Likewise, the *Avon Longitudinal Study of Parents and Children*⁵ found that “maternal education showed a clear, inverse association with child obesity, with a 3-fold risk in the least educated group.”

Geographical patterns

Obesity prevalence is lowest in Yorkshire and the Humber (11.4%) and the South East (13.4%) and highest in the North East (18.3%) and London (18.2%). This may reflect socio-economic patterns across England, or regional diet differences.

Ethnicity, age and gender

The Health Survey for England also shows that:

- Ethnicity: Black African, Black Caribbean and Pakistani girls are at increased risk of obesity. Indian and Pakistani boys are more likely to be overweight than the rest of the population.
- Gender: Boys were slightly more likely to be obese than girls (14.9% compared to 12.5%).
- Age: Children aged 8 to 10 were more likely to be obese than children aged 2 to 3 (16.5% compared to 11.5%).

2.2 The structure of this document

Studies of twins and adopted children suggest that genes can lower the threshold for some children for the development of obesity. Section 3 of this document examines this evidence.

However, the rise in obesity over the past two decades in a genetically stable population strongly suggests that environmental factors play a strong role. Bodyweight is regulated by numerous physiological mechanisms that maintain balance between energy intake and energy expenditure. These regulatory systems are extraordinarily precise under normal conditions. However, a positive energy balance of only 500 kJ per day would produce a 50kg increase in body mass over 10 years.⁶ Section 4 therefore examines factors relating to energy intake, whereas section 5 examines factors relating to energy expenditure. Section 6 examines studies that look at both energy intake and expenditure.

⁵ Ness, A.R. (2004) op. cit.

⁶ Ebbeling, C, Pawlak, D. Ludwig, D. (2002) Childhood obesity: public-health crisis, common sense cure, *The Lancet* - Vol. 360, Issue 9331, 10 August 2002, Pages 473-482

Scientific research also suggests that a mothers' behaviour during pregnancy and behaviour patterns in infancy and the pre-school period can also lead children to become "programmed" in a way that increases the likelihood that they will become obese at a later age. Section 7 examines these "perinatal" causes.

2.3 Data sources not available

A huge range of sources were used in this research to test the various hypotheses shown on the tree diagram earlier on the causes of obesity. Throughout this document, they are referenced on the same page as they are mentioned, and collated together in Appendix 3.

However, evidence to test some hypotheses were not available either because epidemiological studies have not been undertaken, because the data was not publicly available, or because the extensive searches undertaken for data did not throw up the data.

Data was not available for:

- Trends in energy intake for children, and trends in the proportion of energy derived from fat, protein and carbohydrate in children's diet. The National Diet and Nutrition Survey for 1.5 to 4 year olds and 4 to 18 year olds only provide a snap-shot of consumption in 1993 and 2000. Some analysis has been done for trends in the diets of children aged 1.5 to 4 years old from 1967 to 1993, but nothing is available that is more recent.
- Portion sizes eaten by children who become obese compared to those that do not.
- Evidence for an increase in "compensation parenting"
- Evidence that women's cooking skills were better in the past.
- Trend data on family eating. This exists back to 1995, but data going back further would be ideal.
- Participation in different types of physical activity by obese children compared to non-obese children in the UK.
- Attitudes of children who become obese to sport (preferably, before they became obese). Trend data on time spent helping around the house by children in the past.
- Trend data on participation in PE and sport before 1994. Sport England have sponsored surveys that track this back to 1994, but no earlier.
- Trend data on children's active play.

However, I do not feel that the conclusions of this research would be significantly altered if further sources became available. The only exception would be data on the attitudes of obese children to sport. This would tell us what the barriers are to increased participation in sport for children who become obese. Instead, we have to use data on the barriers to sport for all children as a proxy.

3. Genetic causes

Section 2 showed that children with obese or overweight parents are much more likely to become obese or overweight themselves. Studies of twins and adopted children show that genes can lower the threshold for the development of obesity in some children.

Twin studies

Identical twins have the same genetic make-up. Fraternal twins share half their genes. Studies of both identical and fraternal twins have shown a much higher correlation of obesity among identical twins (who have the same genes), than among fraternal twins (who share half of them). Furthermore, genetic influences appear to account for 50-70% of the difference in BMI (Body Mass index, an indicator of fatness) in the later life of both identical and fraternal twins brought up apart, whereas the childhood environment had little or no original influence.⁷

Adoption studies

Adoptive studies further reinforce the idea that genetic influences play an important role in obesity. Adoption studies show that there is a strong relationship between Body Mass Index (BMI) of biological parents and the adoptee, while there is no relationship shown between the adoptive parents and the adoptee⁸.

Susceptibility genes

A “susceptibility gene” is one that increases susceptibility, or risk, for a disease, but is not necessary for the expression of a disease. Possession of susceptibility genes for obesity therefore lowers the threshold for the development of obesity, but do not predestine an individual to become obese. For a considerable time, it was thought that obese children and parents both had a gene that produced high levels of leptin. The mechanism by which scientists thought this happened is described below. However, scientists now believe that there are a whole range of genes that can raise the likelihood of obesity⁹, though it is not yet clear as to the exact combination of these genes or the exact mechanism by which it works.

Leptin

⁷ British Nutrition Foundation (1999) Obesity, Blackwell Science (chapter 6)

⁸ Stunkard et al (1986) An adoption study of human obesity, New England Journal of Medicine, 314, cited in British Nutrition Foundation (1999) Obesity, Blackwell Science

⁹ Bouchard, C., Obesity in the Genes? <http://www.obesity.chair.ulaval.ca/genestxt.htm>

One of the mechanisms by which genotype affects body weight is in the regulation of energy expenditure. It is estimated that approximately 40% of the variance in daily energy expenditure (excluding vigorous physical activity) is attributable to genotype. Thus, there is substantial evidence implicating the role of genetics in body weight regulation.¹⁰

Excess energy is stored as lipids known as “triacylglycerols” in fat tissue. The primary function of this fat tissue is to store energy when calories are in excess and to mobilise energy from this triacylglycerol reservoir when energy needs exceed. Weight gain during adulthood is characterised by a process by which fat cells can increase their volume several thousand fold (adipocyte hypertrophy) to accommodate large increases in lipid storage.

Fat cells secrete hormones and growth factors that regulate fat metabolism through feedback mechanisms. One of these regulators is the hormone leptin. Leptin is secreted by fat cells in proportion to total fat mass. Because larger fat cells synthesise more leptin, obesity is associated with high plasma leptin concentrations. Dietary intake also influences leptin secretion - short-term food restriction decreases leptin concentrations, whereas resumption of habitual eating patterns restores them. An increase in leptin in rats will reduce energy intake and increase energy expenditure, which in turn produces weight loss. Leptin resistance has therefore been proposed as the mechanism by which humans with high leptin concentrations remain obese. However, leptin does not appear to play a role in the causes of human obesity except in very rare cases of genetic mutations.¹¹

¹⁰ Bouchard C., Tremblay A. (1990) Genetic effects in human energy expenditure components. *Int J Obes.* 1990;14(suppl 1):49-55, cited in Racette S.B., Deusinger S.S., Deusinger R.H. (2003) Obesity: overview of prevalence, etiology, and treatment. *Phys Ther.* 2003;83:276-288

¹¹ Racette S.B., Deusinger S.S., Deusinger R.H. (2003) Obesity: overview of prevalence, etiology, and treatment. *Phys Ther.* 2003;83:276-288

4. Diet

Summary of hypotheses tested and outcomes

Hypothesis	Outcome
Diet causes obesity	
UK children in general eating more than they used to	Lack of data to prove this either way
Foods that are high in fat and high in sugar cause obesity in children	<p>A complex debate with considerable disagreement. A consensus is emerging that a high consumption of “energy-dense” foods which are either high in fat and/or sugars are correlated with obesity because:</p> <ul style="list-style-type: none"> • Fat contains the largest amount of energy per gram. Fat can also be “passively” over-consumed. • High glycaemic foods also contain large amounts of energy, and can lead to a positive energy balance. Although these will be oxidised rapidly, this means that other energy stores such as fat are less likely to be oxidised. High glycaemic foods can also stimulate hunger.
Carbonates, snacks and convenience foods cause obesity	There is epidemiological evidence that heavy consumption of carbonated drinks is correlated to weight gain and obesity. No epidemiological studies have been undertaken specifically on convenience foods or snacks.
	The closest proxy to grazing is frequency of eating. On balance, the empirical

	Grazing is linked to obesity	evidence cited below shows that if children eat more frequently, but overall eat the same amount of calories per day, then they are actually less likely to gain weight. However, if the effect of grazing is to overall eat more calories, then clearly this will increase adiposity.
	Obese children eat larger portions	Evidence from the US shows this is correct, but no data is available in the UK.
	Obese children simply have less self-constraint	There is no consensus yet on whether obese adults and children are more reactive to external cues (time, presence of food, and situational effects) and less sensitive to internal hunger and satiety signals.
	Obese children have more of a “sweet” (or fat?) tooth than ideal weight children?	Obese and ideal weight individuals do not differ in their general sensitivity to, or perceptions of, intensity of sweetness, or in their liking for sweetness in foods and drinks. On the other hand, there is evidence to show that obese children and adults do have enhanced preferences for fat-containing stimuli.
	Eating at the end of the day can lead to obesity	Overall, the current consensus is that evidence for a causal link between the patterns and circadian distribution of energy intake and obesity is weak. Nevertheless, it remains a recommendation for anyone who wants to lose or control weight that they do not have their largest meal at the end of the day.
	Parents of obese children simply do not realise that their children are fat	Surveys do show that obesity and overweight are now so commonplace that parents are failing to recognise that their children have a problem.
	Obese children eat a different diet to non-obese children	Surveys demonstrate that obese children eat more convenience foods, snacks, and carbonates (which are all high in fat and/or sugar) than ideal weight children, and less fruit and vegetables.
	Children’s diets are increasingly biased towards high in fat and sugar foods	<ul style="list-style-type: none"> • <i>A shift towards convenience foods in the home, which tend to be high in fat and sugar.</i> The main drivers for this are time pressures and parents’ inability to conceptualise an attractive and affordable healthy diet. • <i>Continued low consumption levels of vegetables:</i> There are a number of reasons for this - the importance of convenience over health, the

		<p>time needed to prepare vegetables, poor awareness of recommended portion sizes, resistance of children to vegetables, the perceived high cost of fruit are the main barriers to increased consumption of vegetables. Location of supermarkets is a barrier, but not a decisive one. Fresh vegetables and fruit are also much less likely to form part of a meal where the main component of a meal is convenience food.</p> <ul style="list-style-type: none"> • <i>An increase in children eating alone, rather than as a family:</i> When eating alone, they tend to eat foods that are high in fat and sugar. The only research that has been undertaken into the relationship between family eating and obesity suggests that having a healthy maternal attitude to family eating and diet was more important than the frequency of shared meals. • <i>Increasing consumption of food outside of the home:</i> These foods are high in fat and sugar, but it is not clear that this market has increased in the past ten years. • <i>Increased snacking:</i> Snacks are high in sugars and fat which can cause over-eating and tip energy balance. Carbonated drinks have been proven to cause obesity. For this age group, snacks are mostly bought by parents and consumed in the home. One of the reasons given for the increase in snacks eaten in the home is “compensation parenting” but, there is no evidence publicly available that either confirms or negates this.
	CAP made unhealthy food more attractive	The Common Agricultural Policy has sustained prices of most food products above the level that would otherwise apply, and does so in an uneven way. However, this unevenness has actually created incentives for a better, not worse, diet.
	Packed lunches and meals provided by schools contributing to a high intake of high in fat and sugar foods?	Packed lunches are high in fat and sugar. Currently, primary school children can choose school meals that are high in fat and sugar. New nutritional guidelines will limit this choice, and may shift more children to eat packed

		lunches.
Children's increasing control over their diet means that they are given the high in fat and sugar foods that they like		
	Children prefer foods that are high in fat and sugar	<p>This is true for children in general, and even more so the case for obese children. The evidence shows that the reasons for this are:</p> <ul style="list-style-type: none"> • Parents interfere with a child's natural ability to regulate energy intake by bribing them with unhealthy foods, giving them portion sizes that are too large, and telling them to eat up their plate • Children tend to eat similar foods to their parents, and then develop a taste for these foods • The low importance given to health by children • Negative image of healthy food • And possibly, and evolutionary disposition to fat
	Children have increasing control over what foods they are given	<p>A significant proportion of children have considerable say in the foods they are given. Their parents give into their children because:</p> <ul style="list-style-type: none"> • Parents' fear that their children are not eating enough. • Fear of conflict during family meals and dislike of throwing out food. • Certain types of parents have much weaker discipline than others, and put a very great weight on making their child happy by meeting their immediate needs.
	Parents of obese children have a more laissez faire attitude to parenting, particular in the context of meals	Parents of obese children on average have less control of their children during meal times than the parents of ideal weight children.

	<p>Advertising of high in fat and sugar foods by the food and beverage industry causes obesity</p>	<p>The Hastings review found that:</p> <ul style="list-style-type: none"> • While there is considerable debate in this area, the weight of the evidence suggests that food advertising may have little influence on children's general perceptions of the make-up of a healthy diet. • There is robust evidence that food advertising does influence children's preferences for eating unhealthy foods. • A number of studies have also shown that food advertising can influence what parents choose to buy and subsequently what children choose to eat. • A good number of studies provide modest evidence that food advertising does, in some contexts, exert an influence on consumption behaviour. • There is evidence that food advertising cause both brand switching and an increase in overall sales of whole categories of foods. <p>The evidence from Hastings, OfCom, and Livingstone together suggests that advertising does have an effect on children's food choices at both brand and category level, but the size of this is effect is not known, both absolutely, and relative to other factors.</p>
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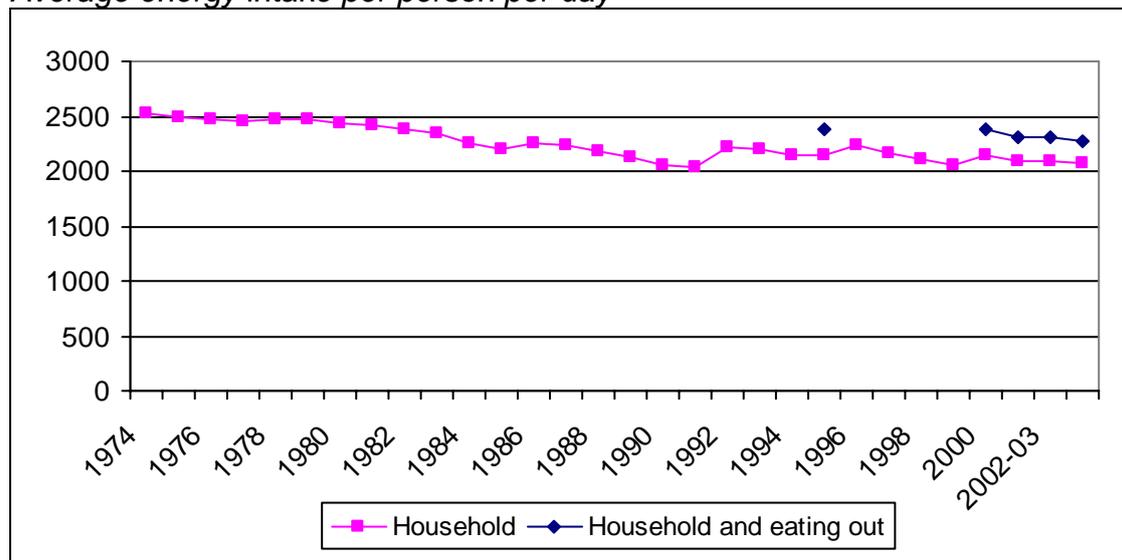
4.1 Does diet cause obesity in children?

4.1.1 Are UK children in general eating more than they used to?

In a stable genetic population, obesity occurs when energy intake exceeds energy expenditure. Critics of the view that diet causes obesity frequently refer to official statistics showing that average intake per person per day has been in decline since the 1970s, at the same time as obesity has increased.

The way that average energy intake per person has been measured in the UK has changed a number of times since 1996, with more and more elements such as “eating out” being brought into the overall measurement. Appendix 1 gives a more detailed analysis. However, whatever elements you include, official statistics show that there has been a downward trend since 1970 in average energy intake in UK households.

Average energy intake per person per day



Source: DEFRA, Expenditure and Food Survey (“Family Food”), 2003/4

Trend data on energy intake of children under the age of 11 exclusively is rare and not recent. Analysis by Gregory et al¹² of 1.5 to 4 year olds in the National Diet and Nutrition Survey showed that energy intake amongst 1.5 to 2.5 year olds had declined from 1967 to 1993. A much older analysis by Whitehead et al¹³ in 1982 showed that energy intake by 0.5 to 18 year olds in the UK (as well as USA and Australia) had declined from 1930 to 1978.

¹² Gregory et al. (1995) National Diet and Nutrition Survey for 1.5 to 4 year olds, Stationery Office

¹³ Whitehead, R.G. Paul, A.A., Cole, T.J. (1982) Trends in food energy intakes throughout childhood from one to 18 years, Human Nutrition: Applied Nutrition, 36; cited in Burniat W. (ed) et al. (2002) Child and adolescent obesity, causes, consequences, prevention and management, CUP

However, there are a number of problems in using data on average energy intake to draw conclusions on the contribution of diet to childhood obesity:

- It shows average energy intake. The average intake could be falling, whilst at the same time the intake of the largest energy consumers may be increasing.
- Obese adults and parents of obese children notoriously under-report the amount of food that they eat.
- Hunger and satiation have been effective in the past in ensuring that we accurately regulate the amount of energy we take in relative to the amount we expend. The question therefore becomes: what has disturbed our normal systems (hunger, satiation) for energy regulation?
- In particular, the analysis below shows that it is not only the energy intake of food that can cause obesity, but the balance of nutrients in the diet which may disrupt the system for energy regulation.

Studying trends in average energy intake in order to understand the causes of the recent rise in obesity is therefore inappropriate.

4.1.2 Do foods that are high in fat and high in sugar cause obesity?

Research by Prentice and Jebb¹⁴ suggest that adults are more likely to gain weight if a high proportion of the energy that they receive comes from fat because:

- Carbohydrate is more likely to be oxidised than laid down as fat
- Fat is less satiating than carbohydrate, leading to over-eating
- Fat has increased as a proportion relative to carbohydrate in the British diet
- There is a proven correlation between high-fat diets and obesity

A number of studies discussed below also show that children who derive a high proportion of energy from fat are also more likely to become obese. However, the little trend data that exists suggests that there has been a strong trend increase in the proportion of energy derived from protein (rather than fat) in children's diets. Studies also suggest out that foods which have a high glycaemic index can actually stimulate hunger. A consensus is therefore emerging that a key driver of obesity in children is a high consumption of "energy-dense" foods which are high in fat and sugars because:

- Fat contains the largest amount of energy per gram. Fat can also be "passively" over-consumed.
- High glycaemic foods also contain large amounts of energy, and can lead to a positive energy balance. Although these will be oxidised

¹⁴ ¹⁴ Prentice, A.M., and Jebb, S.A (1995) Obesity in Britain: gluttony or sloth?. *BMJ*, 311: 437-439

rapidly, this means that other energy stores such as fat are less likely to be oxidised. High glycaemic foods can also stimulate hunger.

In contrast, fruit and vegetables are far less energy-dense than a similar weight of food that is high in fat and sugar, and fill up the stomach, creating satiation.

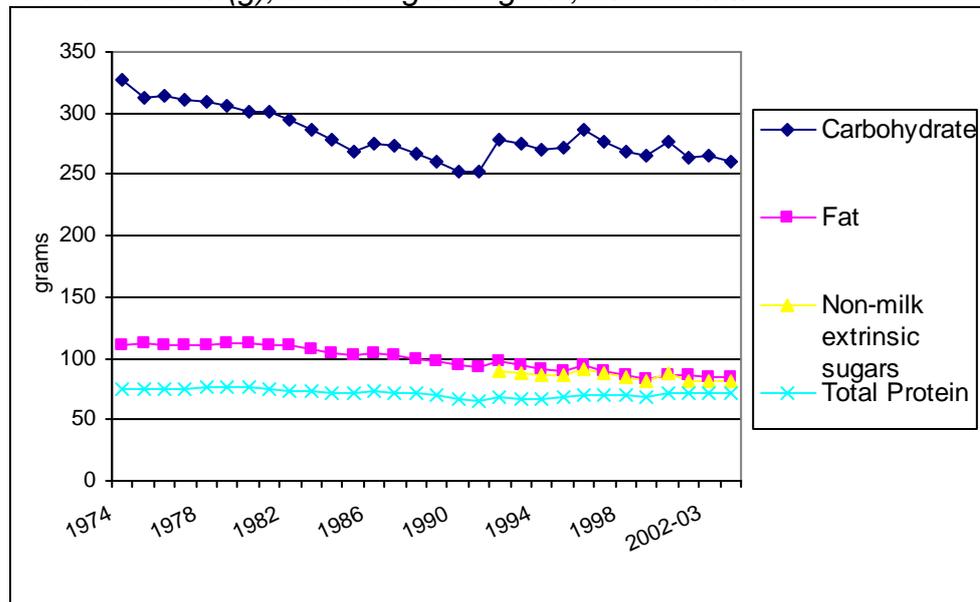
This debate is explained in the following sections, and conclusions are drawn at the end of the section.

Studies emphasising the proportion of energy derived from fat as a cause of obesity in adults and children

The argument that fat is the key contributor to obesity (though not necessarily in children) is most strongly put by Prentice and Jebb.¹⁵

As discussed earlier, the National Food Surveys and Expenditure and Food Surveys show that since 1970 there has been a decline in calorific intake. There has also been a decline in both the average intake of fat and the amount of energy derived from fat per person in UK households (even if you take into account alcohol, confectionery, salty snacks, carbonates and eating outside of the home).

Nutrient intake (g), excluding eating out, 1974-2003/4

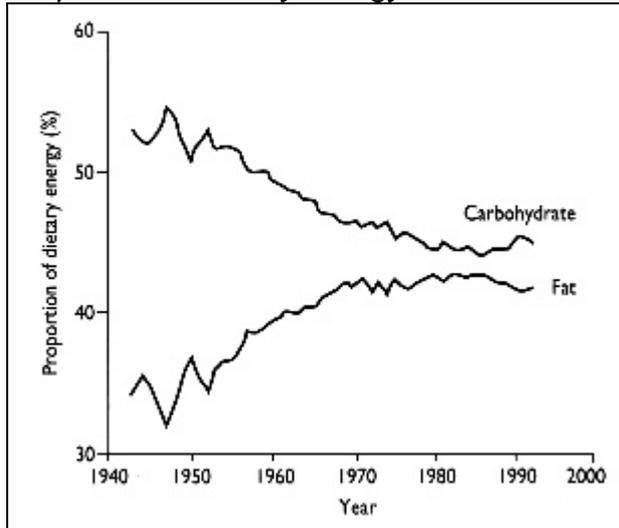


Source: DEFRA (2005), Family Food in 2005 (this graph excludes alcohol, confectionery, salty snacks, carbonates and eating outside of the home)

However, there has been an increase in the proportion of fat in the British diet. In the 1940s each kJ of carbohydrate in the diet was associated with 0.6 kJ of fat and in the 1990s with 0.9 kJ of fat, an increase of 50%.

¹⁵ Prentice, A.M., and Jebb, S.A (1995) Obesity in Britain: gluttony or sloth?. *BMJ*, 311: 437-439

Proportion of dietary energy from fat and carbohydrate



Source: National Food Survey (now Expenditure and Food Survey), cited in ¹ Prentice, A.M., and Jebb, S.A op. cit.

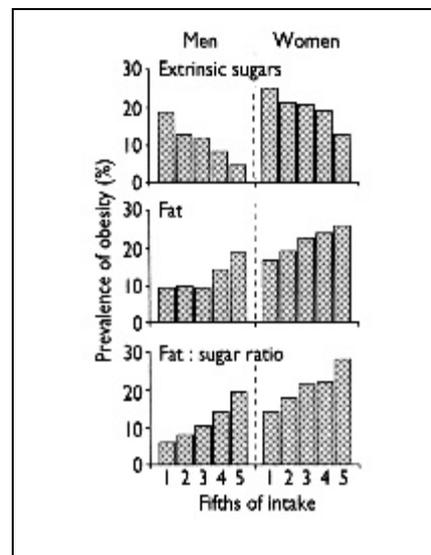
Correlation between high-fat diets and obesity

Fat contains more calories per gram than carbohydrate and protein and is frequently found in high-calorie foods. Numerous dietary studies have shown an association between fatness and the consumption of a high fat diet.

One of the most reliable comes from a study of over 11,600 Scottish men and women ¹⁶

The prevalence of obesity was examined in different fifths of the population according to their relative intakes of sugars, fat, and the fat:sugars ratio. The groups consuming the highest proportion of energy as sugars were much less likely to be obese than low sugar consumers.

Obesity rates were highest in the groups consuming the highest proportion of energy as fat, and particularly in the highest category for the fat:sugars ratio.



This is significant because there is evidence from several sources to indicate that the consumption of a high fat diet undermines the normal mechanisms regulating energy balance in humans.

Carbohydrate more likely to be oxidised than laid down as fat

¹⁶ Bolton-Smith C., Woodward M. (1994) Dietary composition and fat to sugar ratios in relation to obesity. Int J Obesity 1994;18:820-8; cited in ¹⁶ Prentice, A.M., and Jebb, S.A (1995) op. cit.

Firstly, Prentice and Jebb argue that mechanisms for regulating body weight function much more effectively on a high carbohydrate (that is, low fat) diet.

In terms of fuel utilisation, carbohydrate balance is accurately regulated through automatic increases in carbohydrate oxidation in response to excess intake. The creation of fat from carbohydrate is a minor process in humans.¹⁷ In the case of fat, there is virtually no such system to maintain fat balance.¹⁸ Each of these findings suggest a rather benign role for carbohydrate in the development of obesity.

Unwitting over-consumption of fat

Neural and hormonal systems regulate appetite, hunger and satiety. However, this system can be deceived by fat. A number of experiments have shown that if subjects are asked to eat freely from diets that have been covertly manipulated to have a range of fat contents, then they will over-consume energy at high-fat concentrations.¹⁹ The reason for this is that individuals tend to consume a weight of food that remains similar across treatments (high-, medium- and low-fat) through habit. As a consequence of this failure to down-regulate the amount of food eaten in concordance with its energy density, there is an accidental over-consumption of fat and energy on high-fat diets.

Evidence that the proportion of energy derived from fat may be to blame for childhood obesity

The analysis so far has been based on studies of adults. Prospective studies with children clearly show that diet is a cause of obesity.²⁰ As with Prentice and Jebb's studies for adults, some studies for children such as that by Maffeis²¹ have shown a positive relationship between adiposity and the proportion of energy intake represented by fat.

Evidence questioning the role of fat

However, opinions vary with respect to optimum composition fat, carbohydrate and protein of children's diets.²²

¹⁷ Hellerstein M.K., Christiansen M., Kaempfer S., Kletke C., Wu K., Reid J.S., et al. (1991) Measurement of de novo hepatic lipogenesis in humans using stable isotopes. *J Clin Invest* 1991;87:1841-52; cited in ¹⁷ Prentice, A.M., and Jebb, S.A (1995) op. cit.

¹⁸ Schutz Y., Flatt J.P., Jequier E. (1989) Failure of dietary fat intake to promote fat oxidation: a factor favouring the development of obesity. *Am J Clin Nutr* 1989;50:307-14; cited in ¹⁸ Prentice, A.M., and Jebb, S.A (1995) op. cit.

¹⁹ Stubbs et al. (1995) The effect of covert manipulation of the dietary fat and energy density on food intake and substrate flux in ad libitum, *American Journal of Clinical Nutrition*, 62, cited in British Nutrition Foundation (1999) *Obesity*, Blackwell Science

²⁰ Klesges R.C. et al. (1995) A longitudinal analysis of accelerated weight gain in pre-school children. *Pediatrics*, 95

²¹ Maffeis, C. et al. (1996) Fat intake and adiposity in 8 to 11 year olds obese children, *International Journal of Obesity*, 20; cited in Burniat, W. (ed) et al. (2002) op. cit.

²² Jequier E. (2001) Is fat intake a risk factor for fat gain in children? *J Clin Endocrinol Metabol* 2001; 86: 980-983; cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002) *Childhood*

Firstly, the relation between dietary fat and adiposity has been questioned. Findings of epidemiological studies do not consistently show an association between dietary fat and adiposity in children and young adults.²³

Secondly, no analysis has been done to see if the proportion of energy derived from fat has increased for UK children in the recent past. The only analyses we have identified comes from Gregroy et al.²⁴ who show that for 1.5 to 2.5 year olds, the proportion of energy derived from fat fell from 1967 to 1993, whilst that for protein rose, and that for carbohydrate increased. Overall, energy intake of children this age fell. However, the age range here is very narrow, and there is no analysis after 1993.

In fact, the study by Gregory is typical. Studies of children and teenagers across Europe and the USA in the post war period generally show that the proportion of energy derived from fat fell whilst that for protein increased.

How about protein?

In fact, Rolland-Cachera and Bellisle²⁵ hypothesise from this data that the over-consumption of protein during infancy could stimulate the infant's hormonal system to develop too much high-plasma insulin-like growth factor-1 (IGF-1), which in turn stimulates the production of too many fat cells (adipocytes). They also hypothesise that excess protein intake in childhood can under-stimulate the production of growth hormone, which in turn reduces the burning of fat for energy.

However, these hypotheses are yet to be proven in prospective or intervention studies. Furthermore there is no trend data on the proportion of energy derived from protein in children diets over the most recent decade.

High glycaemic foods can stimulate hunger

The glycaemic index relates to the way your body's sugar levels respond to certain foods. Foods are given a rating from 0 –100 on the glycaemic index with glucose in the highest position. High glycaemic index foods (such as simple carbohydrates) will increase the body's sugar levels rapidly whereas low glycaemic index foods will increase the body's sugar levels slowly.

obesity: public-health crisis, common sense cure, The Lancet - Vol. 360, Issue 9331, 10 August 2002, Pages 473-482

²³ Atkin L-M, Davies P.S.W. (2000) Diet composition and body composition in preschool children. Am J Clin Nutr 2000; 72: 15-21; and Ludwig D.S., Pereira M.A., Kroenke C.H., et al. Dietary fiber, weight gain and cardiovascular disease risk factors in young adults: the CARDIA Study. JAMA 1999; 282: 1539-1546; cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002) op. cit

²⁴ Gregory et al (1995) National Diet and Nutrition Survey for 1.5 to 4 year olds, Stationery Office

²⁵ Rolland-Cachera and Bellisle (2002) Nutrition, chapter 4 in Burniat W. (ed) et al. (2002) Child and adolescent obesity, causes, consequences, prevention and management, CUP

Although the proportion of carbohydrate in the British diet has declined over the past thirty years, children now have a high consumption of refined foods such as breads, sugared cereals, soft drinks, cakes, and biscuits. Consumption of meals composed predominately of high glycaemic index foods induces a sequence of hormonal events that stimulate hunger and cause overeating in adolescents.²⁶

On the other hand, these findings are controversial. Firstly, other studies suggest that people whose diet is high in free sugars many have lower fat intake. This is because of a phenomenon know as the fat see-saw – research shows that the more energy that people take in from fat, the less they take in from sugars. Secondly, studies have not been done with children to show that high glycaemic foods stimulate hunger.

Any energy dense foods (either fat or carbohydrate) cause over-eating

So far, the “fat” camp seem to dismiss the “carbohydrate camp” and vice versa, and a new “protein” camp has arrived. A review by Rolls²⁷ in 2000 offers a resolution that offers an explanation of how both carbohydrate and fat can cause childhood obesity through over-eating.

This reviews shows that “energy-density” seems to affect satiety and food consumption, at least in the short term. Adults consumed substantially less energy when served test meals with a low, rather than a high, energy density, irrespective of fat content (25%, 35%, or 45% of total energy).²⁸ The energy density of children's diets is directly associated with not only fat but also a range of starchy foods, including breakfast cereal, bread, and potatoes.²⁹ In contrast, fruit and vegetables are far less energy-dense than a similar weight in food, and fill up the stomach, creating satiation.

Do UK children have diets that are high in fat and sugar?

The analysis so far suggests that children who eat diets that are high in fat and sugar are more likely to become obese. The National Diet and Nutrition Survey³⁰ shows that, on average the proportion of calories young people aged 4 to 10 derive from fat is close to the recommended 35%. However, 10% of boys and 13% of girls aged 4 to 10 derive more than 40% of their food energy from fats. Saturated fatty acids should contribute an average of no more than 11% of food energy intake, yet 95 % of boys and girls exceed this limit. Likewise, non-milk extrinsic sugars (NMES) should contribute an average of

²⁶ Ludwig D.S., Majzoub J.A., Al-Zahrani A., Dallal GE, Blanco I., Roberts S.B. High glycaemic index foods, overeating, and obesity. *Pediatrics* 1999

²⁷ Rolls B.J. The role of energy density in the over-consumption of fat. *J Nutr* 2000; 130 (suppl): 268S-271S.

²⁸ Bell E.A., Rolls B.J. (2001) Energy density of foods affects energy intake across multiple levels of fat content in lean and obese women. *Am J Clin Nutr* 2001; 73: 1010-1018

²⁹ Gibson S.A. (2000) Associations between energy density and macronutrient composition in the diets of pre-school children: sugars vs starch. *Int J Obesity* 2000; 24: 633-638.

³⁰ Food Standards Agency (2000), *The National Diet and Nutrition Survey, young people aged 4 to 18 years*, Stationery Office, London

no more than 11% of food energy intake, yet 85 % of boys and girls aged 4 to 10 exceed this limit.³¹ As section 4.3.2 shows, children also eat well below the recommended portions of fruit and vegetables.

However, there is not even trend data on the sources energy intake of obese children compared to non-obese children in the UK over the past ten years. Research cited earlier on children in the UK undertaken by Gregory et al. for 1.5 to 4 year olds in 1994 and Whitehead et al for 0.5 to 18 year olds in 1982 is not recent, and does not distinguish between the diets of children with different BMIs. We cannot therefore correlate the trend increase in obesity amongst children under the age of 11 in the 1990s with changes in diet or diet composition.

Summary of evidence basis

In conclusion, evidence can be found that both fat and high glycaemic carbohydrate can cause over-eating. Evidence also exists showing that both adults and children whose energy-intake has a high proportion of fat are more likely to be obese. However, the same evidence does not yet exist for carbohydrate or high glycaemic foods. There is insufficient data on children's diets to correlate the trend increase in obesity prevalence with changes in the proportion of energy consumed by children as fat or carbohydrate. In fact, the trend has been for an increase in the proportion of energy coming from protein rather than fat. Drawing back from the obsession with fat versus carbohydrate, studies do show that energy-dense foods do affect satiety and food consumption, but no relationship has yet been proven with obesity in children.

To re-state the conclusion earlier, this does allow us to safely conclude that it is a high consumption of "energy-dense" foods is linked to obesity because:

- Fat contains the largest amount of energy per gram. Fat can also be "passively" over-consumed.
- High glycaemic foods also contain large amounts of energy, and can lead to a positive energy balance. Although these will be oxidised rapidly, this means that other energy stores such as fat are less likely to be oxidised. High glycaemic foods can also stimulate hunger.

4.1.3 Are specific types of foods linked to obesity?

The data above suggests that a diet which is biased towards foods which are high in fat and sugars (such as convenience foods, carbonated drinks or confectionery) is correlated with obesity. The only types of food that have been directly correlated with obesity through a controlled trial are carbonated drinks.³² The evidence for this is discussed below.

³¹ Ibid.

³² Cavadini C, Siega-Riz A.M., Popkin B.M. (2000) US adolescent food intake trends from 1965 to 1996. Arch Dis Child 2000; 83: 18-24.; and Morton J.F., Guthrie J.F. (1998) Changes in children's total fat intakes and their food group sources of fat, 1989–91 versus 1994–95:

There is not any epidemiological data either way linking solid snacks such as crisps or confectionery specifically as food groups to childhood obesity.

However, it is important to bear in mind that it only takes a small excess of energy intake of energy expenditure over time to lead to obesity. One additional snack a day can tip the balance, but so can having an imbalance of meat compared to vegetables for an evening meal. We should not therefore “demonise” specific food types.

Carbonated drinks

Some researchers argue that sugar-sweetened soft drinks might promote energy intake and excessive weight gain because of their high glycaemic index³³ or because compensation for calories consumed in liquid form is less complete than for calories consumed in solid form.³⁴ By contrast, milk, a low glycaemic index drink, seems to protect overweight young adults from becoming obese.³⁵

In a study of 650 UK schoolchildren aged 7 to 11, James et al.³⁶ ensured that half of the youngsters cut their consumption of fizzy drinks by half a glass a day - about 250 ml (9 ounces). The other half, a control group, drank about 0.2 glasses more a day in addition to their average of about two glasses every three days. By the end of the school year the percentage of overweight and obese children in the control group rose by 7.6% but fell 0.2% in the children who cut fizzy drinks.

Results of a cross-sectional study³⁷ in the US showed that total energy intake was about 10% greater among school-age children who consumed soft drinks than in those who did not. Additionally, findings of a study in Massachusetts communities³⁸ indicated a 60% increased risk of development of obesity in

implications for diet quality. *Fam Econ Nutr Rev* 1998; 11: 44-57; all cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002), op. cit.

³³ Ludwig D.S., Peterson K.E., Gortmaker S.L. (2001) Causes of obesity. *Lancet* 2001; 357: 1978-1979; cited in Ebbeling, C., Pawlak, D. Ludwig, D. (2002), op. cit.

³⁴ Ludwig D.S., Peterson K.E., Gortmaker S.L. (2001) Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet* 2001; 357: 505-508.

³⁵ Pereira, M.A., Jacobs D.R., VanHorn L., Slattery M.L., Kartashov A.I., Ludwig D.S. (2002) Dairy consumption, obesity, and the insulin resistance syndrome in young adults: the CARDIA study. *JAMA* 2002; 287: 2081-2089; all cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002), op. cit.

³⁶ James, J. Thomas, P., Cavan, D. and Kerr, D., (2005) Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial, *BMJ*

³⁷ Harnack L., Stang J., Story M. Soft drink consumption among US children and adolescents: nutritional consequences. *J Am Diet Assoc* 1999; 99: 436-441; cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002), op. cit.

³⁸ Ludwig D.S., Peterson K.E., Gortmaker S.L. (2001) Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet* 2001; 357: 505-508.

middle-school children for every additional daily serving, after controlling for the effects of other factors.

Fast food

The rise in consumption of fast food, in developed and developing nations, might have particular relevance to the childhood obesity epidemic. Fast food typically incorporates all of the potentially adverse dietary factors described above, including saturated fat, high glycaemic index, high energy-density, and, increasingly, large portion size. A large fast food meal (double cheeseburger, french fries, soft drink, dessert) could contain 9200 kJ (2200 kcal), which, at 350 kJ (85 kcal) per mile, would require a full marathon to burn off.³⁹

Results of several studies⁴⁰ suggest an association between fast-food consumption and total energy intake or bodyweight in adolescents and adults, though no work has been done on young children. Although there are no data on fast food and obesity in children under the age of 11 in the UK, the “NHLBI” study in the US found that adolescent girls who ate fast food four times a week or more consumed about 770–1095 kJ (185–260 kcal) per day more than those who did not.⁴¹

4.1.4 Does “grazing” cause obesity?

There has been a trend in the UK for adults and children to shift away from eating three substantial meals a day to eating three meals a day as well as snacking in between meals. This is usually described as “grazing”.

On balance, the empirical evidence cited below shows that if children eat more frequently, but overall eat the same amount of calories per day, then they are actually less likely to gain weight. However, if the effect of grazing is to overall eat more calories, then clearly this will increase adiposity.

Studies undertaken in the 1960s and reported in the 1970s showed that consumption of larger, less frequent “meals” was associated with a greater fat deposition and risk of obesity, compared to a more frequent pattern of

³⁹ Ebbeling, C, Pawlak, D. Ludwig,, D. (2002), op. cit.

⁴⁰ French S.A., Story M., Neumark-Sztainer D., Fulkerson J.A., Hannan P. (2001) Fast food restaurant use among adolescents: associations with nutrient intake, food choices and behavioral and psychosocial variables. *Int J Obesity* 2001; 25: 1823-1833. ; and French S.A., Harnack L., Jeffery R.W. (2000) Fast food restaurant use among women in the Pound of Prevention study: dietary, behavioral and demographic correlates. *Int J Obesity* 2000; 24: 1353-1359.; and Binkley J.K., Eales J., Jekanowski M (2000) The relation between dietary change and rising US obesity. *Int J Obesity* 2000; 24: 1032-1039; all cited in Ebbeling, C, Pawlak, D. Ludwig,, D. (2002), op. cit.

⁴¹ McNutt S.W., Hu Y., Schreiber G.B., Crawford P.B., Obarzanek E, Mellin L.(1997) A longitudinal study of the dietary practices of black and white girls 9 and 10 years old at enrollment: the NHLBI Growth and Health Study. *J Adolesc Health* 1997; 20: 27-37; all cited in Ebbeling, C, Pawlak, D. Ludwig,, D. (2002), op. cit.

eating.⁴² For example, Fábry et al.⁴³ conducted a study in two schools for 6 to 16 year olds in 1996 to compare the effect of three-meal-a-day compared to seven-meal-a-day regimes. A third school remained on its normal five meals a day regime. Energy intakes were planned to be the same in all three groups. After one year, anthropometric measurements suggested that for 10 to 16 year olds (but not 6 to 9 year olds) the more meals you had per day, the less fat you became. Other more recent studies have confirmed this finding,⁴⁴ whilst others have disproved it.⁴⁵

⁴² Leveille, G. (1970) Adipose tissue metabolism. Influence of periodicity of eating and diet composition. Federation Proceedings, 29, cited in British Nutrition Foundation (1999) Obesity, Blackwell Science

⁴³ Fábry, P. et al. (1996) Effect of meal frequency in school children. Changes in the weight-height proportion and skin-fold thickness, American Journal of Clinical Nutrition, 18; cited in British Nutrition Foundation (1999) op. cit.

⁴⁴ Kant A.K. et al. (1995) Frequency of eating occasions and weight change in the NHANES I Epidemiological Follow-up study, International Journal of Obesity, 19, cited in British Nutrition Foundation (1999) Obesity, Blackwell Science

⁴⁵ Ruxton, C.H.S. (1996) The contribution of specific dietary patterns to energy and nutrients in 7 to 8 year olds Scottish school children III. Snacking habits. Journal of Human Nutrition and Dietetics, 9; cited in British Nutrition Foundation (1999) Obesity, Blackwell Science

4.1.5 Are obese children simply eating larger portions?

The best known study in this area comes from the US⁴⁶, and shows that portion sizes have indeed increased from 1989/1991 to 1994/1996. However, no equivalent study has been identified for the UK.

What we can say is that once children are beyond the age of around 5, they become less responsive to internal hunger and satiety cues and more reactive to environmental stimuli – so if you give them a large portion, they are more likely to eat it all, even if they already feel full. For example, in a study⁴⁷ in which preschool children were given lunches that contained small, medium, or large amounts of macaroni and cheese, and in whom voluntary energy consumption was measured, younger children (mean age 3 to 6 years) ate the same amount irrespective of portion size, whereas older children (5 years old) consumed more energy when given a large versus a small portion.

4.1.6 Do obese children simply have less self-constraint?

Research amongst adults in the 1960s and 1970s known as “externality theory”⁴⁸ suggested that, compared with their ideal weight counterparts, obese people were more reactive to external cues (time, presence of food, and situational effects) and less sensitive to internal hunger and satiety signals. An environment of easily accessible, abundant and highly palatable food would therefore encourage over-eating and the development of obesity. In experimental studies, better-liked foods are not only consumed in higher quantities than lesser-liked foods, but the magnitude of this palatability effect is reliably found to be exaggerated in obese subjects.

However, this “externality theory” lost favour over subsequent years, partly as a consequence of studies showing that even thin people were responsive to external cues (such as wide availability of food), but overall the evidence is not consistent.

⁴⁶ Young L.R., Nestle M. (2002) The contribution of expanding portion sizes to the US obesity epidemic. *Am J Public Health*. 2002;92:246-249.

⁴⁷ Rolls B.J., Engell D., Birch L.L. (2000) Serving portion size influences 5-year-old but not 3-year-old children's food intake. *J Am Diet Assoc* 2000; 100: 232-234; all cited in Ebbeling, C, Pawlak, D., Ludwig, D. (2002), op. cit.

⁴⁸ Schachter et al. (1968) Effects of fear, food deprivation and obesity on eating, *Journal of Personality and Social Psychology*, 10(2), cited in British Nutrition Foundation (1999)

4.1.7 Do obese children just have more of a “sweet” (or fat?) tooth than ideal weight children?

It is often suggested that obese children and adults have a greater preference for sweet foods which contributes to their obesity. This would then explain why they eat more foods that are high in sugar. However, studies have shown that obese and ideal weight individuals do not differ in their general sensitivity to, or perceptions of, intensity of sweetness, or in their liking for sweetness in foods and drinks.⁴⁹

On the other hand, there is evidence to show that obese children and adults do have enhanced preferences for fat-containing stimuli. Fisher and Birch⁵⁰ assessed fat preferences of young children using a test battery comprising savoury high fat items and a mix of sweet and savoury low fat items. They found that children of overweight parents show a greater preference for fatty foods. It is possible that these preferences could be linked to genetically based / physiological factors, which predispose to obesity. However, this is only now beginning to be empirically tested.

4.1.8 Does it matter what time of the day you eat?

Some epidemiological investigations of the “circadian” distribution of energy intake have suggested that the obese consume a greater proportion of energy intake in the latter half of the day compared to ideal weight individuals. For example, in a group of French 7 to 12 year olds, Bellisle found that breakfast represented 15.7% of daily energy intake in the obese whereas it accounted for 19.2% of daily energy intake in controls of average BMI. By contrast, dinner accounted for 32.5% of total daily energy intake in the same group of obese children and 28.7% in controls of average BMI.⁵¹ However, other studies have failed to find such a relationship.⁵²

Overall, the current consensus is that evidence for a causal link between the patterns and circadian distribution of energy intake and obesity is weak.

⁴⁹ Dresnowski et al. (1985) Sweet tooth reconsidered: taste responsiveness and food preferences in human obesity, *Physiology & Behaviour*, 35; and Grinker et al, (1986) Sweet preference and body fatness: neonatal data, *Nutrition and Behaviour*, 3; and Mela (1996) Eating behaviour, food preferences and dietary intake in relation to obesity and body weight status, *Proceedings of the Nutrition Society*, 55; all cited in British Nutrition Foundation (1999) op. cit.

⁵⁰ Fisher, J.O, Birch, L.L. (1995) Fat preferences and fat consumption of 3 to 5 year old children are related to parental adiposity, *Journal of the American Dietetic Association*, 95, cited in British Nutrition Foundation (1999) op. cit.

⁵¹ Bellisle, F. et al. (1988) Obesity and food intake in children: evidence for a role of metabolic and/or behavioural daily rhythms, *Appetite*, 11; cited in Burniat W (ed) et al. (2002) op. cit.

⁵² Kant et al. (1995) Evening eating and its relation to self-reported body weight and nutrition intake in women, CSFII 1985-6, *Journal of the American College of Nutrition*, 14, cited in British Nutrition Foundation (1999) op. cit.

Nevertheless, it remains a recommendation for anyone who wants to lose or control weight that they do not have their largest meal at the end of the day.

4.1.9 Do the parents of obese children simply not realise that their children are fat?

One argument that is sometimes made is that such a significant proportion of the population is either overweight or obese, particularly in poorer socio-economic populations, that it is not seen as abnormal to be overweight or obese. Certainly rates of overweightness and obesity are very high, though generalisations about social class need to be qualified.

On average, adult manual workers are only slightly more likely to be overweight or obese than non-manual workers. Manual workers (C2DEs) are slightly more likely to be obese than non-manual workers (ABC1), but slightly less likely to be overweight. A BMI of 25-30 is overweight, and over 30 is obese.

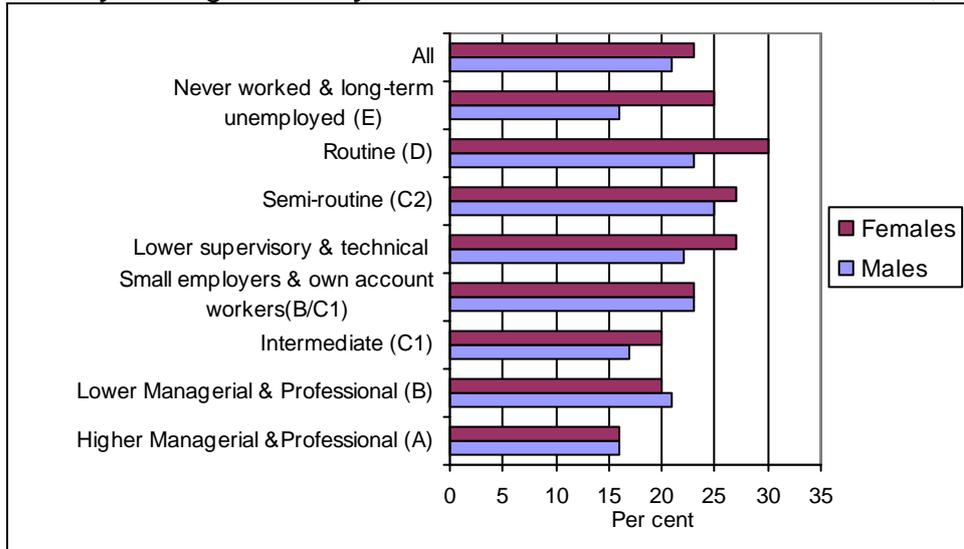
Body Mass Index by social class, % observed with BMI in different bands

Gender	Social Class of head of household			
	Men		Women	
	Non-manual	Manual	Non-manual	Manual
20 or under	3.9	4.9	6.0	7.7
20-25	32.7	31.8	41.6	37.1
25-30 (overweight)	46.0	43.0	33.3	32.4
Over 30 (obese)	17.4	20.3	19.1	22.8
Average	26.5	26.7	26.1	26.6

Source: Erens, B, Primatesta, P., Prior, G. (2001) Health Survey for England, The Health of Ethnic Minority Groups, 1999, DH

A finer split of social economic groups shows that this hides considerable differences between the most affluent social groups (higher and professional – roughly As) and some of the least affluent (routine – roughly Ds) particularly amongst women.

Obesity among adults: by Sex and Social economic classification, 2001



Source: Primatesta, P., Sproston, K.. (2002) Health Survey for England, 2002, DH

The House of Commons Health Committee quotes a recent study carried out by the Peninsula Medical School that suggests obesity and overweight are now so commonplace that parents are failing to recognise that their children have a problem. In this study of 300 British families 25% of parents with overweight children recognised that their children were overweight. The figures were even higher for obesity, with 33% of mothers and 57% of fathers describing their children as “normal,” when in fact they were obese.⁵³

A survey for Ofcom by NOP paints a stronger picture.⁵⁴ Only 14% of parents with an obese child considered that child to be overweight, while 82% perceived the child to be of average weight. The parents of obese children in the NOP survey are also just as likely as the parents of normal weight children to say their child is in good health. More than nine out of ten claim this (obese child, 93%; normal weight child, 95%).

⁵³ Findings presented to Diabetes UK medical conference in Birmingham in March, 2004 by Alison N. Jeffrey of the Early Bird Survey at Derriford Hospital and Peninsula Medical School in Plymouth. See http://www.news-medical.net/print_article.asp?print=yes&id=2178, cited in House of Commons Health Committee (2004) House of Commons Health Committee report on obesity, Third Report, UK Parliament

⁵⁴ Ofcom (2004) Childhood Obesity: Food Advertising in Context, July 2004

4.2 Do obese children eat different kinds of foods to ideal weight children?

Do obese children eat foods that are high in fat and sugar?

The National Diet and Nutrition survey shows that obese children do eat more than their ideal weight counterparts. There is a correlation between average daily energy intake and both BMI (Body Mass Index) and MUAC (Mid Upper Arm Circumference) for children aged 4 to 11. However this tells us about how much obese children eat once they are obese. It does not tell us if these children ate more than their ideal weight counterparts in the run up to becoming obese.

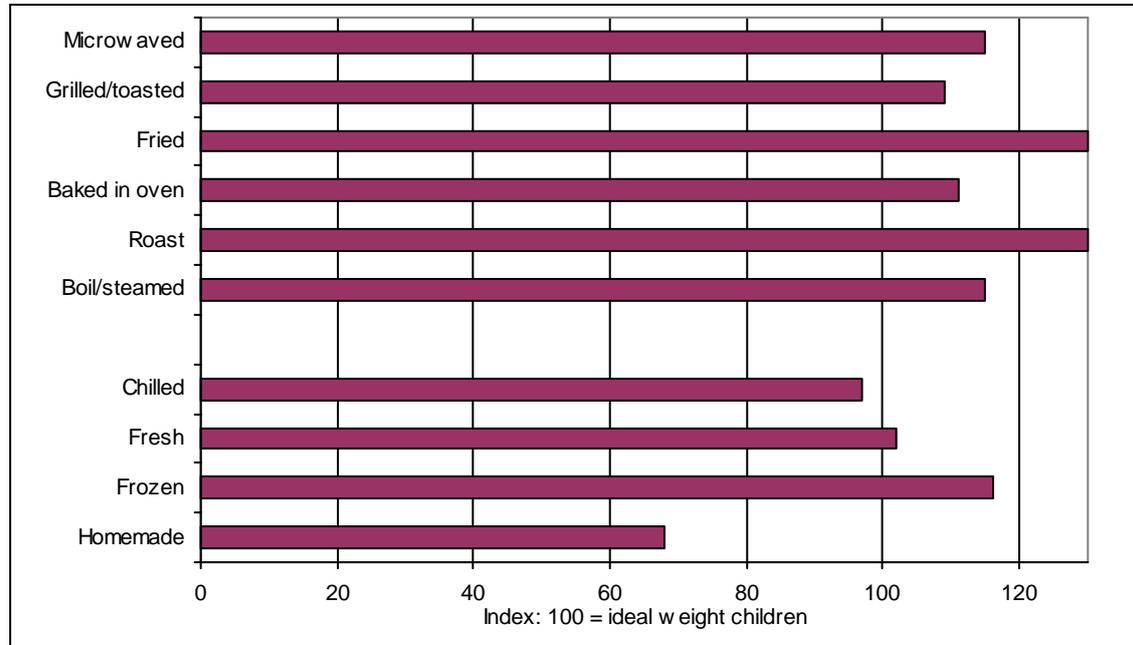
As the analysis in the subsequent sections will show, there have been strong trends in the UK towards consumption of high in fat and sugar convenience meals and snacks, and under-consumption of fruit and vegetables compared to recommended levels. Analysis of the TNS Family Food Panel and quantitative research by NOP for Ofcom⁵⁵ all demonstrate that obese children are more likely than non-obese children to have diets with these characteristics.

⁵⁵ Ofcom (2004) Childhood Obesity: Food Advertising in Context, July 2004

Convenience foods

Children's diets are already low on fresh and home-made foods, and the diet of obese children is even worse, with more reliance on micro-waved and frozen food (TNS).

Share of category consumption by obese children indexed on ideal weight children

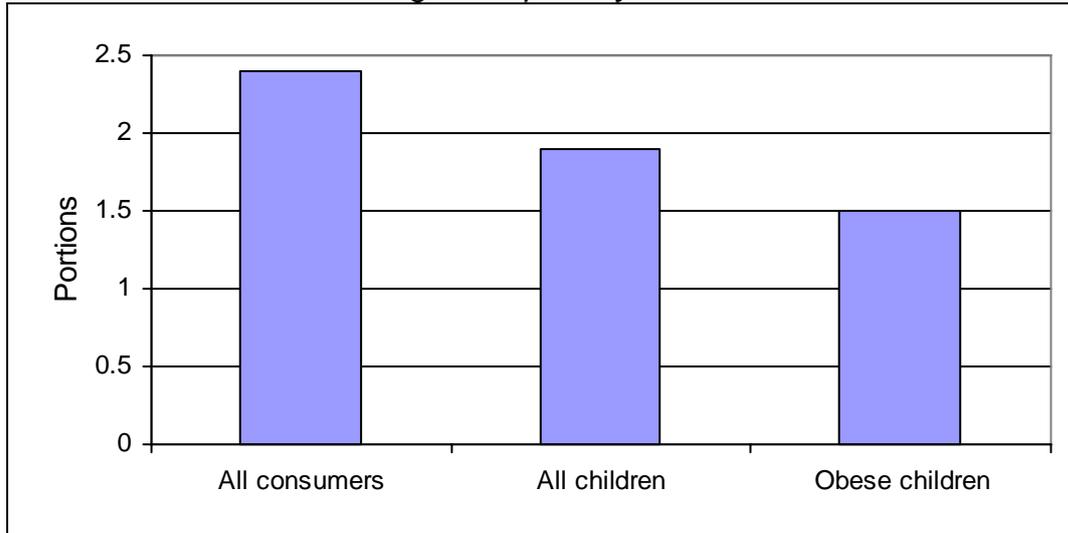


Source: TNS, Family Food Panel (2003), for Ofcom

Fruit and vegetables

Obese children are also even less likely to eat fresh fruit and vegetables than children generally (TNS). Similarly, in the NOP survey, when asked to list the contents of a recent main meal they had enjoyed, obese children aged 8 to 15 were more likely than children of normal weight to report consuming a meal which contained products that are high in fat and sugar (74% do so compared with 59% of normal weight children). They were also less likely to eat fruit on a typical school day (3% compared with 18%).

Portions of fresh fruit and vegetable per day

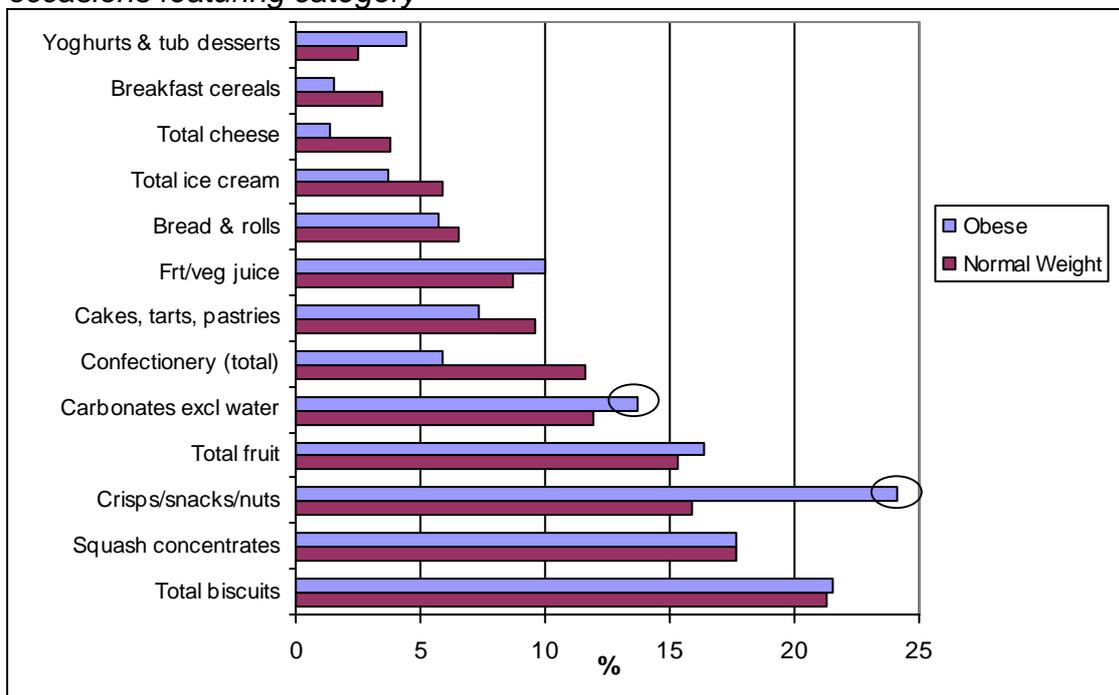


Source: TNS, Family Food Panel (2003), for Ofcom

Snacking

Obese children are more likely than children of normal weight to snack on crisps, nuts and savoury snacks at home.

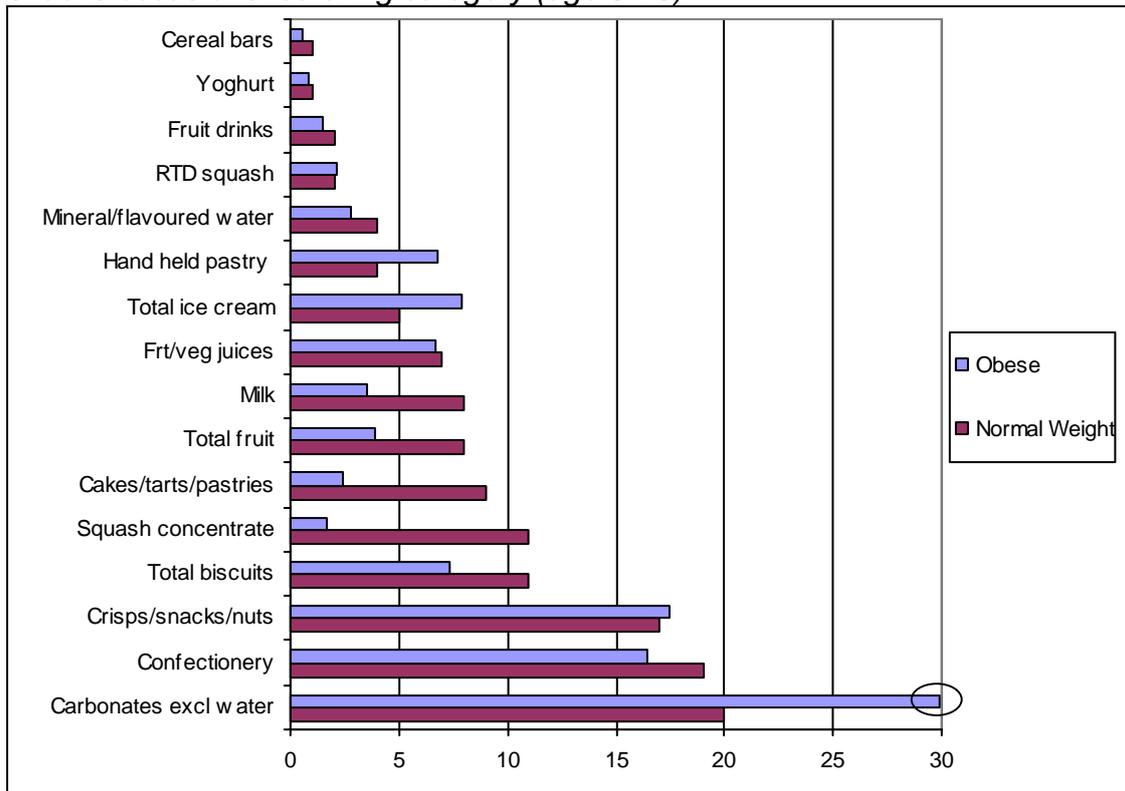
What do children eat as a snack in home? Percentage of snacks in home occasions featuring category



Source: TNS Family Food Panel (2003), for Ofcom

Outside the home, obese children are much more likely than non-obese children to consume carbonated drinks, ice-cream and crisps/snacks/nuts. Surprisingly, snacks, sweets, biscuits and cakes are less likely to be eaten by obese children. (TNS)

What do children eat as a snack out of home? Percentage of out of home snacks occasions featuring category (age 5-15)



Source: TNS Family Food Panel (2003), for Ofcom

Obese children are more likely than normal weight children to have snacked yesterday on what Ofcom call a “Big 6 item” - confectionery, soft drinks, crisps/savoury snacks, fast food pre-sugared breakfast cereals, convenience foods. Almost all obese children (97%) say their favourite snack is a Big 6 item, compared with around four in five of normal weight children (79%). They say they snacked more often “yesterday” and are more likely to buy sweets, crisps or fizzy drinks on the way home from school (NOP).

Comparison of “ideal weight” versus “obese” child aged 8-15 – Key differences

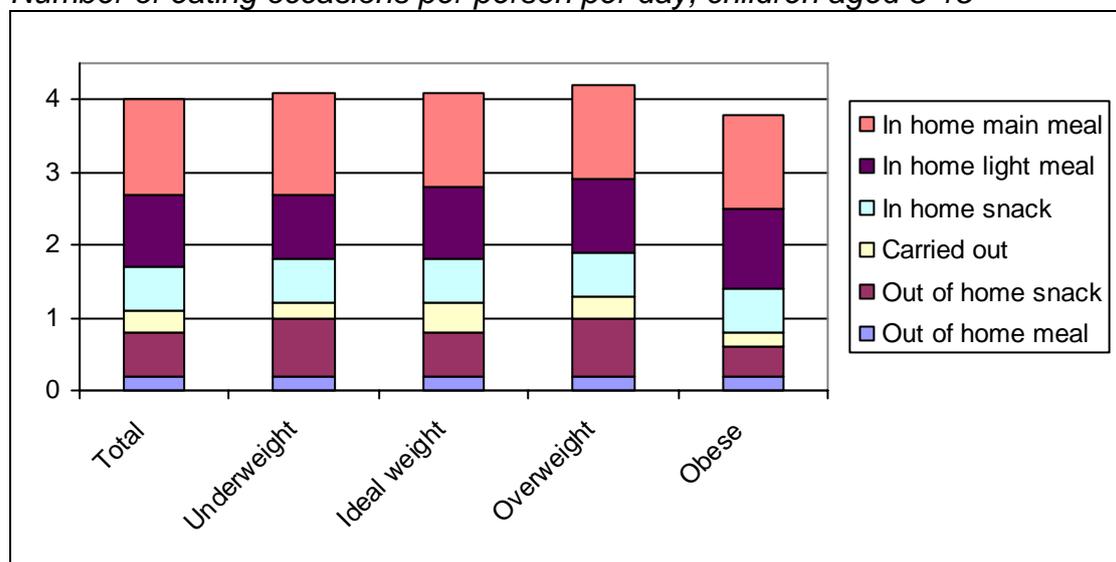
Child’s perceptions of:	Ideal weight	Obese
Child perceives they eat the same as their friends	54%	79%
Main meal enjoyed last week – mention of “Big 6 item”	59%	74%
Mention of fruit at lunchtime on typical school day	18%	3%
Mean number of snacks yesterday	2.02	2.96
Snacked on Big 6 item	85%	94%
Favourite snack is Big 6 item	79%	97%
Mean frequency of buying sweets, crisps, fizzy drinks on way to school	1.11	1.44

* Big 6 items are: confectionery, soft drinks, crisps/savoury snacks, fast food pre-sugared breakfast cereals, convenience foods

Source: NOP (2003), for Ofcom

The TNS Food Panel data suggests that obese children, contrary to expectation, do not eat on more occasions and do not indulge in more snacking occasions than children of normal weight.

Number of eating occasions per person per day, children aged 5-15



Source: TNS, Family Food Panel, 2003, for Ofcom

However this TNS data is based on the reports of parents, and parents may be under-reporting their children's consumption. In the NOP survey, parents' responses indicate that obese children are not likely to snack more often in a day than their non-obese counterparts. When children (rather than parents) were asked how often they snacked yesterday, obese children were more likely than non-obese children to say they snacked 6 or more times.

How many times did you have a snack yesterday? Children aged 8-15

Number of times	Underweight / normal	Overweight / obese
6+ times	-	15%
4-5 times	5%	7%
2-3 times	45%	44%
About once	50%	35%
Mean number of snacks	2.02	2.96

Source: NOP (2003) for Ofcom

Obese or overweight children in the survey are slightly more likely than non-obese children to say they snack in the afternoons and evenings.

When, if at all, did you have a snack yesterday? Children aged 8-15

Time when had a snack	Underweight / normal	Overweight / obese
In afternoon	31%	47%
In evening	32%	37%
At lunchtime	20%	17%
At playtime/school breaks	37%	3%
Coming home from school	32%	28%
In the morning	8%	12%
On the way to school	9%	13%
Other	2%	-
Didn't have a snack yesterday	4%	5%
Don't know	1%	-

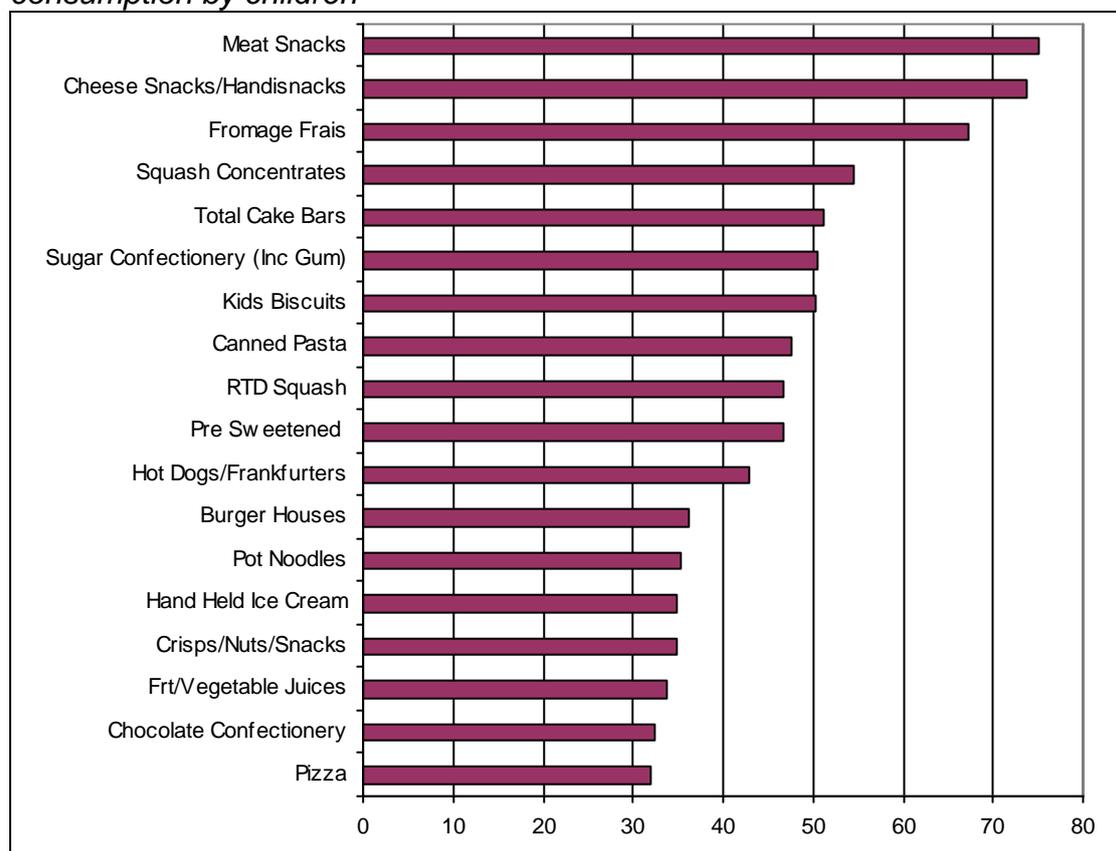
Source: NOP (2003) for Ofcom

4.3 Why are children's diets increasingly biased towards high in fat and sugar foods?

The TNS Family Food Panel data reviewed in section 4.2 shows that obese children have a diet which is more biased towards high in fat and sugar convenience foods and snacks than all other children. As section 4.3.1 will show, convenience is more important to parents of obese children than ideal weight children when choosing food.

Nevertheless, this dietary bias is not exclusive to obese children. On average, all children consume more convenience foods as well as sugar confectionery and squash concentrates than their share of the overall population. Obese children's diets are simply worse than non-obese children's.

Food categories most heavily dependent on children – 50%+ additional consumption by children



Source: TNS, Family Food Panel (2003) for Ofcom

This reflects a number of features in the diets of children in general in the UK:

1. A shift towards convenience foods in the home, which tend to be high in fat and sugar.
2. Continued low consumption levels of vegetables.

3. Children eating alone, rather than as a family. When eating alone, they tend to eat foods that are high in fat and sugar.
4. High levels of eating food outside of the home (e.g. in fast food restaurants) and take-aways, which again tend to be high in fat and sugar.
5. High levels of snacking (especially confectionery and carbonated drinks), which tend to be high in sugars.

None of the five channels above necessarily are more to blame than others. As noted in section 4.1, it only takes a small excess of energy intake of energy expenditure over time to lead to obesity. One additional snack a day can tip the balance, but so can having an imbalance of meat compared to vegetables for an evening meal. We should not therefore “demonise”, say, snacks over school-provided meals, or convenience foods over carbonated drinks.

The sections below analyse each of the five trends, and the reasons behind them.

Underlying all five trends is children's increasing control over what they are given to eat. The reason behind this are covered in sections 4.4 and 4.5. Factors that are particularly strong amongst poorer socio-economic groups are summarised in section 4.7.

4.3.1 High consumption of convenience foods in the home

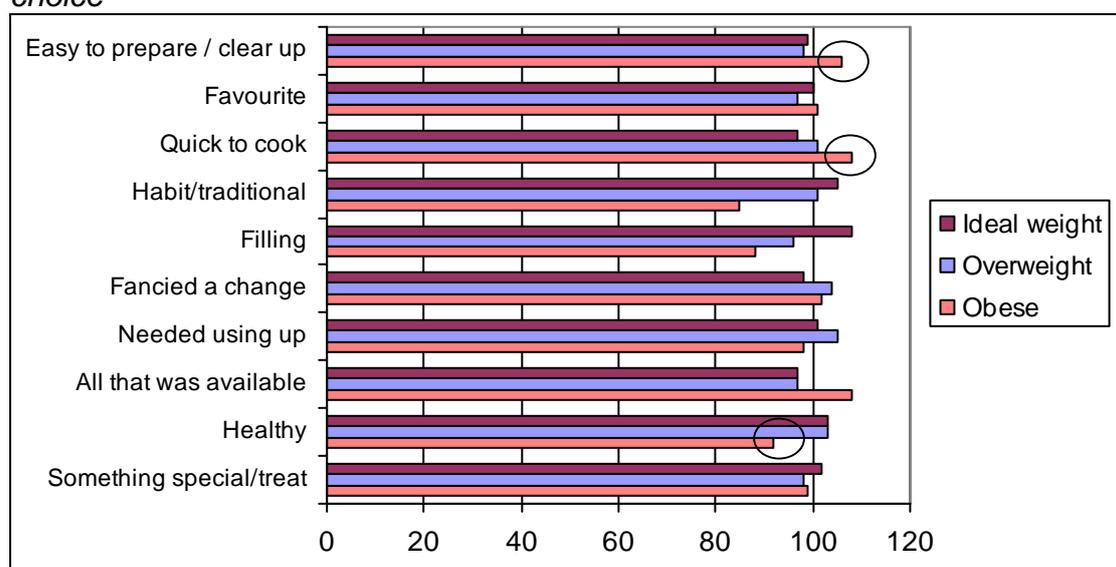
The epidemiological evidence discussed in section 4.1 suggested that high consumption of foods that are high in fat and sugar are correlated with obesity because they can stimulate hunger and can tip the energy balance. Section 4.2 also showed that obese children eat more convenience foods than non-obese children. Convenience also had more of an influence for parents of obese children than normal weight children. Furthermore, pre-prepared convenience foods limit the consumer's choice and control over what they eat compared to home prepared food.

Is convenience important for parents of obese children?

Convenience and special offers are more important than health

Data from the TNS Family Food Panel show that convenience and practicality is more important to parents of obese children than non-obese children. Health is less important.

Index of the reasons for food choice by parents – figures show the index vs the share of all needs. Adults citing need as primary reason for food/drink choice



Source: TNS, Family Food Panel (2003), for Ofcom

Likewise, in the NOP survey, parents of obese children were more likely to be motivated by convenience. Parents of obese children were more likely than those of normal weight children to report that they buy things because they are “quick and easy to prepare”, “friends like it” and it is “slimming”. Health was less of a reason for them.

Importance of reasons for selecting groceries

Reason	Mean score importance (1-15)	
	Ideal weight	Obese
Healthy	5.98	5.87
My child likes it	5.92	6.00
Family likes it	5.77	5.87
Quick and easy to prepare	5.14	5.43
Not expensive	5.13	5.37
Something familiar	4.94	5.4
Something for a change	4.77	5.14
Caught eye in shop	4.33	4.99
Slimming	3.98	4.39
Saw/hear ad	3.93	4.35
Friends like it	3.9	4.5

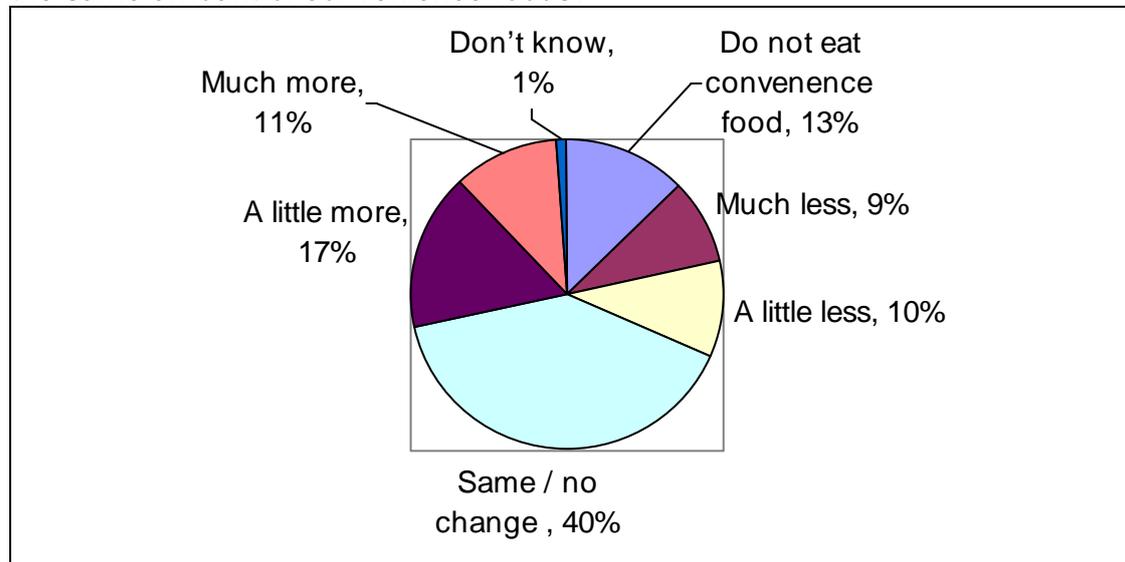
Source: NOP (2003), for Ofcom

Has there been a shift in consumption towards convenience foods within families with children?

The demand for ready-meals in Britain grew by 44% between 1990 and 2002, while growth across Europe as a whole was 29%.⁵⁶ Britain is now consuming double the amount of ready-meals consumed in France and six times the number in Spain. Eighty per cent of households in the UK have a microwave, compared with 27% in Italy.⁵⁷

Data for the consumption of convenience foods by children over time has not been identified. However, there has been an increase in consumption of convenience foods over the past decade. The Nestlé Family Monitor⁵⁸ shows that 28% of the British public said that they ate more convenience foods in 2001 than they did five years ago, and 19% eat less. At the time, only 12% estimated that they would be eating more in five years time.

Compared with five years ago, would you say that you eat more, less or about the same amount of convenience foods?



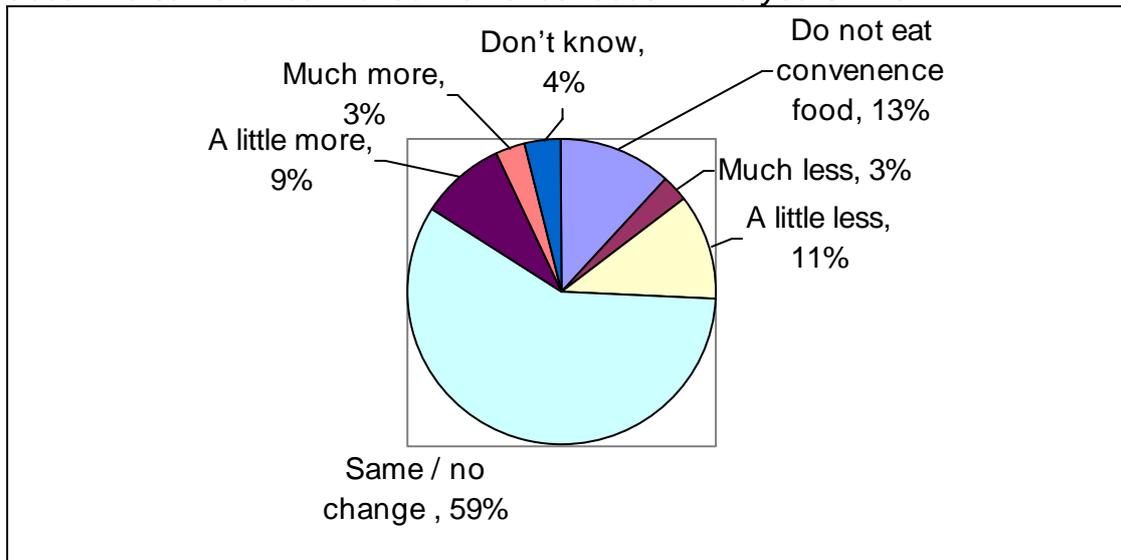
Source: MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

⁵⁶ Mintel report summarised on <http://news.bbc.co.uk/1/hi/uk/2787329.stm>.

⁵⁷ Ofcom, July 2004, Childhood obesity – Food advertising in Context

⁵⁸ MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

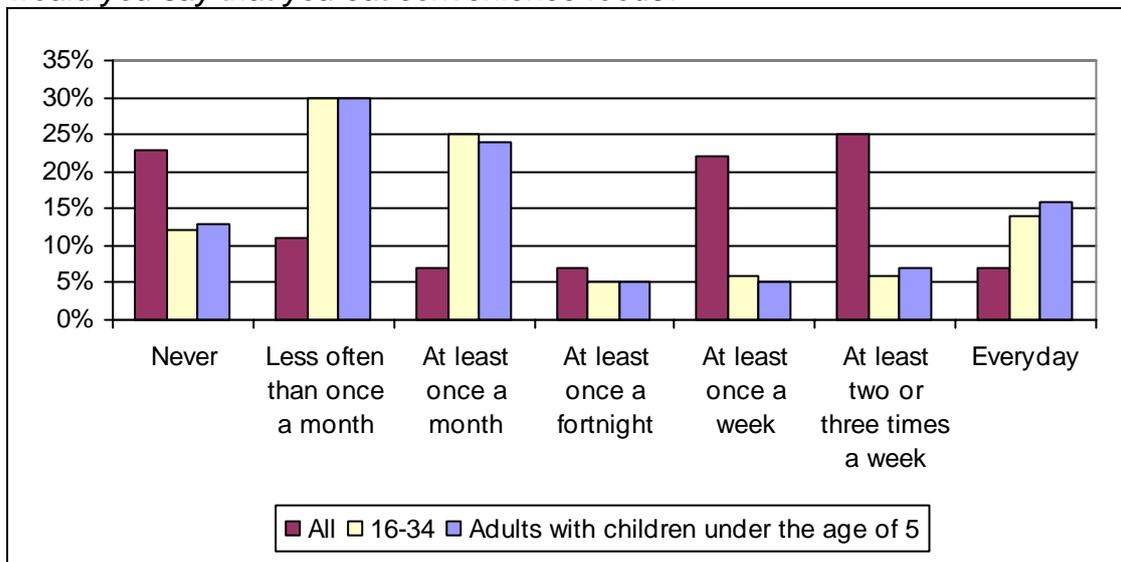
Compared with now, would you say that you will be eating more, less or about the same amount of convenience foods in five years time?



Source: MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

The Nestlé Family Monitor in 2001⁵⁹ also showed that 13% of households with young children eat convenience food every day.

Frequency of Eating Convenience Foods - Nowadays, how often, if at all, would you say that you eat convenience foods?

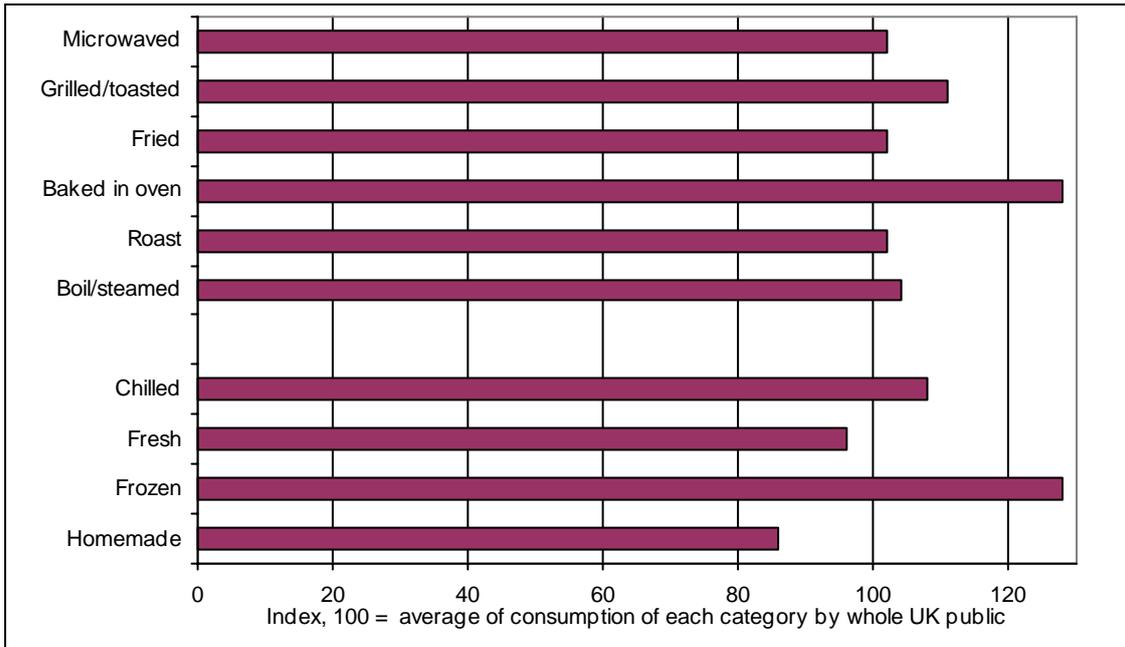


Source: MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

Likewise, the TNS Food panel shows that the diets of children relative to their share of the population are high for frozen (convenience) foods, and low for home-made and fresh foods. As shown earlier in section 4.2, this pattern is even stronger for obese children.

Share of category consumption by children indexed on share of all consumption

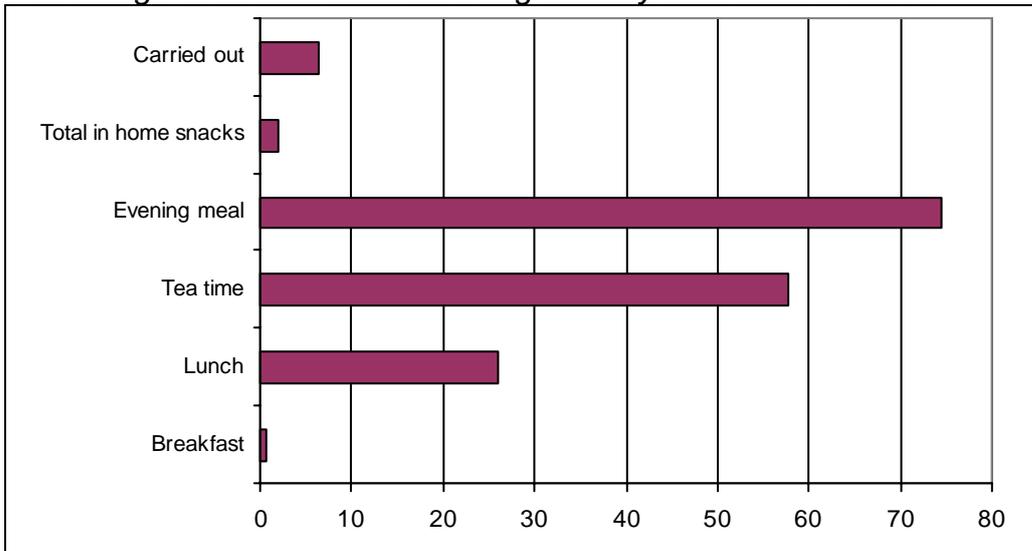
⁵⁹ MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor



Source: TNS, Family Food Panel (2003), for Ofcom

According to the TNS Family Food Panel data, the evening meal is particularly likely to contain pre-prepared or convenience food.

Percentage of all occasions featuring savoury convenience foods



Source: TNS, Family Food Panel (2003), for Ofcom

Why has there been a shift to buying convenience foods amongst families with children?

The Nestlé Family Monitor⁶⁰ shows that in the majority of households in Britain, the women still do all or most of the cooking. In Ofcom's qualitative research⁶¹ many mothers talked of having no time to do proper cooking, and there was a feeling that real cooking is hard work. An abundance of processed products which do not need forward planning and require little if any preparation time, make it easy to produce food for children quickly and conveniently.

In fact, data from the NOP survey and TNS Food Panel for Ofcom⁶² show that parents of obese children compared with parents of normal weight children are less motivated by health and more motivated by convenience and price when choosing food.

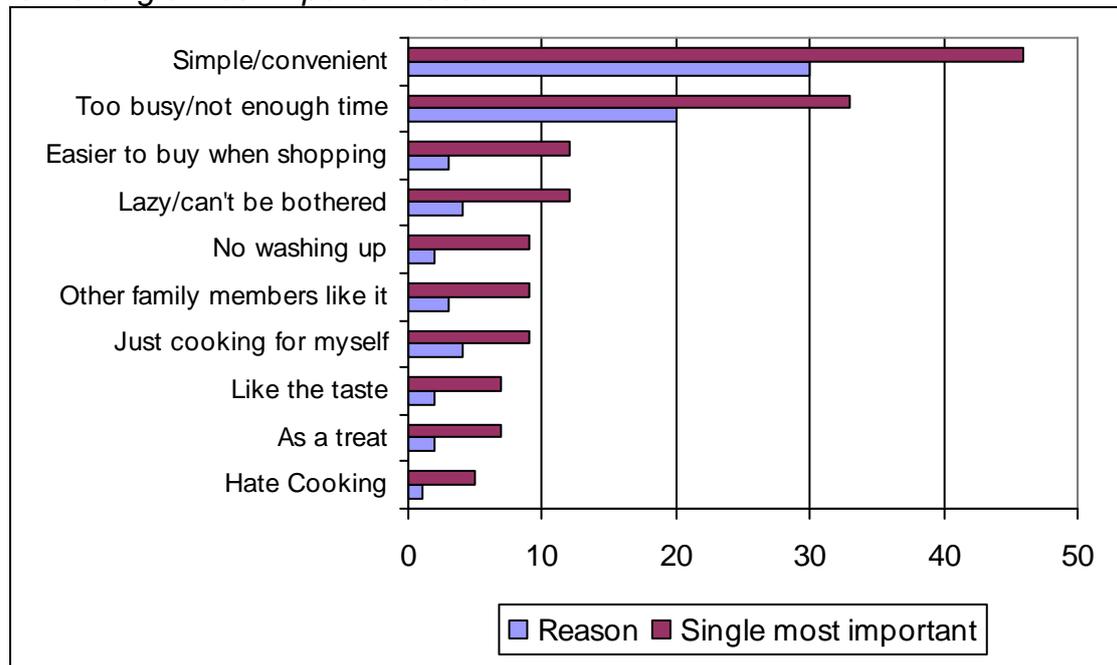
These factors are analysed in depth below.

⁶⁰ MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

⁶¹ Ofcom (2004) Childhood obesity – Food advertising in Context, July 2004

⁶² Ibid.

Reasons for Buying Convenience Foods – Which, if any, are the main reasons why you/others in your household buy convenience foods? And what is the single most important reason?



Source: MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

Time

The Nestlé Family Monitor⁶³ shows that half (47%) of respondents (with and without children) say they buy convenience food because it is simple. A third say they buy convenience foods because they are 'too busy' and do not have enough time to prepare food.

People spend less time cooking now than they did twenty years ago. This food trend is probably best illustrated by Henley Centre research which suggests that the average time taken to prepare a meal in 1980 was two hours. This has now been reduced to 20 minutes. Consumers in employment spend 40% less time cooking than those who are not in work. Consequently they seek out products that will make their lives easier. Likewise, the Henley Centre⁶⁴ found that one third of women in the UK agree that cooking and preparing food is too time-consuming.

One of the key reasons behind this "lack of time" is the increase in the proportion of mothers who work. Mothers continue to be the person in families who prepare foods, even in families where both parents work. From 1991 to 2001, the overall employment rate for women with dependent children increased from 58.7% to 65.4%. The increase was particularly marked for women with their youngest child aged 0 to 4 – participation in employment rose from 43.4% in 1991 to 54.4% in 2001. Seventy per cent of women with their youngest child aged 5 to 10 were in employment in 2001. Nevertheless,

⁶³ MORI (2001) Eating and today's lifestyle – Nestlé Family Monitor

⁶⁴ The Henley Centre (2000) A Taste of the 21st Century, in press

the majority of these jobs were part-time – 40% of women whose youngest child is aged 0 to 10 work part-time, compared to 21% who work full time.⁶⁵

As well as finding time to prepare food, working women with children also need to find time to play with their children, undertake household chores, shop for groceries, transport their children back and forth to school, clubs, recreation and friends, and find time for themselves and their partner. Convenience foods are therefore a solution for their busy lifestyles.

However, this does not necessarily mean that women who work provide worse meals for their children compared to those who stay at home. Research undertaken by the University of Glasgow⁶⁶ into the diets of 11 year old children in the West of Scotland in 1994 showed that 63% of children whose mothers were at home full-time were classed as eating "less healthily", compared to 52% of those whose mothers worked full-time. This evidence in itself does not mean that time is not a reason for the shift towards convenience foods, as there will be other reasons why mothers who stay at home provide less healthy foods. The factors which had the strongest relationships with poorer diet were living in a deprived area and having a mother with fewer qualifications.

Inability to conceptualise an attractive, affordable and healthy diet

Section 4.5 discusses a typology of mother identified by qualitative research known as "Fatalist" mothers – the majority of mothers. One of the characteristics is that they are hampered by their lack of ability to conceptualise an attractive, affordable and healthy diet. In putting together their "ideal diet for a child" these mothers are likely to feel they have to reject whole categories of foods: fats, dairy products, sugar and carbohydrates. Consequently their notion of the "ideal diet" is extremely austere and perceived to be unattainable.

Cooking skills

Related to this, many commentators suggest that the present generation of mothers are unable to prepare and cook. This is often blamed on the demise of Home Economics as a subject in schools when these mothers were themselves at school. However, we have not been able to identify evidence for this either way.

⁶⁵ ONS (2002) Women in the labour market: results from the spring 2001 Labour Force Survey

⁶⁶ Sweeting, H., West, P. (2005) Dietary habits and children's family lives, Journal of Human Nutrition & Dietetics; 2005; vol 18: 93-98

Do not enjoy cooking?

Parents' and children's attitudes to cooking were covered briefly in NOP's quantitative survey for Ofcom.⁶⁷ Replies showed a minority of around one in five parents (20%) to be enthusiastic about cooking. One in six parents (16%) actually disliked cooking.

Availability of convenience foods

The food and grocery market is responding to the needs of such parents and their children by developing a range of chilled, frozen and ambient pre-prepared meals specifically for children who eat alone, which can be got ready without affecting the meal patterns of the rest of the household.⁶⁸

The food industry is also meeting the trend towards children eating separately from their parents. Children-only meals also increase the demand for pre-packaged, convenience foods in another way. If children eat separately, mothers may face the inconvenience of cooking twice.

Location of outlets

A common argument for the increase in consumption of convenience foods by lower socio-economic groups and those in inner city areas is that there are considerable barriers for them to reaching outlets such as large supermarkets that sell healthy foods. During the 1990s, supermarket store size increased and significant numbers of stores were relocated or set up at out-of-town locations. It is suggested that poorer groups are less likely to own a car, and therefore need to use public transport or walk in order to reach supermarkets. They are therefore more likely to shop for their food in local convenience stores. These are more likely to stock convenience foods.⁶⁹ However, no clear evidence for this has been identified. In a socio-economic study of the spatial distribution of retail outlets in Newcastle upon Tyne, White and Raybould⁷⁰ actually found that proximity to supermarkets did not have a significant effect on food choice. Section 4.7 discusses socio-economic factors in more detail.

Children's influence on diet

This is a recurring theme, and is discussed in section 4.4

4.3.2 Continued low consumption of fruit and vegetables

⁶⁷ Ofcom (2004) op. cit.

⁶⁸ Groves, A. (2002) Children's Food: Market Forces and Industry Responses, p120. IGD Business Publication, cited in British Nutrition Foundation (1999) op. cit.

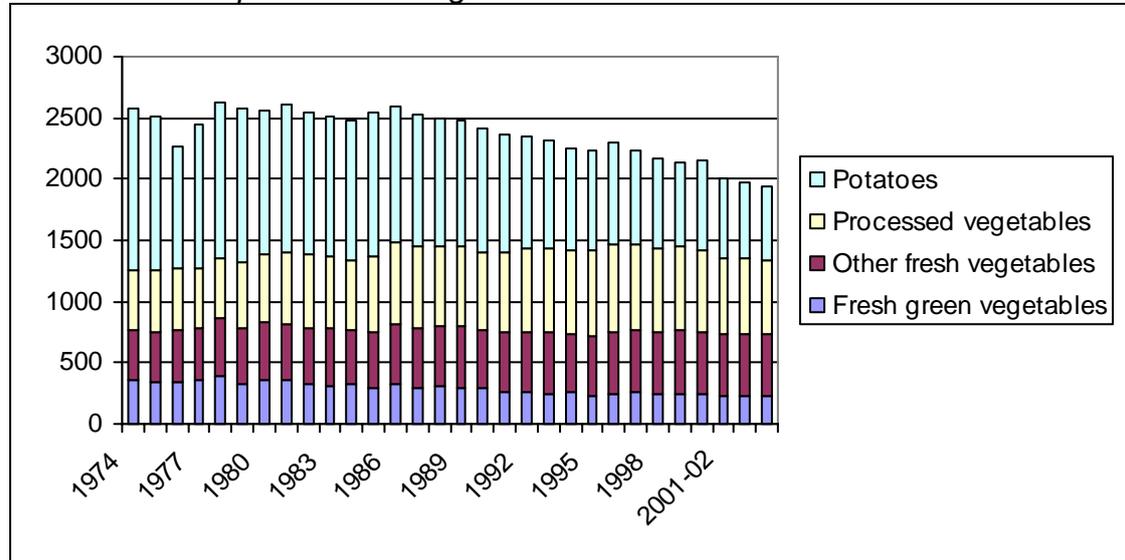
⁶⁹ National Consumer Council (2005) Healthy competition, how supermarkets can affect your chances of a healthy diet

⁷⁰ White M. and Raybould S. (1996) Who eats a healthy diet? Spatial and socioeconomic patterning of dietary behaviour in Newcastle upon Tyne, Nutrition Abstracts and Reviews (Series A: Human & Experimental) 1997, 67 (8), 827-836; cited in British Nutrition Foundation (1999) op. cit..

Levels of consumption of fruit and vegetables over time

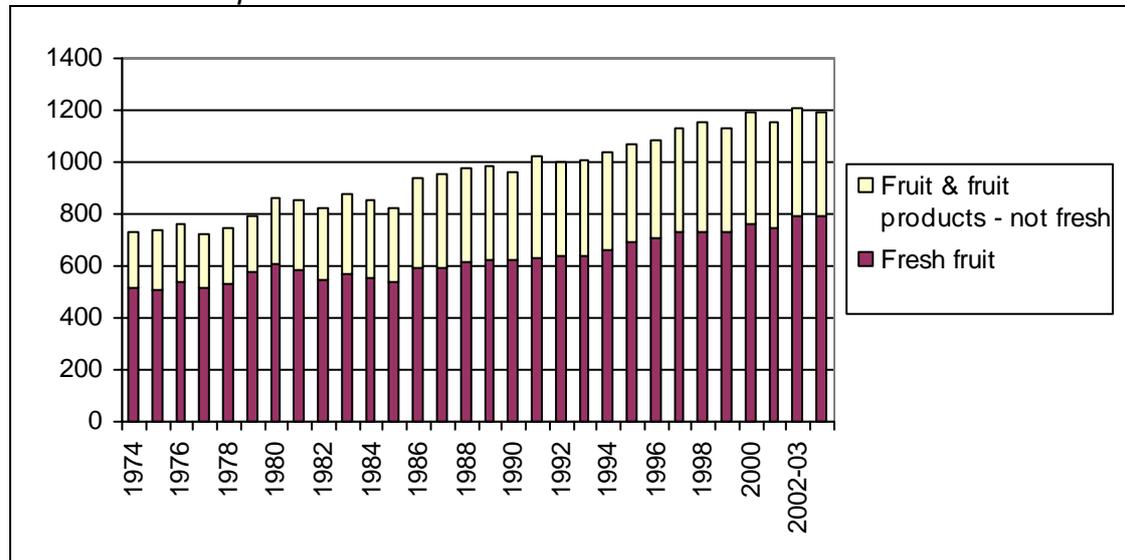
Looking at households as a whole over time, the consumption of fresh fruit in the home has risen for much of the last twenty five years. However, the consumption of fresh green vegetables was 27% lower in 2000 than in 1975.⁷¹

UK households purchase of vegetables



Source: DEFRA (2005) Family Food in 2003/4

UK households purchase of fruit



Source: DEFRA (2005) Family Food in 2003/4

WHO recommends at least five 80g portions of fruit and vegetables a day. The Health Survey of England shows that both adults and children eat well below the recommended amount of fresh fruit and vegetables. In England,

⁷¹ Data from National Food Survey (NFS) annual surveys. Cited in the Government's Food and Health Action Plan: Food and Health Problem Analysis for Comment. 31st July 2003.

adults are eating around 3 portions of fruit and vegetable per day. For boys and girls aged 5 to 9, the average is 2.5 and 2.6 portions respectively.⁷² This splits out as follows:

Average number of portions of fruit and vegetables eaten by children in England

	5-6	7-9	10-12
<i>Boys</i>			
Fruit and vegetable	2.6	2.4	2.5
All vegetables (excl. pulses)	0.5	0.4	0.6
All fruit (excl fruit juice)	1.4	1.2	1.2
<i>Girls</i>			
Fruit and vegetable	2.6	2.6	2.9
All vegetables (excl. pulses)	0.6	0.5	0.7
All fruit (excl. fruit juice)	1.4	1.4	1.4

Source: Deveril, C. (2002) Fruit and vegetable consumption. In Health Survey for England 2002 report, The Health of Children and Young People. Chapter 3.

This is important because fruit and vegetables are far less energy-dense than a similar weight in other food, and fill up the stomach, creating satiation.

Consumption of fruit and vegetables does vary by socio-economic group. If we use the index of multiple deprivation as a measure, the proportion of boys aged 5 to 15 who had consumed no fruit and vegetables ranged from 8% in the 2nd quintile to 16% in the top (or least deprived) quintile. Amongst girls, the proportions who had consumed no fruit and vegetables ranged from 6% in the top quintile to 13% in the 4th quintile.

Fruit and vegetable consumption by areas deprivation and sex, children aged 5-15

Portions of fruit and vegetables	Top quintile (least deprived)	2 nd quintile	3 rd quintile	4 th quintile	Bottom quintile, (most deprived)
None	16%	8%	13%	13%	12%
5 portions or more	17%	16%	16%	13%	11%

Source: Deveril, C. (2002) Fruit and vegetable consumption. In Health Survey for England 2002 report, The Health of Children and Young People, Chapter 3.

Analysis of the Health Survey for England by Wardle⁷³ shows that there were no significant differences in levels of obesity between children who consumed either one or less portions of fruit and vegetables (15.2%), children who consumed more than one but less than five portions of fruit and vegetables (15.8%), and the minority of children who had consumed five or more portions a day (18.4%). However, as parents of obese children are more likely to be either overweight or obese themselves, it may be that “calorie rich” food

⁷² Deveril, C. (2002) Fruit and vegetable consumption. In Health Survey for England 2002 report, The Health of Children and Young People, Chapter 3.

⁷³ Wardle, H. et al. (2005) Obesity among children under 11, National Statistics

consumption is under-reported and consumption of food such as fruit and vegetables is over-reported.

Furthermore, the analysis in section 4.2 clearly showed that obese and overweight children eat less fruit and vegetable portions than their ideal weight counterparts.

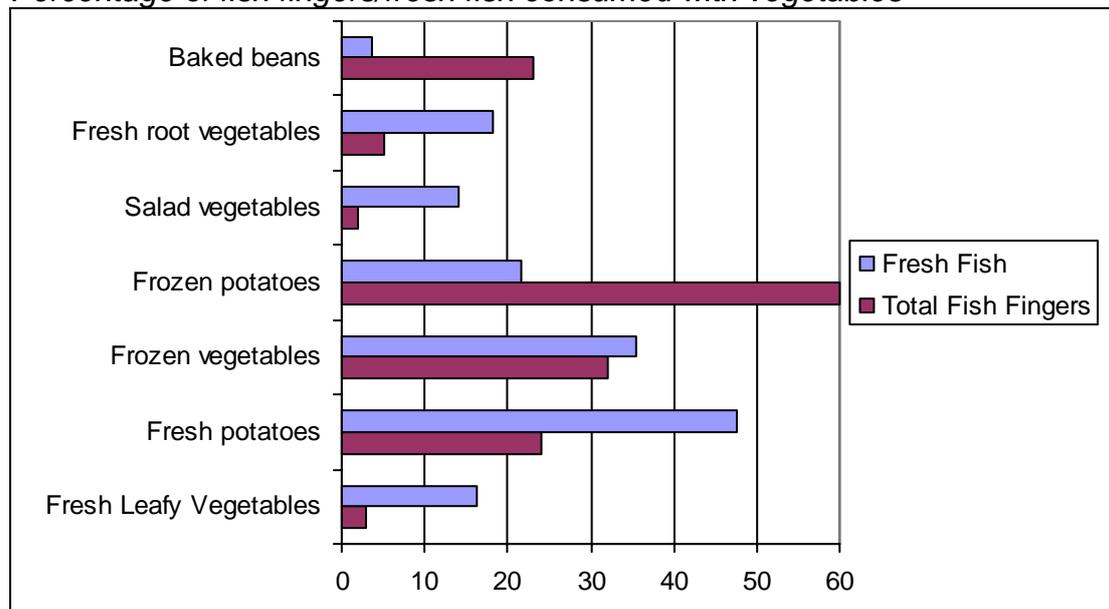
Why is consumption of fruit and vegetables low?

Consumption of fruit and vegetables is not low simply because consumption of convenience foods is high. There are distinct reasons why consumption of fruit and vegetables is so low.

Convenience foods and snacks are not associated with fruit and vegetables

Analysis of the TNS Family Food Panel data suggests that fresh vegetables are much less likely to form part of a meal where the main component of a meal is convenience food. For example, fresh potatoes, fresh leafy vegetables, salad and fresh root vegetables are all much more likely to be eaten with fresh fish, as opposed to fish fingers. Fish fingers on the other hand are most often served with frozen potatoes.

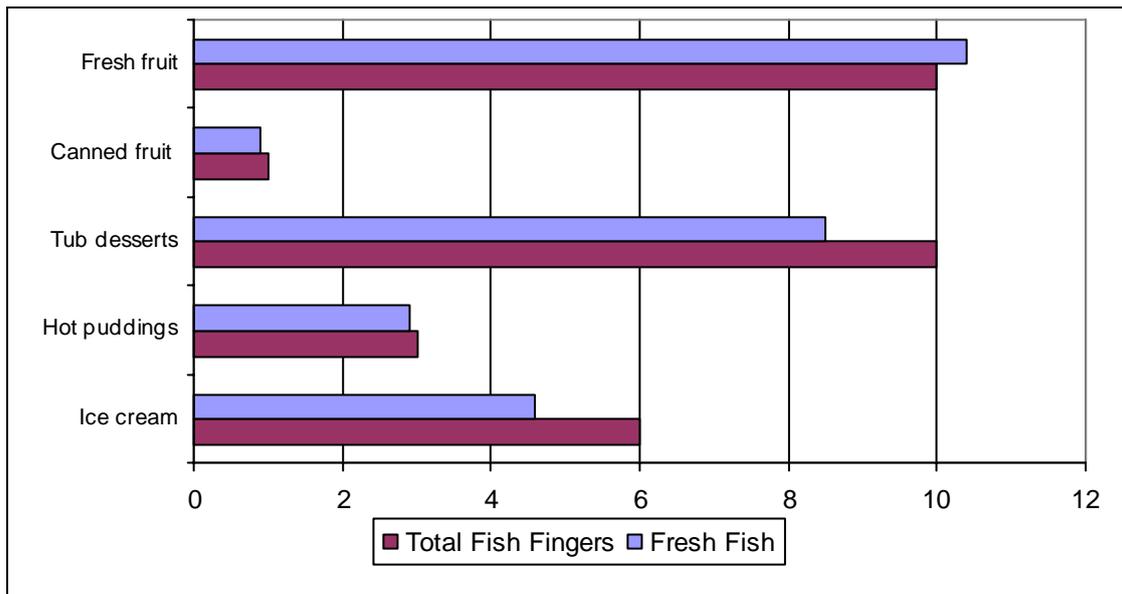
Percentage of fish fingers/fresh fish consumed with vegetables



Source: TNS, Family Food Panel (2003), for Ofcom

Children are also less likely to eat fruit if the main component of their meal is convenience food. The chart below shows that if children eat fish fingers, as opposed to fresh fish, they are more likely to have ice cream and tub desserts as a pudding and less likely to have fresh fruit.

Percentage of category consumed with fruit



Source: TNS, Family Food Panel (2003), for Ofcom

A similar pattern is observed for drinks. Confectionery, salty snacks and savoury sandwiches are much more likely to be linked to the consumption of carbonates rather than to the healthier options of milk or pure fruit juice.

Time

Just as time pressure is cited as a reason for buying convenience foods, it is also cited as a reason for not buying and eating larger amounts of fruit and vegetables. In a Gallup survey in 2001, 20% of adults said that this was a reason why they did not eat more fruit and vegetables.⁷⁴ Likewise in an intervention study by Anderson et al in 1998, time was identified as a barrier to consumption of vegetables.⁷⁵

Health is not an important reason for people deciding which foods to eat

A segmentation analysis by Mintel found that 33% of parents take little or no interest in their child's diet, and 17% of parents give their child what they want when it comes to food, whether it is healthy or not.⁷⁶

A review of evidence on fruit and vegetable consumption in 2001 by Stockley found that the main motivator for fruit and vegetable consumption was to prevent disease or to promote health.

“The worrying aspect of this is that in the literature on food choice, health is not an important reason for people deciding which foods to eat. There is thus somewhat of a conundrum. The main reason for

⁷⁴ Gallup (2001) Survey to support British Dietetic Association's Food First 'Give me Five' campaign.

⁷⁵ Anderson, A. S., Cox, D. N. et al. (1998) Take Five, a nutrition education intervention to increase fruit and vegetable intakes: impact on attitudes towards dietary change. *BJN* 80: 133-140, cited in Stockley, L. (2001) op. cit

⁷⁶ Mintel (2005) Childhood obesity

people to increase fruit and vegetable consumption is for health, but health is not an important consideration for most people. The implication of this may be that the best way to motivate many people in the population is to work through the important influences on general food choice.”⁷⁷

Indeed, data from the NOP survey and TNS Food Panel for Ofcom⁷⁸ show that parents of obese children attach less importance to eating fresh fruit and vegetables than parents of normal weight children. They attach more importance than the other group of parents to avoiding eating processed foods.

Mean importance scores for eating types of food: 5 represents very important and 1 represents very unimportant.

Food type	Parents of obese children	Parents of ideal weight children
Fresh fruit and vegetable	4.35	4.52
Processed food	3.73	3.50

Source: NOP (2003), for Ofcom

*A lack of understanding of how much is enough?*⁷⁹

In the general population there is a high level of awareness that fruit and vegetables are good for health. Rainford and Mason in 2000⁸⁰ found that 62% of men and 74% of women identified eating “lots of fruit, veg or salad” as important components of a healthy diet. The high level of awareness is supported by the findings of a study that looked at consumers’ interpretations of a “healthy” and “unhealthy” diet.⁸¹ The main attributes of a healthy diet were seen, in order of importance, as: eating “healthy” foods, avoiding “unhealthy” foods, foods containing fibre, natural foods, foods containing vitamins, a balanced diet, and fresh foods. When asked what specific foods were healthy, the most commonly mentioned were vegetables, followed by fruit.

Nevertheless, there is confusion about portion sizes. A survey of over 1,000 adults by Gallup found that about 60 % correctly identified 2 tbsp of frozen vegetables, and 1tbsp of dried apricot, as a portion.⁸² Similarly, in a survey commissioned by the Food Standards Agency in 2001⁸³, 71 % of respondents

⁷⁷ Stockley, L. (2001), Influences on fruit and vegetable consumption: a review of qualitative and descriptive research, DH

⁷⁸ Ofcom (2004) op. cit.

⁷⁹ Stockley, L. (2001), Influences on fruit and vegetable consumption: a review of qualitative and descriptive research, DH

⁸⁰ Rainford, L., V., Mason et al (2000) Health in England 1998, investigating the links between social inequalities and health, HEA

⁸¹ Povey, R., M. Conner, et al. (1998) Interpretations of healthy and unhealthy eating and implications for dietary change, Health Education Research 13(2): 171-83.

⁸² Gallup (2001) Survey to support British Dietetic Association's Food First 'Give me Five' campaign

⁸³ Food Standards Agency (2001). Consumer attitudes to Food Standards. Food Standards Agency

correctly identified one apple as a portion, but only 33% recognised two plums as a portion.

This poor understanding of portion size has considerable consequences. A pan-European review of barriers to healthy eating habits showed that for the UK, between a half and two thirds of respondents believed that they were already eating enough fruit and vegetables.⁸⁴

The 5 A Day programme has increased awareness of how many portions should be eaten a day, but overall levels are still low.⁸⁵ By 2004, only 49% of the population correctly identified that the recommended number of fruit and veg portions eaten each day is 5 (the data is not split by family type). Thirty per cent thought it was less, and 19% didn't know. Knowledge was highest amongst the AB social group, when compared with all others (68% and 45% respectively).

Qualitative research for the DH also found that consumers have an exaggerated view of what constitutes a portion size. They also were unaware that frozen, canned and dried fruit and vegetables would count. Consequently they see five portions as unattainable and unrealistic.

Location of supermarkets

In qualitative research, consumers frequently state that one of the barriers to buying more vegetables is the fact that they only do a "big shop" once a week and do not have a car. They can therefore only buy fresh food once a week. Fresh produce goes off quickly and also is very heavy. Fresh fruit and vegetables from convenience stores are seen as poor quality. Consequently, they under-purchase vegetables and fresh fruit.⁸⁶

As stated earlier, however, in a different study of the spatial distribution of retail outlets in Newcastle upon Tyne, White and Raybould⁸⁷ actually found that proximity to supermarkets did not have a significant effect on food choice. This suggests that location of supermarket is one barrier, but not the decisive one for purchasing fruit and vegetables for low income groups in inner cities. The influence of income as opposed to location is discussed in greater detail in section 4.7.

Children dislike the taste of vegetables

⁸⁴ Kearney, J. M. and S. McElhone (1999). "Perceived barriers in trying to eat healthier - results of a pan-EU consumer attitudinal survey." *British Journal of Nutrition* 81(Supplement 2): S133-S137; cited in Stockley (2001) op. cit.

⁸⁵ COI Research (2005) Five a day awareness and understanding tracking research, wave 3

⁸⁶ Anderson, A. S., Cox, D.N. et al. (1998) Take Five, a nutrition education intervention to increase fruit and vegetable intakes: impact on attitudes towards dietary change. *BJN* 80: 133-140, cited in Stockley, L. (2001) op. cit.

⁸⁷ White M. and Raybould S.(1996) Who eats a healthy diet? Spatial and socioeconomic patterning of dietary behaviour in Newcastle upon Tyne, *Nutrition Abstracts and Reviews* (Series A: Human & Experimental) 1997, 67 (8), 827-836; cited in British Nutrition Foundation (1999) op. cit.

The influence of children on family food choices is discussed in more depth in section 4.4. However, with respect to vegetables alone, Stockley found that

- children were described as resistant to eating vegetables, and mothers saw this as normal
- mothers do not want to throw food away that children refuse, nor do they want too much tension at meal times, so they give into rejection of vegetables
- children want to fit in once they go to school by eating food that is “cool”, tastes good and is not too messy
- children dislike plain boiled vegetables, but prefer vegetables in a sauce⁸⁸

Perception that healthy food is expensive

The common perception of healthy food as expensive is also a barrier to healthier eating. Convenience foods are heavily price-promoted and there are large numbers of special offers on these sorts of food in supermarkets. Furthermore healthy convenience foods are often premium priced and it is only the more affluent who can afford them. “Fatalist” mothers, with their perception of a carbohydrate-free “ideal diet”, think that children will need a larger quantity of “healthy” foods to feel satisfied, with a consequent greater spend.

Cultural reasons

Stockley found that women also had to balance their awareness that fruit and vegetables were healthy with a number of other cultural values. In particular:

- Meat is a high status food
- Fish fingers and baked beans are seen as “children’s food”
- Fruit and vegetables are not seen as high status, and are also not seen as “children’s food”

Has CAP made unhealthy food more attractive?

By a mixture of minimum import prices, quotas and export subsidies, the Common Agricultural Policy has sustained prices of most food products above the world market price, and does so in an uneven way. However, this unevenness has actually created incentives for a better, not worse, diet. The table below shows that CAP puts healthy foods such as fruit and vegetables 10% above world prices, whereas sugar is 72% above world prices, and meats high in fat such as lamb are more than twice as high as world food prices.

⁸⁸ Stead, M. and Goodlad, N. (1996) Promoting Consumption of Vegetables: a qualitative exploratory study of women’s knowledge, attitudes and practice, Centre for Social Marketing, University of Strathclyde, cited in Stockley (2001) op. cit.

Products	EU price as % of world market price (1968-1993)
Milk and dairy products	300
Lamb	222
Beef	177
Sugar	172
Pork	131
Poultry	128
Bread and cereal products	125
Most fruit and vegetables	110
Vegetable oils	105
Potatoes	100

Source: Ritson (1997) The Common Agricultural Policy, cited in British Nutrition Foundation (1990) op. cit

Although this data is now relatively old, reforms to CAP so far have maintained much of the relative imbalances.

4.3.3 Decline of the family meal

Why does this lead to high consumption of meals that are high in fat and sugar?

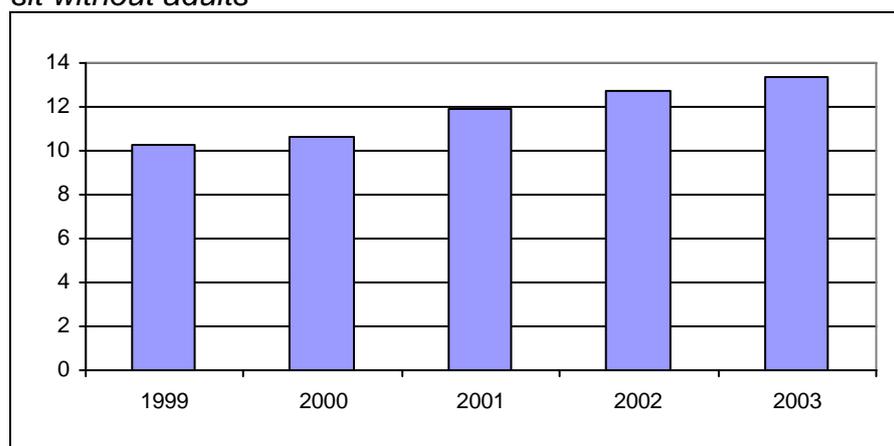
If children eat without adults, their own preferences are more likely to be considered and most children seem to have a taste for high in fat and sugar food (see section 4.4.1 for the drivers of this behaviour).

However, the only research that has been undertaken into the relationship between family eating and obesity (undertaken in Australia) suggests that a healthy attitude to family eating and diet from the mother was more important than the frequency of shared meals.⁸⁹

Has there been a decline of the family meal?

Trend data on family eating is rare. The TNS Food Panel shows that the trend from 1999 to 2003 is towards more “children-only” meals, particularly at teatimes.

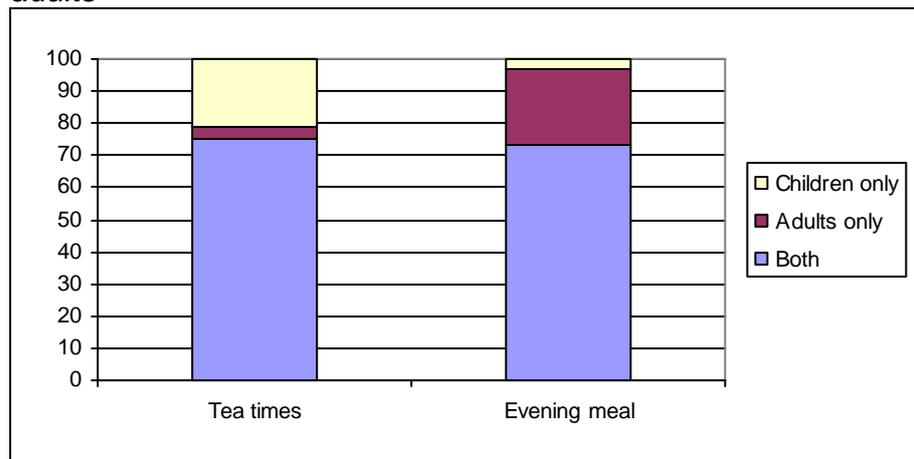
Percentage of occasions in homes with children aged 5-15 at which children sit without adults



Source: TNS, Family Food Panel (2003), for Ofcom

⁸⁹ Mamun, A.A. et al. (2005) Positive maternal attitude to the family eating together decreases the risk of adolescent overweight, *Obesity Research*, Aug;13 (8)

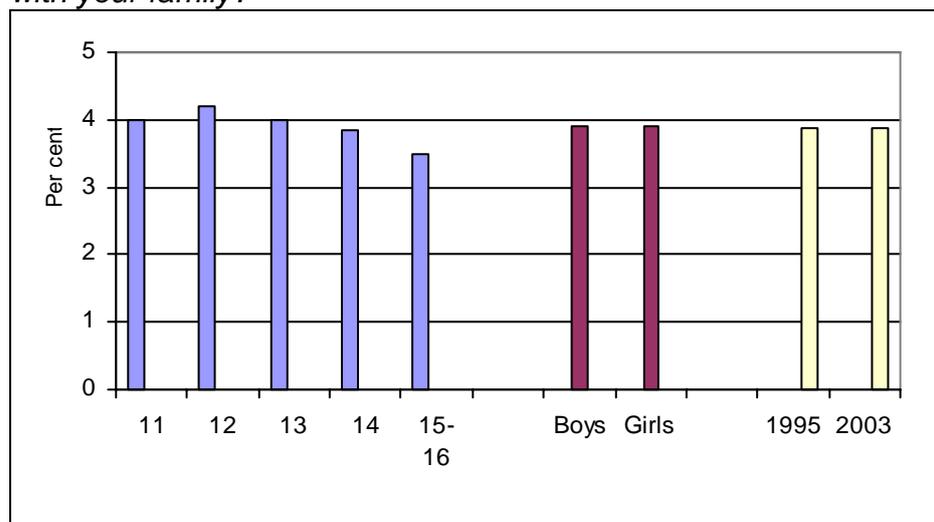
Percentage of occasions in homes with children at which children sit without adults



Source: TNS, Family Food Panel (2003), for Ofcom

In contrast, data from the British Household Panel shows little change in frequency of family eating amongst 11 to 17 year olds from 1995 to 2003 at a time when obesity rates were rising considerably.

"In the past 7 days how many times have you eaten an evening meal together with your family?"



Source: British Household Panel, cited in "Marketing to families", the Future Foundation

Other data merely shows a snap-shot of family eating at different times. However, because the samples are so different, it is difficult to compare change over time.

- In a survey conducted in the spring of 1997, Livingstone and Bovill⁹⁰ found that 75% of 6 to 17 year-olds claimed to eat a main meal with their parents "most days".
- In the NOP survey commissioned by Ofcom in 2004⁹¹, less than half (46%) of children aged 8 to 15 claimed that they ate with their family on

⁹⁰ Livingstone, S., Bovill, M. (1999) Young People and New Media, LSE, Report of Research Project Children Young People and the Changing Media environment

6/7 days in a week, although 76% agreed that the family “always sit down together for our Sunday lunch.”

The evidence is therefore that there has been a decline in family meals is not conclusive.

4.3.4 Food eaten outside of the home and take-aways

Are foods eaten outside of the home and take-aways high in fat and sugar?

Food eaten outside of the home and take-aways are particularly high in fat and sugar. Eating out for children, compared with eating at home, is dominated by the consumption of chips and burgers, and a reduced consumption of fruit and vegetables.⁹² The National Food Survey (2000) showed that almost 40% of calories from foods and drink eaten outside the home is from fat, compared with less than 37% from foods and drinks eaten inside the home.⁹³ The National Food Survey also recorded that food eaten outside the home contributes 11% of total energy intake and 12% of total fat intake.

Eating outside of the home and take-aways reduce parents control over what goes into food, making it more difficult to monitor the amount of fat and sugar that are being consumed.

Has children’s consumption of food eaten outside of the home increased?

Data on the growth of food eaten outside of the home is contradictory, and focuses on the market as a whole, as opposed to the market for families with children. The annual report of the Chief Medical Officer states that the number of restaurant meals increased by 14% from 1995 to 2000 to 675 million meals.⁹⁴ However, TNS tracking surveys suggests that over the last decade the market has been flat, with the possible exception of fast food restaurants.

The Nestlé Family Monitor⁹⁵ gives an idea of the scale of eating out in 2001 for families with children, though not of change over time. It reported that two thirds (65%) of households with children aged between 5 and 10 years ate at a fast food restaurant once a month or more. In the NOP survey for Ofcom⁹⁶, 87% of children aged 8 to 15 said they eat out with family or friends at a

⁹¹Ofcom (2004) op. cit.

⁹²Ofcom (2004) op. cit.

⁹³Quoted in Department of Health (2003) Food and Health Action Plan: Food and Health Problem, Analysis for comment. Chapter 2, www.dh.gov.uk/assetRoot/04/06/58/34/04065834.pdf

⁹⁴DH (2000) Chief Medical Officer’s Annual Report 2000

⁹⁵ MORI (2001), Eating and today’s lifestyle – Nestlé Family Monitor

⁹⁶ Ofcom (2004) op. cit.

restaurant of some kind at least as often as once a month. Around two in five (43%) said they ate at a restaurant once a week or more.

Frequency of eating out , children aged 8-15

Frequency	Go out to eat at a restaurant with family or friends
About once a week or more	42%
About once a fortnight	19%
About once a month	22%
Less than once a month	11%
Never	3%
Don't know	1%

Source: NOP (2003), for Ofcom

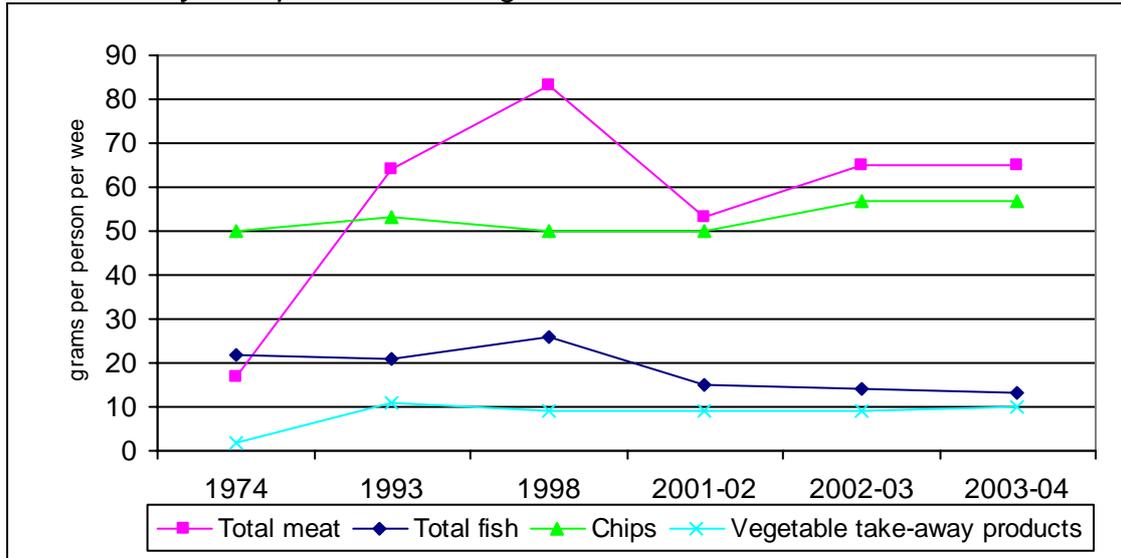
Take-aways

Take-aways are food eaten inside the home but ordered from outside. As with eating out, consumers are restricted to the items on the menu. Parents who use take-ways for themselves and their children to avoid cooking occasionally therefore have less control over the diet of their children.

Data from the National Food Survey and Expenditure and Food Surveys clearly shows that there has been a significant increase in consumption of take-aways since 1974, though this has fallen or flattened off since 2000. Consumption of take-aways has increased considerably over the past two decades. The composition of this has also shifted. The average person ate 17g of meat take-away in 1974, rising to 64g in 1993 and 65g in 2003/4. At the same time, consumption of take-away fish fell from 22g in 1974 to 13g in 2003/4, whilst consumption of take-away chips rose from 50g to 57g over the same period.⁹⁷

⁹⁷ DEFRA (2005), Family Food in 2005 (this graph excludes alcohol, confectionery, salty snacks, carbonates and eating outside of the home)

UK takeaway food purchases brought home



Source: DEFRA, Expenditure and Food Survey ("Family Food"), 2003/4

There is less data tracking consumption of take-aways by children. The NOP survey shows that half of children have a take-away once a week.

Frequency of eating out and eating take-aways, children aged 8-15

Frequency	Got a take away to eat at home
About once a week or more	52%
About once a fortnight	19%
About once a month	15%
Less than once a month	8%
Never	6%
Don't know	-

Source: NOP (2003), for Ofcom

Why is there a shift towards eating food outside of the home or take-aways for young children?

- Time, reward, relaxation: Eating out with children is often seen as benefiting both the child and its parents. For the child it is a treat and an adventure, while it gives the parents a break from the usual food preparation.⁹⁸
- Rising incomes: Eating out in on average costs more than preparing and eating food at home, so growth in personal disposable income is a key driver of eating out. Personal disposable income grew from £600bn to just under £800bn in 1998 prices by 2003.

⁹⁸ IGD Consumer Unit, 2000, cited in Ofcom (2004) op. cit.

4.3.5 Savoury snacks, confectionery and carbonated drinks

Section 4.1 showed that there were epidemiological studies correlating a high consumption of carbonated drinks to obesity. There was no epidemiological evidence that the grazing culture was correlated to obesity, based on studies of eating frequency – in fact, higher eating frequency is more likely to reduce weight. There was also no epidemiological evidence that eating snacks at a particular time of the day is correlated to obesity. Finally, there was no epidemiological evidence either way that a high consumption of snacks such as confectionery or crisps is correlated to obesity. However, snacks are energy-dense.

However, the analysis in section 4.2 showed that obese children eat slightly more snacks and carbonated drinks than non-obese children, eat them slightly more often, and are more likely to have a snack in the evening.

Comparison of “ideal weight” versus “obese” child – Key differences

Child's perceptions of:	Ideal weight	Obese
Mean number of snacks yesterday	2.02	2.96
Snacked on Big 6* item	85%	94%
Favourite snack is Big 6* item	79%	97%
Mean frequency of buying sweets, crisps, fizzy drinks on way to school	1.11	1.44

* Big 6 items are: confectionery, soft drinks, crisps/savoury snacks, fast food pre-sugared breakfast cereals, convenience foods

Source: NOP (2003), for Ofcom

However, soft drinks do constitute a significant proportion of non-milk extrinsic sugars for children aged 4 to 10. This was very slightly higher for children where the chief income earner was a manual worker.

Sources of NMES by age group

Source	4-6	7-10
NMES from soft drinks, of which	20.4%	22.3%
NMES from carbonated soft drinks	9.9%	12.3%
NMES from concentrated drinks	6.1%	6.2%
NMES from ready-to-drink soft drinks	4.4%	3.9%
NMES from chocolate confectionery	10.0%	11.3%
NMES from sugar confectionery	10.2%	10.4%
NMES from cakes & pastries	8.7%	8.0%
NMES from biscuits	8.4%	8.2%
NMES from breakfast cereals	8.5%	8.4%
NMES from table sugar and sweeteners	4.9%	5.6%
NMES from other foods	28.9%	25.8%

Source: Gibson, S (2003) Analysis of NDNS data for the Food and Health Action Plan, internal DH document

Sources of NMES by social class, children age 4-18

Source	Non-	Manual
--------	------	--------

	manual	
NMES from soft drinks, of which	23.8%	25.3%
NMES from carbonated soft drinks	14.9%	17.4%
NMES from chocolate confectionery	11.7%	11.6%
NMES from sugar confectionery	7.9%	8.9%

Source: Gibson, S (2003) Analysis of NDNS data for the Food and Health Action Plan, internal DH document

Has there been an increase in snacking?

There is a growing grazing/snacking culture amongst children, which favours the consumption of foods that are high in fat and sugar.

The Food Commission campaign to *Chuck Snacks off the Checkout!* contains an analysis from the National Diet and Nutrition Survey showing that between 1983 and 1997, children's average intake of sugary soft drinks increased from 1.4 litres to 2.4 litres a week. This represents an equivalent increase from about 28 teaspoons of sugar to 48 teaspoons of sugar a week, in soft drinks alone.⁹⁹ They claim that these figures are likely to significantly underestimate the real quantities of sugary drinks and savoury snacks consumed.

	1983	1997	Increase
Sugary drinks	1,442 ml/per week	2,361ml/per week	+919ml per week
Savoury snacks	99 g/per week	120 g/per week	+21 g per week
Confectionery	210g/per week	235 g/per week	+25 g per week

Source: Food Commission, *Chuck Snacks off the Checkout!*, based on National Diet and Nutrition Survey

What is the extent of snacking at the moment?

In 2000, the National Diet and Nutrition Survey reported that on average four out of five children aged 4 to 18 regularly ate snack foods such as crisps, biscuits and chocolate. About two thirds of young people ate sugar confectionery during the 7-day recording period and 84% boys and 80% of girls ate chocolate.

Around a half of parents in the NOP survey for Ofcom¹⁰⁰ said their child had two or more snacks "yesterday". Their children's account is largely in agreement.

How many times child had a snack yesterday

⁹⁹ Food Standards Agency (2000), National Diet & Nutrition Survey of four and a half to eighteen year olds.

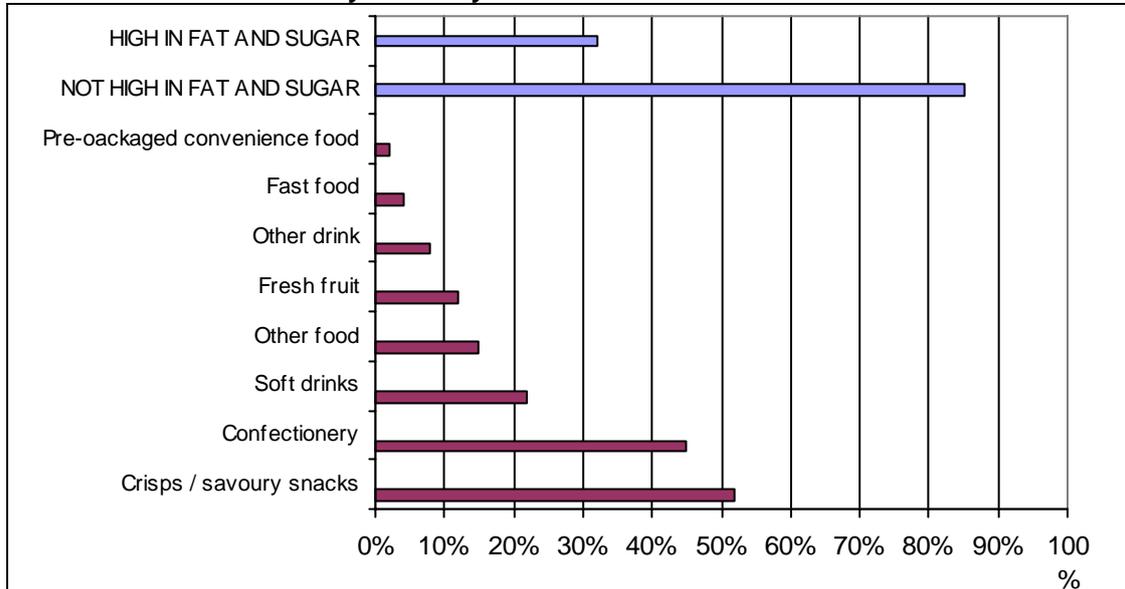
¹⁰⁰ The TNS Food Panel reports children as snacking around once a day on average. This even lower figure is likely to be attributable to the fact that parents on the panel provide this information.

	Parent		Child
	Child aged 2-7	Child aged 8-15	Aged 8-15
6+ times	3	3	4
4-5 times	7	9	5
2-3 times	41	34	40
About once	32	29	39
Don't know	4	14	6
Didn't snack	13	12	6

Source: NOP, 2003, for Ofcom

Crisps and confectionery are the most common snack foods. Overall, 85% of those 8 to 15 year olds who had snacked yesterday mentioned a “Big 6” product (soft drinks, crisps/savoury snacks, fast food pre-sugared breakfast cereals, convenience foods). Only 12% mentioned fruit.

Snack items consumed yesterday



Source: TNS, Family Food Panel (2003), for Ofcom

Who buys the snacks and from where?

Analysis of TGI data from BMRB for Mintel shows that for children aged 7 to 10, parents are the main purchasers of all types of snacks.

Purchase of snacks, by source, 2002 - percentage

	Crisps		Ice lollies		Chocolate		Ice cream bars		Sweets	
	Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child
7-8	95	6	91	7	84	15	66	5	81	19
9-10	94	9	86	17	80	25	71	12	69	35

Source: TGI Youth Survey, for Mintel (2003) Child Snacking Habits

This survey also shows that for 7 to 10 year olds, the most important place for eating snacks is actually in the home, rather than at school or on the move.

Most important place for eating snack products, by age, 2002 - percentage

	Chocolate			Sweets			Ice cream		
	Home	School	On the move /outside	Home	School	On the move/ outside	Home	School	On the move/ outside
7-8	85	18	17	85	10	20	58	2	22
9-10	84	24	22	83	14	27	64	3	28

Source: TGI Youth Survey, for Mintel (2003) Child Snacking Habits

This would imply that attempts to limit obesity in children up to the age of 11 by reducing snacking should focus on snacks bought by parents for their children's consumption in the home, rather than snacking at school or out of the home. In particular it suggests that a focus on how children spend their own pocket money is less worthwhile.

It is from the age of 11 onwards that the importance of home consumption drops, with that for sweets falling to a greater extent than chocolate. By the age of 15 to 16, only 24% of children eat most of their sweets at home.

Why are children given so many snacks inside the home?

Compensation parenting

One argument that is often made is that children are increasingly given snacks because parents feel guilty because they see so little of their parents. They may feel this guilt because:

- They are divorced and do not see their children so often.
- They work long hours, and do not see their children so often.

No publicly available data was identified making this link.

Why has pocket money grown?

The amount of money that parents give their children is governed by household income. From 1998 this has grown significantly. As discussed earlier, personal disposable income grew from £600bn to just under £800bn in 1998 prices by 2003.

In an atmosphere where personal disposable income is increasing, parents are more likely to be generous giving money to their children.

The rising number of single-parents may also mean that children are receiving dual sets of pocket money. In 1972 92% of children were living in couple families. This had fallen to 78% by 2003.

4.3.6 Are packed lunches and meals provided by schools contributing to a high intake of high in fat and sugar foods?

What proportion of children eat packed lunches?

According to the NOP survey for Ofcom, 37% of children aged 8 to 15 eat a packed lunch during school term time. A half eat a meal provided by the school, and small numbers eat outside the school or eat at home.

How important is consumption at school relative to other sources of energy

Neil Porter of the Local Authority Caterers' Association notes that school meals are only 15% of a child's annual food intake.¹⁰¹ However, as section 4 noted, the rise in obesity is caused by an excess of energy intake over expenditure, driven by consumption of energy-dense foods. Given the small excess required to generate obesity, demonising one particular venue where energy-dense foods is consumed is futile.

Quality of school lunch boxes

Research by the British Dietetic Association for the FSA in 2004¹⁰² into the quality of School Lunch Boxes in 2004 found that:

“Overall the packed lunches, are high in saturated fats, sugars and in particular sodium. Of concern is the low inclusion of fruit and vegetables into lunch boxes and high frequency of sugary and fatty foods in the form of sweetened soft drinks, cakes, biscuits, chocolate bars and crisps.”

In particular it found that:

- The most popular items in a lunchbox were a white bread sandwich (69% lunchboxes), accompanied by a packet of crisps (69% lunchboxes) and by at least one of the following: chocolate bar or biscuits (58%), cake (29%), yoghurt or a cheese snack (59%).
- 26% of lunchboxes met the food groups standard. If the requirement for provision of a dairy food were excluded then in total 41% of lunchboxes met the standard.
- Average energy content of lunchboxes was 682kcal, equivalent to 35% of Estimated Average Requirement (EAR).
- Fat content was slightly high at 29g, equivalent to 38% of average lunchbox energy.
- Saturates were high at 12g, equivalent to 16% of average lunchbox energy.

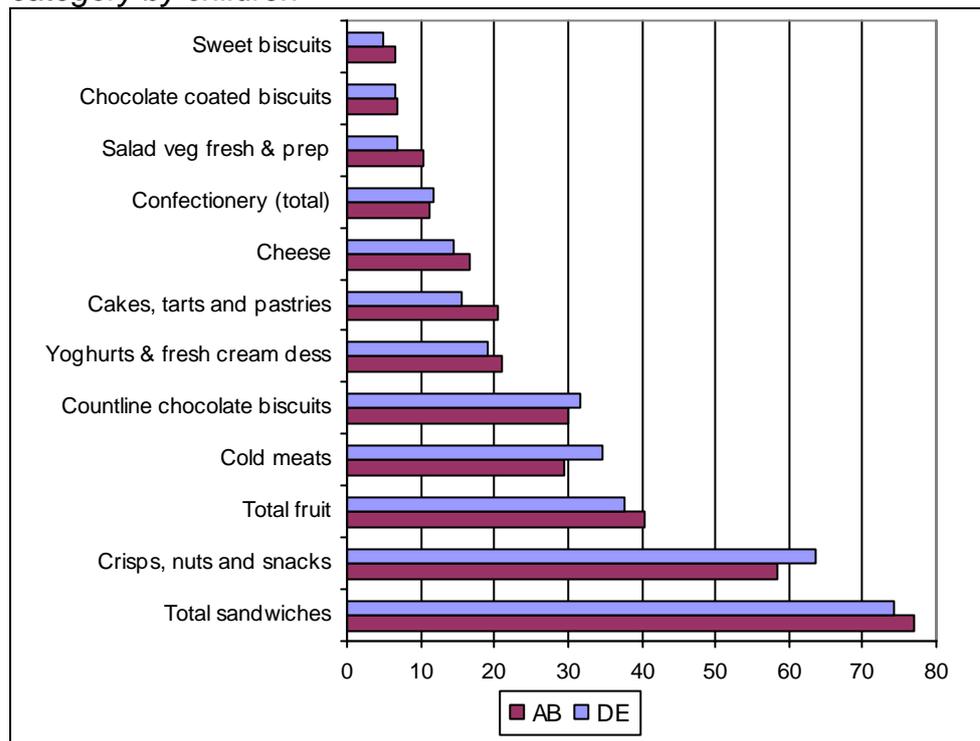
¹⁰¹ Quoted in the Economist (Dec 2004) Eat up your greens

¹⁰² British Dietetic Association (2004) School Lunch Box Survey, FSA

- Carbohydrate content was 91g, equivalent to 50% of average lunchbox energy.
- Average protein content was 18g, equivalent to 11% of Recommended Nutrient Intake (RNI).

The TNS Family Food Panel confirms these findings. Sandwiches are the most common lunchbox food, but crisps, nuts and other snack foods are to be found in three in every five lunchboxes. Middle-class children are slightly less likely to have crisps or chocolate biscuits and slightly more likely to have fruit.

Lunchboxes of children, by social class - Percentage of occasions featuring category by children



Source: TNS, Family Food Panel (2003), for Ofcom

Comparison of lunchboxes and meals provided by schools¹⁰³

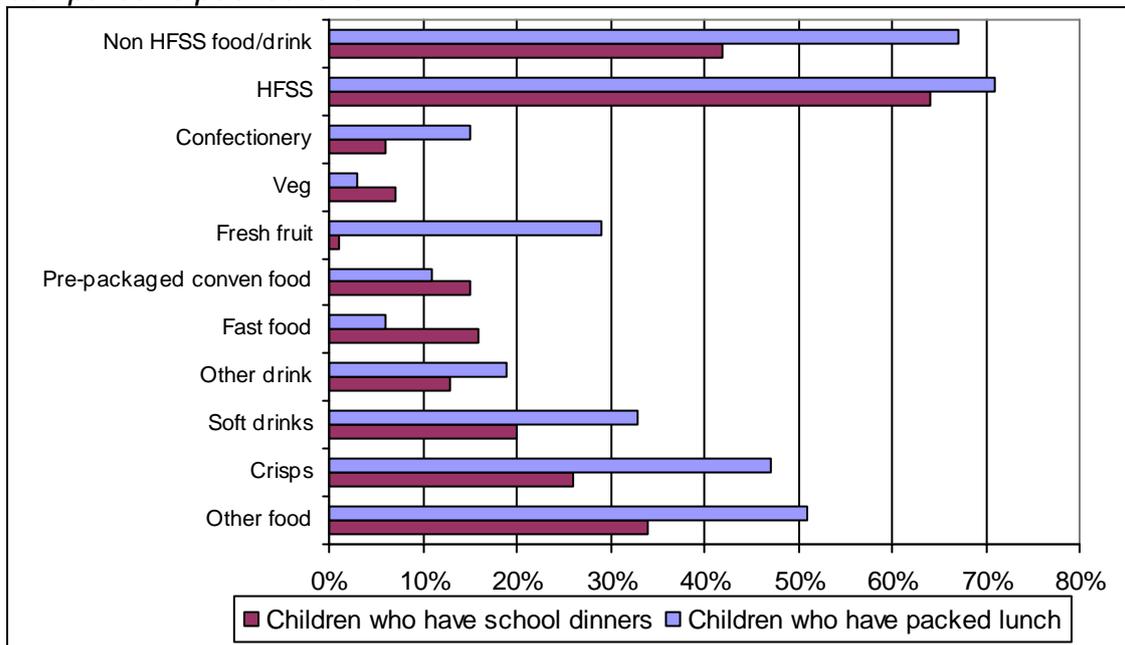
A survey by NOP for Ofcom compared the contents of lunchboxes with meals provided by schools.

Children aged 8 to 15 consumed more soft drinks, crisps or savoury snacks at lunchtime than those children who have school dinners. However, a substantial minority of school dinners also contained crisps, savoury snacks or soft drinks.

On the other hand, children eating packed lunches were much more likely to eat fruit at lunchtime. Fresh fruit appears in the lunch boxes of one in every three children (29%) with a packed lunch, while only 1% of children eating school dinner say they had fruit “yesterday”.

¹⁰³ Ofcom (2004) op. cit.

What children aged 8 to 15 eat at school at lunchtime – school dinners compared to packed lunch



Source: NOP (2003), for Ofcom

Why do so many parents opt to give their children packed lunches?

Some parents perceive meals provided by the school to be of poor quality. Ofcom’s research found that less than one in five (14%) considered the meals provided by schools to be unhealthy. Twelve per cent considered them to be “very healthy” and 36% considered them to be “fairly healthy.”

Children in particular are a strong influence on their parents to actually give them a packed lunch rather than have a school-provided meal. Research for Barnardo’s¹⁰⁴ shows that there are a number of reasons why children prefer packed lunches.

- The poor quality of school meals puts children off them. Children see school meals as “greasy”, “soggy” and “not cooked properly”, low quality, lacking in choice.
- In contrast, having a packed lunch has a higher status for children than having a school meal because it implies freedom and choice. Children can ensure that their own food preferences (crisps, chocolate) are put in their lunch box (the reasons for these preferences are given in section 4.4).
- There are strict unwritten rules among children about what you can and cannot eat while at schools in a packed lunch – a sandwich, crisps, chocolate bar or biscuit, and a drink. Aside from the sandwich, all of these are high in saturated fat and low in fibre. These

¹⁰⁴ Ludvigsen, A., Sharma, N. (2004) Burger boy and sporty girl, Barnardo’s

preferences are clearly a function of what they receive at home (which they often control) and wider social norms.

Why are lunchboxes so bad?

As discussed above, children have influence over the content of their packed lunch, and children prefer high in fat and sugar foods. Packed lunches for school are prepared in the morning rush, when mothers are particularly busy.¹⁰⁵

Why are school meals so bad?

A number of explanations are given for the consumption of high in fat and sugar food in school meals.

Low funding for ingredients

Up until recently, the low level of funding for ingredients in a school meal meant that it was easier for mass caterers to prepare meals with cheap ingredients that are mostly high in fat and sugar. School dinners in primary school cost between £1.20 and £1.30, of this:

- 55p is for labour costs
- 5p for equipment
- 15p for administration
- 8p profit

This left only 40p for ingredients.

Although nutritional standards were introduced in 2001, the funding still remained very low and still allowed caterers to offer high in fat and sugar foods.

Weak nutritional standards

In 2001, the government introduced nutritional standards for meals provided by schools. These guidelines required schools to have a balance of “food groups”. For example, the compulsory standards for primary schools state that lunches must contain at least one item from each of the following food groups:

- Starchy food (bread, pasta, potatoes etc) cooked in oil or fat should not be served more than 3 times a week
- Fruit and vegetables must be served everyday
 - Fruit-based desserts must be available twice a week
- Red meat must be served at least twice a week
- Fish must be served at least once a week
- Milk and dairy foods

¹⁰⁵ Ofcom (2004) op. cit.

However, these nutritional standards for school meals still allowed schools to offer high in fat and sugar meals, just as long as they offered healthy alternatives. As explained in section 4.4, many children have developed a preference for these foods and therefore choose them.

Catering to children's tastes

In fact, it has been suggested that most school provision appeared to be driven by what children wanted and could be seen as giving a seal of approval to eating high in fat and sugar products such as chips, burgers, hot dogs, sausages, pizza, cake and jelly.¹⁰⁶

Ofcom¹⁰⁷ suggests that contracted catering companies can be very resistant to moves towards healthier provision that may be less popular with pupils and affect the profits or financial viability of their operation.

Contracting out

During the late 1980s and early 90s, the Conservative government made it compulsory for local authorities to put school-meal contracts out to tender. At this time there were no national standards. It is argued that as a result, there was a "race to the bottom" as school meal providers tried to provide best value. Although nutritional standards were introduced in 2001, this still allowed contractors to offer high in fat and sugar foods, and the low budget for ingredients continued to encourage the "race to the bottom".

Vending machines

This is more of an issue in secondary than primary schools. The food and drink industry currently operates a voluntary ban on the supply of vending machines to primary schools.

The presence of vending machines in secondary school canteens mean it is easy for children to supplement their meal with confectionery and carbonated drinks. Many head teachers are reluctant to ban vending machines because they earn a considerable income for schools.

Will reforms to school meals reverse these problems?

Reforms to school meals must be implemented in all schools from September 2006 which should resolve many of the reasons for the consumption of high in fat and sugar foods in meals provided by schools. In particular:

¹⁰⁶ Ofcom (2004) op. cit
¹⁰⁷ Ofcom (2004) op. cit.

Funding

In March 2005, the government unveiled they were to spend £280million to improve the quality of school meals. This money will mean that schools will be able to spend 50p on ingredients per primary school pupil.

Tougher nutritional standards

From September 2006, the government will make tough minimum food-based standards mandatory, stipulating not less than two portions of fruit and vegetables per child per day; oily fish on a regular basis; and easy access to fresh drinking water. They will also effectively ban low quality foods high in fat, salt and sugar, and reformed or reconstituted foods made from “meat slurry.” This will mean that pupils will no longer be able to make unhealthy choices.

Banning high sugar snacks and drinks

The new nutritional standards will ban chocolate, crisps, and sugary fizzy drinks from vending machines.

Inspection of school meal quality

The new Ofsted inspection framework will expect schools to present evidence to Ofsted about their general approach to food and healthy eating as well as more specifically about the standard of school lunches. Ofsted will always comment on the school's success in promoting healthy eating and drinking and will report on any issues which arise out of the self assessment or as a result of their inspection report.

A switch to lunchboxes?

With new nutritional standards in place and more money to spend on ingredients there will be less of a ‘race to the bottom’.

However, the effect of these nutritional standards will be to restrict children’s choices. They may simply react by persuading their parents to give them a packed lunch. Given the current composition of packed lunches, this would lead to a deterioration in the diet of primary school children. A minority of schools ban unhealthy items from lunch boxes, but the government has not indicated that it intends to make this mandatory.

4.4 How do children influence their own diets?

It is argued that:

- Children prefer high in fat and sugar foods
- They have considerable control over what they are given
- They therefore ensure that they are given foods that are high in fat and sugars

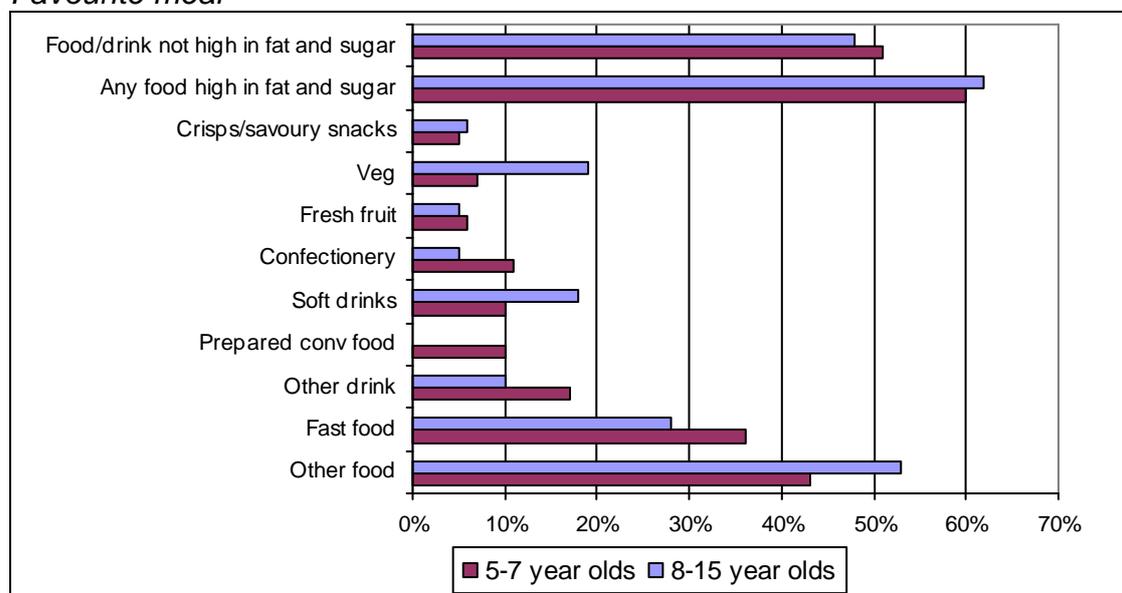
The evidence for each of these arguments is examined below, along with the factors driving each one.

4.4.1 Do children prefer high in fat and sugar foods?

In the NOP survey for Ofcom,¹⁰⁸ children aged 5 to 7 were asked to describe their favourite meal. Over a third named fast food (36%), while almost two thirds (60%) mentioned at least one high in fat and sugar item and 51% mentioned foods that are not high in fat and sugar.

The older children aged 8 to 15 were asked more specifically to tell the interviewer about the meal they had most enjoyed in the last week. Once again fast food was the single most commonly identified (by 28%) category of food, while almost half talked about at least one high in fat and sugar item.

Favourite meal



Source: NOP (2003), for Ofcom

Likewise, in the qualitative research for Ofcom, when children were asked to sort pictures of different foods into those they would “probably eat” and those

¹⁰⁸ Ofcom (2004) op. cit.

that “are good for you”, they were more likely to identify high in fat and sugar foods as those they were likely to eat.

4.4.2 Why do children prefer high in fat and sugar foods?

A number of reasons for this preference have been given. In particular:

- Parents
 - Parents can interfere with a child’s natural ability to regulate energy intake
 - Children tend to eat similar foods to their parents, and then develop a taste for these foods
 - Anxiety at fall in consumption leads to over-feeding on high in fat and sugar foods
- The low importance given to health by children
- Negative image of healthy food
- Evolutionary disposition

These are discussed in detail in the following section.

There is also a considerable debate on whether promotion directed at children causes children to demand high in fat and sugar foods. The role of promotion is discussed in section 4.6.

Parents

Parents can interfere with a child’s natural ability to regulate energy intake

Some researchers argue that children are actually good regulators of energy balance. Four to five year olds adjust their spontaneous intakes at a meal to the energy density of earlier food consumption.¹⁰⁹ Children also show considerable ability to associate the sensory characteristics of foods with the level of satiety experienced following ingestion.

However, cues from parents (“eat up your plate”) can lead to the loss or the weakening of these innate abilities in children. The effects of such parental orders are to focus on arbitrary cues (such as the size of the serving, threats, food rewards) as a guide to behaviour, rather than on internal signals of hunger. This is particularly strong in the case of girls who have mothers who diet. This control of eating behaviour makes internal biological signals irrelevant and can leave children progressively less capable of responding to them.¹¹⁰

¹⁰⁹ Birch L.L., Deysher, M. (1986) Caloric compensation and sensory specific satiety: Evidence for self regulation of children’s food preferences. *Child Development*, 51

¹¹⁰ Johnson, S.L., Birch, L.L. (1994) Parents’ and children’s adiposity and eating style. *Pediatrics*, 109

In fact, it is argued that a number of parental behaviours create positive emotional associations with high in fat and sugar foods and negative emotional association with vegetables.^{111, 112}

- Parents act anxiously when feeding children healthy food (e.g. vegetables), and excitedly when they eat unhealthy food (e.g. ice-cream).
- Parents bribe their children to eat healthy foods by promising unhealthy foods (e.g. "if you finish your vegetables you can have some ice cream").
- Unhealthy food is given as a reward. For example, fast food restaurants are often a venue for a birthday party for young children.

This means that children will usually end up disliking vegetables even more while at the same time becoming more enthusiastic for the foods that were offered as a bribe. This also begins to create emotional triggers that mean snacks and confectionery become comfort foods.

Children tend to eat similar foods to their parents, and then develop a taste for these foods

Children tend to eat similar foods to their parents, and then develop a “taste” for such foods. The numerous studies by Birch et al.¹¹³ show that as new foods are presented to growing children, a hierarchy of likes and dislikes is formed. Repeated exposure to foods with diverse appearance and diverse nutritional content shapes the development of taste for a variety of foods. The opposite is also true. A typical study of eating habits in Scotland showed that the snack eating habits of mothers and their 5 to 8 year old children were very similar. Johnson et al.¹¹⁴ suggest that repeated exposure to high fat foods is likely to encourage a “taste” for them.

Experts suggest that mothers influence the food preferences of their children as early as two years of age through their own food preferences. Foods that were disliked by mothers were not likely to be offered to children. The number of food liked at age four years was the strongest predictor of foods liked by age eight. Children were more likely to accept foods when they were introduced to them before the age of eight.¹¹⁵

¹¹¹ Tucker, G (2004), The importance of food and drink propaganda, Young Consumers

¹¹² Spencer J. (2004) Influences that shape children's food preferences, British Retail Consortium

¹¹³ Cited in chapter 4 of Burniat W. (ed) et al. (2002) Child and adolescent obesity, causes, consequences, prevention and management, CUP

¹¹⁴ Johnson, S.L., McPhee, I., & Birch, L.L. (1991), Conditioned preferences: young children prefer flavors associated with high dietary fat, *Physiology and Behaviour*, 50, p1245-1251, cited in Lvovich, S. (2003) Advertising and obesity: the research evidence, *Advertising & Marketing to children*, Jan-March 2003

¹¹⁵ Skinner, J.D., Carruth, B.R., Bounds, W., & Ziegler, P.J. (2002). Children's food preferences: A longitudinal analysis. *Journal of the American Dietetic Association* (2002) 102, pp 1638-1647; cited in Lvovich, S. (2003) Advertising and obesity: the research evidence, *Advertising & Marketing to children*, Jan-March 2003

Nevertheless, children's tastes can be changed. In one study parents gave 2-to-6 year olds a vegetable they didn't like for 14 days. The children were not made to eat this food, they were simply asked to taste it, handle or at least smell it. At the end of the study these children showed a significant increase in liking this food.¹¹⁶

Anxiety at fall in consumption leads to over-feeding on high in fat and sugar foods

At about 2, children are eating less as a proportion of their body weight than in infancy, so many parents – feeling that their child isn't eating enough – will give them whatever food they will eat, usually the fatty or sugary snacks a child will eat even if they are not very hungry.¹¹⁷

The low importance given to health by children

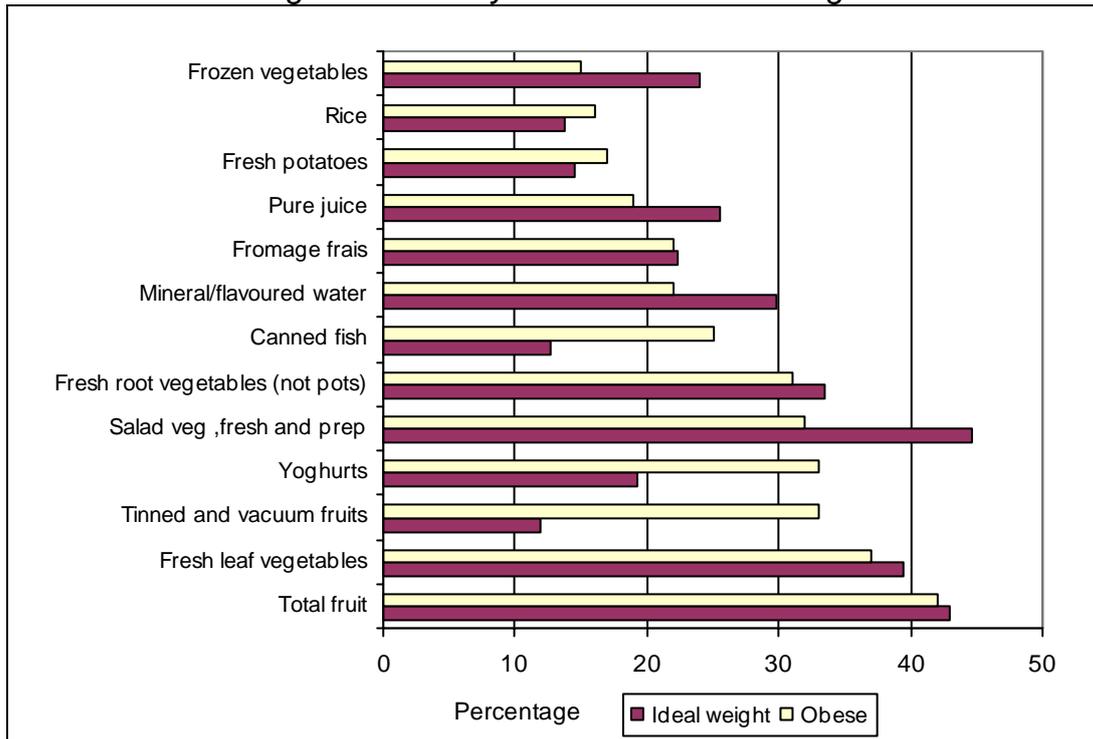
Except for the very youngest children, there is little data on children's understanding of what constitutes a healthy diet when they are under the age of eleven.

However, drawing on data from the TNS Family Food Panel, we can say that obese children are less likely to regard salad and vegetables as healthy and more likely to rate yoghurt, canned fish and canned fruit as healthy.

¹¹⁶ Spencer J., Influences that shape children's food preferences, British Retail Consortium

¹¹⁷ Ibid.

What do children regard as healthy – obese and ideal weight children



Source: TNS, Family Food Panel (2003), for Ofcom

Much comment is made of the demise of Home Economics and the lack of teaching about nutrition in schools as a cause of poor or incomplete knowledge and understanding by children of what constitutes a healthy diet.

However, learning about nutrition is a compulsory element of the National Curriculum in both Science and Design & Technology (Food technology) at primary school (though not for the latter in secondary school).

Nevertheless, health is low on the priority list for children. They consider that they are healthy anyway. Health considerations are difficult for young children to conceive of as they have cognitive difficulty in imagining themselves in the future. For slightly older children and teenagers, any negative effects from eating unhealthy foods is so far in the future as to be irrelevant. If they do not want to get fat, it is because they perceive it to be unattractive rather than because of the health consequences.¹¹⁸

Negative image of healthy food

What children eat clearly categorises them in each other's eyes in the same way that the clothes they wear. Research by Barnardo's¹¹⁹ shows that they have positive images of children who eat burgers, and negatives images of those who eat healthy food. Children want to belong to their peer group, and choosing to be different by eating "healthy" food is difficult for them. The

¹¹⁸ Ofcom (2004) op. cit.

¹¹⁹ Ludvigsen, A., Sharma, N. (2004) Burger boy and sporty girl, Barnardo's

researchers found that children's images of a child who eats healthy foods are negative – a posh girl who is sporty and a goody-goody. Their image of a child that eats unhealthy food has some negative associations (lazy) but also some positive ones (cheeky, funny, badly behaved at school, scruffy). All the factors above that drive children to prefer high in fat and sugar foods are therefore reinforced by children's need to fit in with other children by eating what they perceive as "normal".

Evolutionary disposition

Dr Colin Waine¹²⁰ of the National Obesity Forum offers a Darwinian explanation for the hypothesised link between high fat consumption and obesity. He suggests that people are pre-programmed to like energy-rich foods, which in the past conferred an evolutionary advantage. In the modern world this preference can lead to obesity.

“.. in many ways the present obesity epidemic can be thought of as an inevitable, biological response to an abnormal environment. For millions of years the ability of humans to store energy as fat was an evolutionary advantage, guaranteeing survival through famine. In the modern world of plentiful energy rich foods it has overnight (in evolutionary terms), become a hazard to health and well-being...”

Infants' early food preferences would seem to reinforce this.¹²¹ For example, infants make the same facial expressions in response to sweet, sour and bitter tastes as adults. They also have a natural preference for sweet tastes and will drink far larger quantities of sweetened water than unsweetened water. They breastfeed for longer periods if the mother has eaten foods which make her breast milk even sweeter than usual.

4.4.3 Do children have increasing control over what foods they are given?

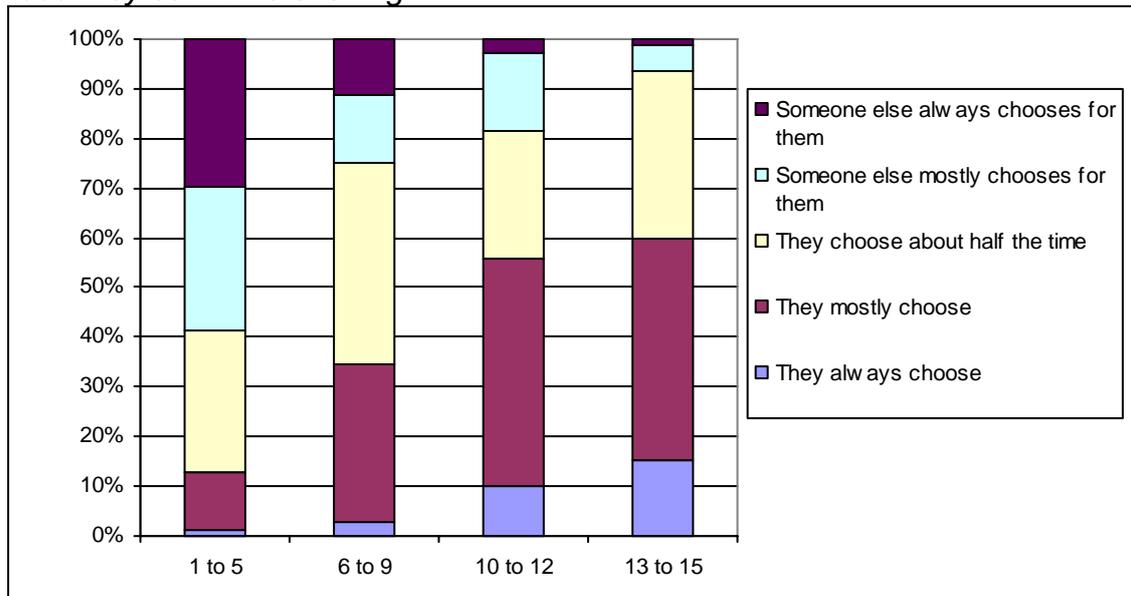
The argument here is that families are increasingly democratic. Parents' roles are tending more towards influencing and encouraging to eat healthier food, rather than dictating what they should eat using bans and rules. However, since children base their food choices on instant and immediate needs, such as taste, rather than on long-term concern over their future health, this has led to parents giving their children high in fat and sugar foods.

Evidence from the British Household Panel does indeed show around one third of parents whose eldest child is aged 6 to 9 say that their children mostly or always choose what they eat in the evening.

¹²⁰ Cited in Ofcom (2004) op. cit.

¹²¹ Spencer J. (2004) Influences that shape children's food preferences, British Retail Consortium

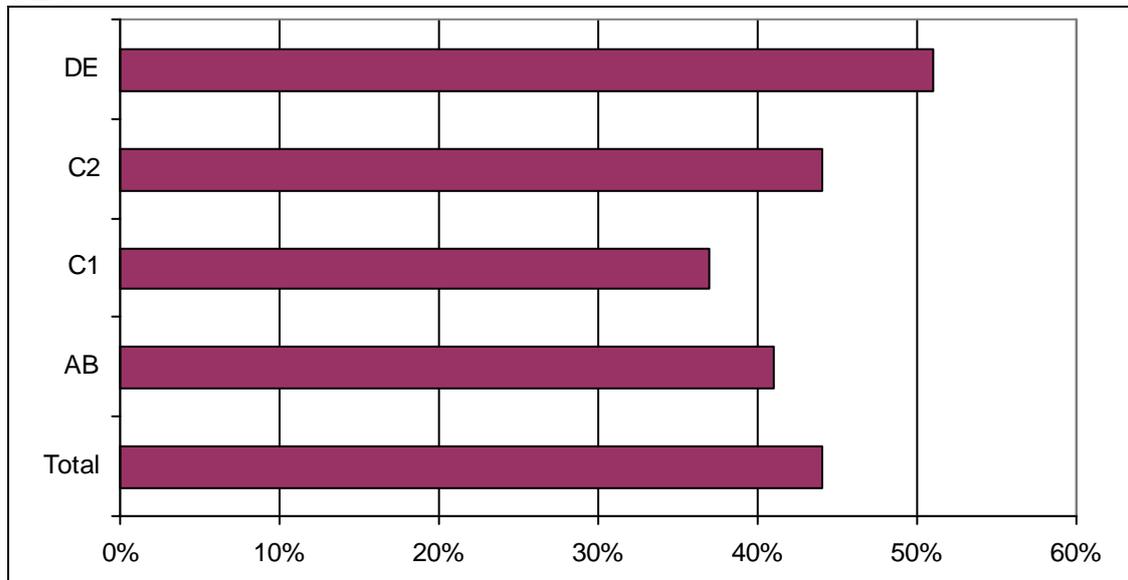
"Thinking about your eldest child how much say do they have in choosing the food they eat in the evening"



Source: British Household Panel, cited in "Changing Lives", Future Foundation

This pattern is confirmed in a number of surveys. The TNS Family Food Panel survey shows that a substantial minority (44%) of all parents agree with the statement: "I tend to buy what the children want." Parents from the lowest social grade group (DE) are the most open to persuasion. Likewise, the NOP survey for Ofcom found that 70% of parents stated that "child likes it" was an important or very important influence on food purchases.

"I buy what the children want"- Percentage of main shoppers agreeing, by SEG



Source: TNS, Family Food Panel (2003), for Ofcom

Likewise research for Barnardo's¹²² showed half of primary school children said there were no rules on what they were allowed to eat at home.

4.4.4 Why do children dictate what they are given?

Parent's fear that their children are not eating enough

Qualitative research with mothers by Ruth Foulds for Ofcom¹²³ found that mothers can show concerns about children not eating. This fear often underpins mothers' attitudes to feeding their children and can work as a very real barrier to healthier eating. Because of this type of anxiety, mothers provide their children with a diet of foods they enjoy, rather than giving them foods they are less keen on and may refuse to eat.

Fear of conflict during family meals and dislike of throwing out food

In a series of experimental studies carried out in the USA by Leann Birch, mothers often described young children as being 'faddy', refusing food, and behaving destructively at meal times.¹²⁴ Mothers are concerned for the health of their children, and would like them to eat more vegetables. They adopt a variety of strategies to try and encourage this. However, it is not such a high priority issue that mothers would be willing to add to tension at mealtimes, or throw too much uneaten food away.¹²⁵

Low levels of control, and the desire to please children

In fact, research for Ofcom and the DfES suggests that certain types of parents have much weaker discipline than others, and put a very greater weight on making their child happy by meeting their immediate needs. This is illustrated by the typologies of parents described in the next section.

¹²² Ludvigsen, A., Sharma, N. (2004) Burger boy and sporty girl, Barnardo's

¹²³ Ofcom (2004), op. cit.

¹²⁴ Stockley (2001) op. cit.

¹²⁵ Stead, M. and N. Goodlad (1996) Promoting Consumption of Vegetables: a qualitative exploratory study of women's knowledge, attitudes and practice, Centre for Social Marketing, University of Strathclyde, cited in Stockley (2001) op.cit.

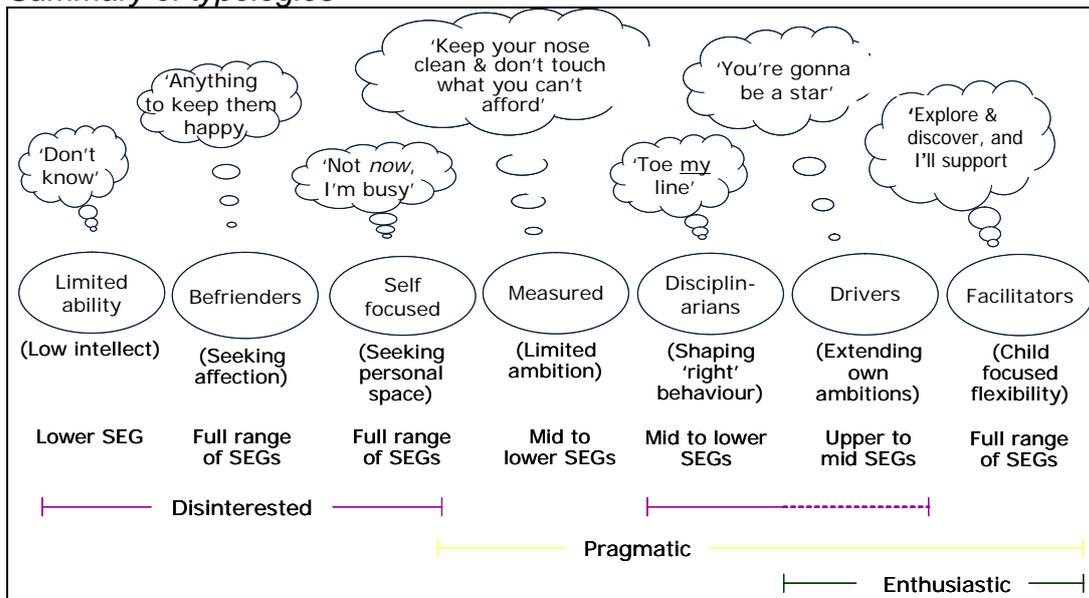
4.5 Typologies of parents

4.5.1 Typologies by general parenting style

Research commissioned by the DfES¹²⁶ shows that certain types of parents have much weaker discipline than others, and put a very great weight on making their child happy by meeting their immediate needs.

Although this study did not specifically use criteria such as diet or physical activity to characterise parents, the typologies did characterise parents according to the degree of control that they had over their children, as well as a number of broad criteria based on the relationship between parents and children. The typologies showed that there were a number of types of parents with a low level of control over their children either through indifference (“Limited ability”, “Self-focussed”) or a desire not to ever upset their children (“Befrienders”).

Summary of typologies



Source: *define solutions* (2003) Parents Information Needs, COI and DfES

- **Limited Ability:** These parents can offer basic care (hygiene, feeding) at competent levels, but lack ability in ensuring their children are disciplined, receive enough play and stimulation, and achieve independence and autonomy over time. They generally had poor educational backgrounds themselves, and have little ability to think beyond the immediate future.
- **Befrienders:** Creating a loving family with happy children is the priority for this group, but as a consequence they do not stand up to their own children's demands. They want their children to think of them as their friend. They tend to respond to their children, rather than creating the

¹²⁶ *define solutions* (2003) Parents Information Needs, COI and DfES

structure and environment that their children need. This group can be from both low and high SEGs.

- *Self-focussed*. This group are un-involved with their children and feel that their children should create their own play and stimulation. Discipline can be inconsistent, and often comes too late. They show little interest in their children's developmental milestones. This group can be from both low and high SEGs.
- *Measured*: For these parents, survival rather than growth is important. They provide good care and discipline to their children, and encourage outdoor play and sport, but do not encourage their children to extend their horizons. This group tend to come from mid to lower SEGs.
- *Disciplinarians*: As the title suggests, discipline and order are important to these parents, but this can also squash a child's propensity to take risks or experiment. They can be over-involved and invasive in their child's development. This group tend to come from mid to lower SEGs.
- *Drivers*: These parents overlay their own ambitions on their child. They value education, and encourage their children to be involved in extra-curricular activities (though only the ones that interest the parent). They like firm but fair discipline. The classic pushy-parent. They tend to come from middle and upper SEGs.
- *Facilitators*: These parents encourage their children to explore and discover, but do not push them into areas that they do not want to be involved in. They like firm but fair discipline. The classic pushy-parent. They tend to come from middle and upper SEGs.

4.5.2 Typologies according based on attitudes to food

Parents of obese children

The NOP survey for Ofcom does indeed show that parents of obese children generally have less control over their children, including at meal times. When parents were asked about mealtime rules, obese children are less likely to be required to:

- help cook and prepare food
- eat some vegetables
- have good table manners
- not fool around whilst eating
- help clear up
- not leave the table until everyone is finished

“Thinking about family mealtimes, which of the following do you try to enforce with your child” – percentage

	Normal weight	Obese
Help cook/prepare food	27%	15%
Good table manners	72%	58%
Eat some vegetables	60%	48%
Don't fool around whilst eating	60%	46%
Help clear up	61%	46%
Don't leave table until everyone's finished	58%	20%

Source: NOP (2003), for Ofcom

Self-believers and Fatalists

Ruth Foulds' qualitative research for Ofcom¹²⁷ identified two types of mother in respect of their attitudes to children's eating – “Fatalists” and “Self-believers.” In contrast to the typologies discussed above these typologies mostly focus on parents and mealtimes. However, parental control and parents' confidence in cooking is a key element within this.

The terms “Fatalists” and “Self-believers” are given because these mothers differ not only in their attitudes to children's food but also in their overall outlook on life. Ofcom describes this as follow:

- “Fatalists” appear to believe that what happens to them is determined by fate, luck or others. They lack confidence in their own judgement and expect others to make decisions for them. “Fatalist” mothers seem content to take a laissez faire approach to their children's diet and make little or no effort to encourage their children to make healthier food choices. Children are likely to be driving the food choices made for them and their diets are generally unhealthy. There is a high reliance on processed foods and other foods that are high in fat and sugar. Mothers in the research were more likely to be “Fatalists” than “Self-believers.” “Fatalists” tend to be less well educated and working class.
- “Self-believers” are characterised by confidence in their own judgement and in their ability to make decisions. “Self-believer” mothers are in control of what their children eat and keenly involved in choosing healthier options for their family. Mothers are in control of food choices and the children's diets are generally healthy with a good proportion of fresh foods and of home-cooked foods and fewer foods that are high in fat and sugar or nutrient-poor. Snacks are confined to certain times, rather than a continual grazing pattern. “Self-believers” tend to be better educated and middle-class. In fact, data from the TNS Family Food Panel confirm that middle-class parents in general are somewhat stricter and more self-confident when it comes to controlling their children's diet.

¹²⁷ Ofcom (2004) op. cit.

Assessment of health benefits

Both “Fatalist” and “Self-believer” mothers know that convenience foods are less healthy than home-cooked foods. They are both aware of the need for fresh vegetables, fruit and foods containing protein and calcium in their children’s diets. However they differ in their assessment of the related health benefits:

- “Fatalist” mothers think in terms of the outcomes of healthy eating outlined in the media - lessening the risk of obesity and better dental health. Their approach is essentially reactive - if their child is of normal weight and has no specific health problem then they make only token gestures towards establishing healthier eating patterns.
- “Self-believer” mothers are more proactive and aware of other long-term risks, such as heart disease, diabetes and cancer.

Food and cooking knowledge

- “Fatalist” mothers are also hampered by their lack of ability to conceptualise an attractive, affordable and varied healthy diet. In putting together their “ideal diet for a child,” “Fatalist” mothers are likely to feel they have to reject whole categories of foods: fats, dairy products, sugar and carbohydrates. Consequently their notion of the “ideal diet” is extremely austere and perceived to be unattainable.
- The “ideal diet” for “Self-believer” mothers is more inclusive and consequently more attainable. They do not exclude whole categories of food, but reject foods that are high in fat and sugar. They are also more likely to exclude processed foods and those with artificial additives.

Perception that healthy food is expensive

The common perception of healthy food as expensive was also a barrier to healthier eating. “Fatalist” mothers noted that convenience foods are heavily price-promoted and there are large numbers of special offers on these sorts of food in supermarkets, compared with the relatively fewer price promotions on raw foods or ingredients. Furthermore healthy convenience foods are often premium priced and it is only the more affluent who can afford them. “Fatalist” mothers, with their perception of a carbohydrate-free “ideal diet” think that children will need a larger quantity of “healthy” foods to feel satisfied, with a consequently greater spend.

Typologies of parents for vegetable consumption

Kilcast et al.¹²⁸ looked at high and low vegetable consumers in the context of family eating and found similar typologies to Foulds. High vegetable consumers had high levels of control over family members and their eating patterns. They planned meals in advance, were interested in food, and prepared to experiment.

Lower vegetable consumers were reactive to requests from children. Fruit and vegetables were bought routinely, with little experimentation. There was a feeling of a lack of control over family eating and an ability to only just cope with immediate needs. Family members tended to eat at different times, and there were strong feelings of guilt about the family diet.

Mintel typologies

Fould's typologies are very similar to those created by Mintel in their 2005 report on Childhood Obesity.¹²⁹ This research is based on quantitative research, and allows us to put proportions on each type. The typologies cover parents of children aged 16 and under.

- Relaxed parents (33%) – take little or no interest in their child's diet (27% of mothers, and 41% of fathers)
- Indulging parents (17%) - give their child what they want when it comes to food, whether it is healthy or not
- Worrying parents (21%) – are concerned about their children's weight as well as their sugar and fat intake
- Controlling parents (29%) – try to ensure their children eat a healthy diet

The research also found that three-quarters (75%) of parents with children under 16 claimed that they try to ensure their kids eat a healthy diet, but only just over half (54%) said that they try to actually educate their children about healthy eating. A similar proportion (51%) mention putting into place any specific course of action such as avoiding too much sugar, while just two in five (42%) avoid giving kids high fat foods.

¹²⁸ Kilcast, D., Cathro J. et al. (1996) Practical approaches to increasing vegetable consumption, *Nutrition and Food Science*, 5; cited in Stockley, L. (2001) Influences on fruit and vegetable consumption: A review of qualitative and descriptive research, DH

¹²⁹ Mintel (2005) Childhood obesity, in press

4.6 What is the role of food promotion in the rise of obesity?

4.6.1 Availability of high in fat and sugar foods

The “Fatalist” mother typology described in section 4.5 is highly reactive to the availability of food when deciding what food to offer her children. Her poor cooking skills, lack of time, and inability to conceive of a set of healthy menus leads her to buy whatever is on the shelves in the store. This has led many to blame the food industry for only making available foods that are high in fat and sugar for this kind of parent.

Nonetheless, the industry argues that they provide food products, not “diets”. Food manufactures and retailers can only keep abreast of competition if they satisfy consumer tastes, preferences and requirements. However, it has been argued that food manufacturers have actually fostered negative attitudes to food preparation in order to promote their own convenience foods.¹³⁰

4.6.2 The nature of food advertising

What is the scale of marketing to children?

The advertised diet contrasts sharply with that recommended by public health advisors, and themes of fun and fantasy or taste, rather than health and nutrition, are used to promote it to children. Meanwhile, the recommended diet gets little promotional support.¹³¹

Ennew et al.¹³² showed in 1995 that approximately 80% of the 100 largest advertising expenditures were made by food companies each with an advertising budget of over £1m in 1995 prices. A further study by the National Food Alliance showed that foods which are high in fat and sugar, which are recommended to comprise no more than 7% of an individual’s diet, were the most heavily advertised, accounting for 44-67% of all food advertisements.¹³³

Nielsen data shows that within the food sector, the largest sub-sectors in terms of advertising spend on television are “Prepared & Convenience Foods”

¹³⁰ British Nutrition Foundation (1999) Obesity, chapter 19, Blackwell Science

¹³¹ Hastings et al.(2003) Review of Research on the effects of food promotion to children, Prepared for the FSA

¹³² Ennew et al (1995) Overview of the UK food and drink industry, In Strak, J., Morgan, W.,, the UK Food and Drink Industry – a sector by sector analysis, in British Nutrition Foundation (1999) op. cit.

¹³³ Dibb, S., Castell, A. (1995) Hard to swallow, hard to stomach, the results of a survey of food advertising on television, National Food Alliance, cited in British Nutrition Foundation (1999) Obesity, Blackwell Science

(33%), “Confectionery” (28%) and “Dairy Products” (13%). These categories are amongst the most prominent in the diets of obese children.¹³⁴

Likewise, the virtually every relevant study in the Hastings review¹³⁵ into food promotion to children found that children’s food adverts were dominated by breakfast cereals, confectionary, savoury-snacks and soft-drinks. Adverts for fast-food outlets were also found to have “significantly” increased their share of children’s adverts in recent years. Over time, the Hastings review found that promotions for staples and fresh foods have reduced to be replaced by promotion for ‘pre-sugared’ breakfast cereals, soft-drinks, confectionary and savoury snacks and fast-food outlets.

What techniques are used?

The Hastings review found that the following techniques were used to promote these foods to children:

- The use of animation techniques in television food adverts was found to be particularly strongly associated with children’s food adverts in comparison to non-food adverts aimed at children and adult-oriented food adverts.
- Of the food products identified as most commonly advertised to children, breakfast cereals were uniquely identified as those most likely to use nutritional or health claims as a selling point.
- A commonplace creative strategy said to employ pester-power was the use of premiums or competition prizes offering collectibles (eg. toys) as well as the use of celebrity.

4.6.3 Do special offers promote over-consumption?

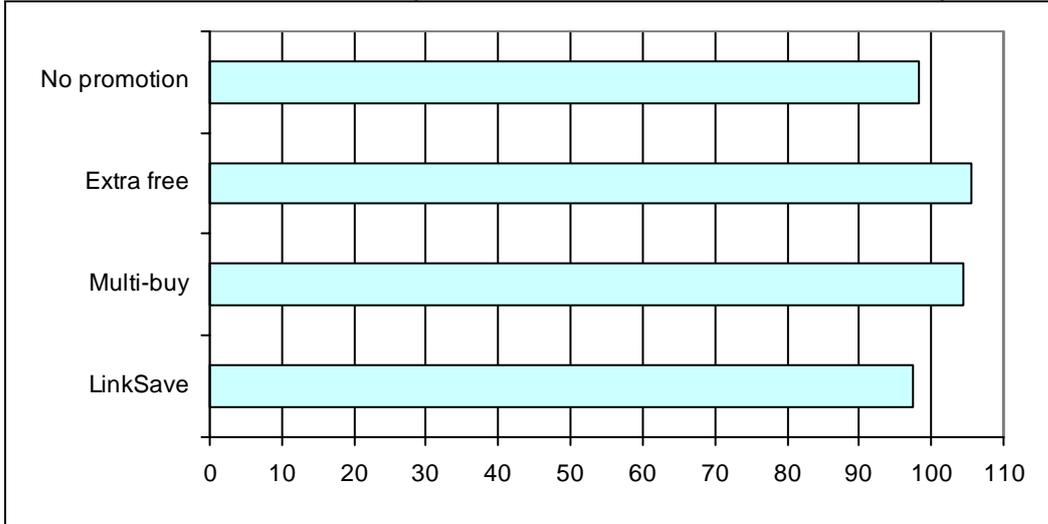
Although special offers such as “multi-buys” and “extra-free” offers provide greater value, it is argued that they encourage additional consumption.

The TNS panel shows that parents of obese children are more likely to be attracted to multi-buys and “extra-free” promotions than parents of obese children.

¹³⁴ Nielsen (2003) cited in Ofcom (2004) op.cit.

¹³⁵ Hastings et al.(2003) Review of Research on the effects of food promotion to children, Prepared for the FSA

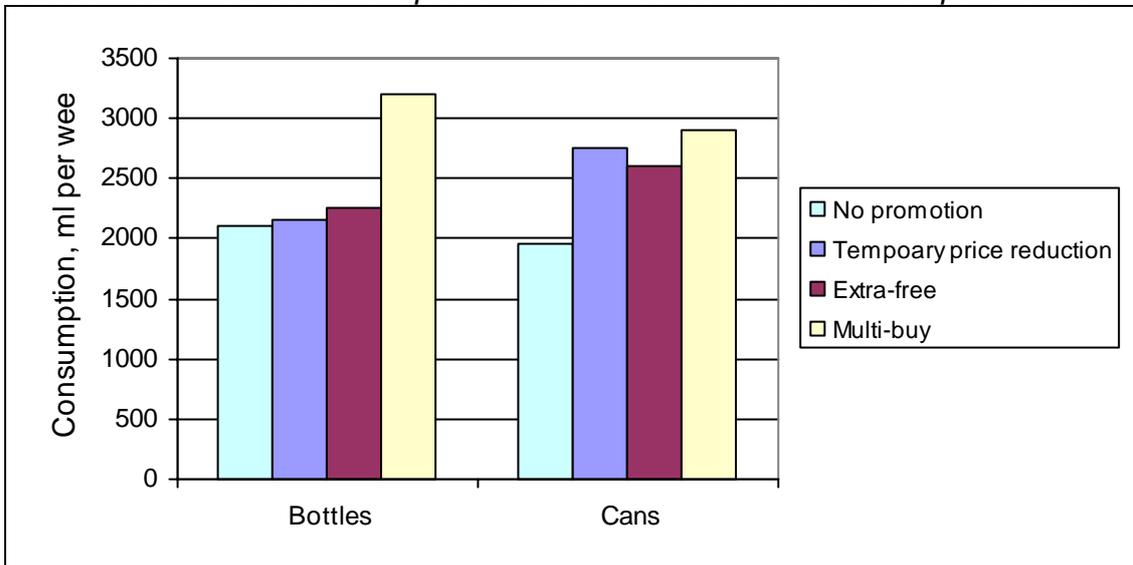
Obese index – attraction of special offers. Indexed on share of all purchases



Source: TNS, Family Food Panel (2003), for Ofcom

Similarly, in the NOP survey, parents of obese children are more likely to be attracted by price cuts than the parents of children of normal weight (57% compared with 45%). This may reflect that obesity prevalence is higher in low-income households. However multi-buys and extra free content offers also encourage extra consumption. Those who buy in larger quantities also use products up more quickly. This “multi-buy effect” can be clearly seen for carbonates.

Obese index – attraction of special offers. Indexed on share of all purchases



Source: TNS, Family Food Panel (2003), for Ofcom

4.6.4 Does advertising affect the purchases and consumption of children and their parents?

This section draws heavily on the Hastings review which was specifically set up to review the evidence of the effect of food promotion on children and their parents. Evidence from Ofcom's research into Childhood obesity has also been taking into account, including Sonia Livingstone's commentary (Appendix 1).¹³⁶

How does food advertising affect children's perceptions of what makes a "healthy diet"?

While there is considerable debate in this area, the weight of the evidence suggests that food advertising may have little influence on children's general perceptions of the make-up of a healthy diet. However, seeing food advertising can, in certain contexts, alter children's perceptions of how healthy food actually is. For example, Ross et al.¹³⁷ examined whether exposure to food adverts affected primary school age children's ability to tell whether actual food products contained fruit or not. The children were asked to decide whether different food products contained real fruit, artificial fruit flavour, or no fruit, both before and after viewing cereal and soft drink adverts. When children viewed that adverts without an accompanying television programme, the children were less able to tell whether or not certain products contained real fruit.

Conversely, Peterson et al.¹³⁸ showed that when children aged 5 to 6 viewed Public Service Announcements and adverts for foods which emphasised the healthiness of certain foods, their perceptions of the healthiness of different foods or what constitutes a healthy diet increased.

¹³⁶ Livingstone S., (2004) A commentary on the research evidence regarding the effects of food promotion on children, Appendix 1 of Ofcom (2004) Childhood Obesity: Food Advertising in Context, July 2004

¹³⁷ Ross R.P., Campbell T.A., Wright J.C. (1981) Nutritional misinformation of children: A developmental and experimental analysis of the effects of televised food commercials. *Journal of Applied Developmental Psychology*, 1(4): 329-347; 1981; Ross R.P., Campbell T.A., Huston-Stein A. (1980) Children's television commercials containing nutritional information: When do they help? When do they hinder? Paper presented at the Biennial Meeting of the Southwestern Society for Research in Human Development, Lawrence K.S., March 27-29, 1980; all cited by Hastings et al.(2003) Review of Research on the effects of food promotion to children, Prepared for the FSA

¹³⁸ Peterson P.E., Jeffrey D.B., Bridgwater C.A., Dawson B. (1984) How pro-nutrition television programming affects children's dietary habits. *Developmental Psychology*, 20: 55-63; cited by Hastings et al.(2003) op. cit.

Does food advertising increase children's preferences for unhealthy foods?

There is robust evidence that food promotion does influence children's preferences for eating unhealthy foods. Some studies for instance have found that children were significantly more likely to prefer high fat, salt or sugar foods over lower fat, salt or sugar alternatives after exposure to food adverts.¹³⁹

Does food promotion encourage children to buy unhealthy foods with their own money?

There is strong evidence to suggest that food promotion influences children's purchase behaviour. Indeed, the effect of food promotion was in the direction of increasing purchase requests for foods high in fat, sugar or salt. One experimental study found that promotional signage on vending machines significantly increased sales of low fat snacks in secondary schools independently of pricing variables.¹⁴⁰

Does food advertising encourage children to pester their parents for unhealthy food?

A number of studies have also shown that food advertising can influence what parents choose to buy and subsequently what children choose to eat.

For example:

- One study involving a natural experiment compared the household purchase of cereals among English- and French-speaking children in Montreal. At the time of the study, English-speaking children in Quebec were exposed to and mostly watched American television, while French-speaking children were also potentially exposed to American television but tended to watch more Quebec television, which banned children's advertising in 1980; they were therefore less likely to be exposed to advertising for children's cereals. Regression analysis indicated that exposure to American television significantly increased household purchase of advertised cereals independently of income or language, suggesting that the difference could not be solely attributable

¹³⁹ Goldberg M.E., Gorn G.J., Gibson W. (1978) The effects of TV messages for high and low nutritional foods on children's snack and breakfast food choices. *Advances in Consumer Research*, 5:540-545; Goldberg M.E., Gorn G.J., Gibson W. (1978) TV messages for snacks and breakfast foods: do they influence children's preferences? *Journal of Consumer Research*, 5(2): 73-81; cited by Hastings et al (2003) op. cit.

¹⁴⁰ French et al. (2001) Pricing and promotion effects on low-fat vending snack purchases: The CHIPS Study. *American Journal of Public Health*, 91(1): 112-117, cited in Hastings et al (2003) op. cit

to cultural differences between high and low cereal purchasing households.¹⁴¹

- Empirical evidence shows that exposure to food advertising increased children's influence behaviour observed in a natural setting (supermarket shopping with parents)¹⁴² - the more attentive a child was to television advertising, the greater the number of attempts to influence parental shopping purchases him or her made at the supermarket. Further research indicates that there are significant associations between the amount of Saturday morning television viewed and frequency of making food purchase requests to parents, with 'heavy' viewers in both studies making more requests than 'light' viewers.¹⁴³

Do parents give into their child “pestering” for their preferred foods when out shopping?

Results from the quantitative survey for Ofcom appear to confirm that children do “pester” their parents for high in fat and sugar foods when they are out shopping.

Parents say they shop for food for the family around twice a week and around two in every five say their child “always” or “often” accompanies them. Hardly anyone (0.5%) says their child “never” accompanies them. As we might expect, the younger the child the more likely they are to accompany their parent on a family food shopping trip. Almost a quarter (23%) of children aged 2 to 7 do so “always”, compared with 7% of 8 to 11 year olds and 4% of 12 to 15 year olds.

Overall, a third (34%) of parents say their child “always” asks them to buy something to eat or drink, or puts something in the basket. A further 29% say the child “often” does so, while 22% do so “occasionally” and 8% “seldom.” Only 7% never ask. Children under the age of 12 are significantly more likely to ask their parent to buy something on a shopping trip: 37% do so “always” compared with 28% of those aged.

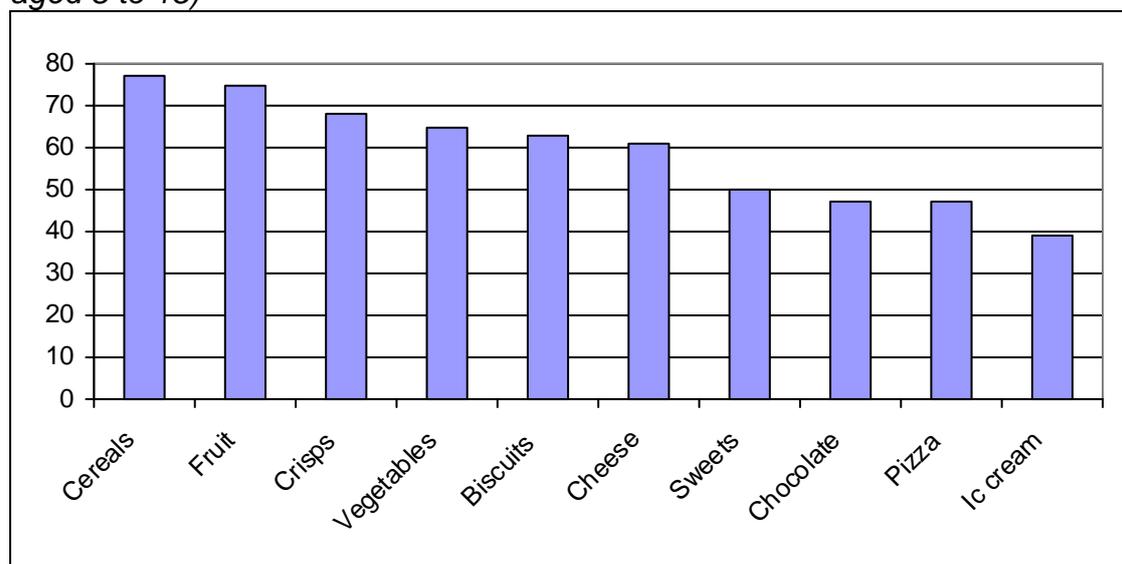
Parents are also very likely to buy particular foods for their children when they ask for them. Replies show that they are more likely to comply when children ask for cereals (77%) or fruit (75%), but around two thirds (68%) say they “always” or “often” buy crisps and a similar proportion (63%) buy biscuits.

¹⁴¹ Goldberg M.E. (1990) A quasi-experimental assessing the effectiveness of TV advertising directed to children. *Journal of Marketing Research*, 27(4): 445-454; cited in Hastings et al (2003) op. cit.

¹⁴² Stoneman Z., Brody G.H. (1982) The indirect impact of child-orientated advertisements on mother-child interactions. *Journal of Applied Developmental Psychology*, 2: 369-376; Galst J.P., White M.A. (1976) The Unhealthy Persuader: the reinforcing value of television and children's purchase influencing attempts at the supermarket. *Child Development*, 47: 1089-1076 ; all cited by Hastings et al (2003) op. cit.

¹⁴³ Reeves B., Atkin C.K. (1979) The Effects of Televised Advertising on Mother-Child Interactions at the Grocery Store. Paper presented at the 62nd Annual Meeting of the Association for Education in Journalism, Houston, T.X., August 5-8, 1979; cited by Hastings et al (2003) op. cit.

Parents who buy when child asks (always or often) – percentage (children aged 8 to 15)



Source: NOP (2003), for Ofcom

Parents from the higher social grades (ABC1) are more likely than those from the lower social grades (C2DE) to say they “always” buy their child fruit when they ask for it (54% compared with 47%). Conversely parents from the lower social grades are slightly more likely to say they “always” buy their child crisps (38% compared with 32%), biscuits (35% compared with 29%) and breakfast cereals (51% compared with 45%) when they ask for them.

In contrast to this research, Mintel¹⁴⁴ in 2003 found that only 33% of parents admitted to buying products or brands requested by their children. The ability to withstand pressure from children also seems to decrease as children get older and more sophisticated in their demands. Only 25% of parents of 0 to 4 year olds bought nominated brands or products, compared to 40% of parents of older children.

Is pester power stronger amongst obese children?

The evidence suggests no, though parents may be under-reporting. Compared with parents of normal weight children, parents of obese children are less likely to say they buy their children crisps, biscuits, breakfast cereals or cheese when they ask. They are also less likely to say they buy them fruit.

¹⁴⁴ Mintel (2003) Children’s snacking habits

How often do parents buy product when child asks?

	Normal weight	Obese
Crisps	2.97	2.69
Biscuits	2.78	2.65
Breakfast cereals	3.14	2.87
Fruit	3.12	2.83
Cheese	2.73	2.34

Source: NOP (2003) for Ofcom

Compared with parents of children of normal weight, the parents of obese children give more polarised answers on whether or not they buy certain items when their child asks. No more admit to giving in to their child's request "often", but rather more say they "never" give in. However, parents of obese children may be especially tempted to give socially desirable answers about their responses to their children's requests for food.

How often parents usually buys when child asks, Percentage

	Parent has obese child		Parent has normal weight child	
	Always buy	Never buy	Always buy	Never buy
Fruit	55%	13%	52%	2%
Pizza	20%	15%	26%	7%
Biscuits	37%	9%	33%	4%
Cheese	36%	17%	44%	9%
Crisps	36%	9%	39%	4%
Chocolate	27%	9%	18%	2%
Breakfast cereals	47%	11%	52%	4%
Sweets	26%	11%	19%	4%
Ice cream	19%	9%	9%	2%

Source: NOP (2003) for Ofcom

Parental typologies

Morales¹⁴⁵ suggests that the characteristics of parents behaviour in relation to shopping for their children fall into four categories:

- Indulgers – enjoy spending for themselves and also for their children.
- Bare Necessities – strive to moderate the influence of their children on brand selection, and also strive to monitor impulse purchasing.
- Kids' Pals – enjoy many aspects of spending time with their children and seem to be recapturing their own childhood. They approve of advertising to children, and do not object to their children's requests for products and services, or input on purchases.

¹⁴⁵ Morales, E. (2000) The nag factor: measuring children's influence; Admap 35-7

- Conflicted parents – are pushovers for their children’s requests, but requests for non-essentials are bothersome to them. They wish to delay their children’s requests for special occasions, but find themselves making impulse purchases. They feel that advertising to children is wrong, but receive an informational benefit from it.

Morales considers the category of parent known as “Kid’s Pals” are much more likely to purchase food for their children following their child’s exposure to advertising, probably because they can relate to the pleasure the item brings to the child. Conversely, the purchases among “Bare Necessities” – who strive to moderate their children’s influence – are, according to Morales, seemingly likely to be unaffected by food advertising.

Does food advertising influence children’s food consumption behaviour¹⁴⁶?

The research discussed so far examines the effect of advertising on buying habits. Some research actually looks at how it effects consumption instead. Most of the evidence focuses on snacks.

A good number of studies surveyed by Hastings provide modest evidence that food advertising does, in some contexts, exert an influence on consumption behaviour. Goldberg et al.¹⁴⁷ showed that when children viewed adverts, it reduced their likelihood of selecting fruit or orange juice, compared to a sweet for a daily snack. Similarly, Jeffrey et al.¹⁴⁸ compared the effects of promoting unhealthy snacks and healthier snacks on 4 to 5 year old children’s calorific consumption from a tray of different foods and drinks. Children who watched adverts for unhealthy foods chose foods and drinks with a high calorific content, while those who watched the adverts which stressed the healthiness of certain foods only increased their calorific consumption for drinks. In the same way, Bolton¹⁴⁹ used detailed television viewing diaries to attempt to identify how much food advertising is attributable to the amount of snacking of unhealthy foods by 2 to 11 year olds. The study found that the greater a child’s food advertising exposure, the more frequent his or her snacking and the lower his or her nutrient efficiency.

¹⁴⁶ This is defined as including consumption of food on a single occasion, daily selection of foods for consumption over a short period of time, and self-reported patterns of consumption behaviour.

¹⁴⁷ Gorn G..J, Goldberg M.E. (1982) Behavioural evidence of the effects of televised food messages on children. *Journal of Consumer Research*, 9 (2): 200-205; Goldberg M.E., Gorn GJ, Gibson (1978) TV messages for snacks and breakfast foods: do they influence children’s preferences? *Journal of Consumer Research*, 5(2): 73-81; all cited in Hastings et al.(2003) op. cit

¹⁴⁸ Jeffrey B., McLellarn R.W., Fox D.T. (1982) The development of children’s eating habits: The role of television commercials. *Health Education Quarterly*, 9(2-3):174-189; cited in Hastings et al.(2003) op. cit.

¹⁴⁹ Bolton R.N. (1983) Modelling the impact of television food advertising on children’s diets. In Leigh J.H., Martin Jr C.R. (eds), *Current Issues and Research in Advertising*. Ann Arbor, MI: Division of Research, Graduate School of Business Administration, University of Michigan, pp173-199; 1983; cited in Hastings et al.(2003) op. cit

Conversely, some commentators have found that results were inconclusive. Galst¹⁵⁰ exposed 3 to 6 year old children to adverts for sugared foods or non-sugared foods, viewed either with or without parents' comments encouraging healthy eating, daily for two weeks and measured their subsequent snack food selections. Results of this study showed that, in fact, children's exposure to food promotion actually reduced selection of sugared snacks.

The Hastings review concluded that the studies provide modest evidence of an effect of food promotion on consumption behaviour. Effects were sometimes inconsistent and were not found in all the studies, but were found in sufficient studies to suggest that food promotion can, in some contexts, influence children's food consumption behaviour.

Does food advertising actually lead to increased snacking?

So far, the studies cited from the Hastings review have examined whether or not food advertising influences what children or their parents buy or consume. A few studies have examined if this adversely affects their diet in terms of nutrient balance.

One study¹⁵¹ measured the specific contribution of food advertising. The use of detailed television viewing diaries enabled a calculation of the extent to which each subject was exposed specifically to food advertising rather than simply the amount of time the subject spent watching television in general. The study found that the greater a child's food advertising exposure, the more frequent his or her snacking and the lower his or her nutrient efficiency.

One experimental study reviewed by Hastings¹⁵² found that overweight children's self-perceptions and attitudes towards eating confectionery were affected both negatively and positively by exposure to food promotion. Another study¹⁵³ found that exposure to either confectionery adverts, fruit adverts or dietary public service announcements had no impact, either positive or negative, on children's attitudes towards snack food consumption.

Does food promotion simply lead parents or children to switch brands, or does it increase overall sales of a category of food?

¹⁵⁰ Galst J.P. (1980) Television food commercials and pro-nutritional public service announcements as determinants of young children's snack choices. *Child Development*, 51(3): 935-938; cited in Hastings et al.(2003) op. cit.

¹⁵¹ Bolton R.N. (1983). Modeling the impact of television food advertising on children's diets. In Leigh J.H., Martin Jr C.R. (eds), *Current Issues and Research in Advertising*. Ann Arbor, MI: Division of Research, Graduate School of Business Administration, University of Michigan, pp173-199; cited in Hastings et al.(2003) op. cit

¹⁵² Lewis, M.K., Hill A.J. (1998). Food advertising on British children's television: a content analysis and experimental study with nine-year olds. *International Journal of Obesity*, 22(3): 206-214; cited in Hastings et al.(2003) op. cit.

¹⁵³ Gorn, G.J. and Goldberg M.E. (1982). Behavioral evidence of the effects of televised food messages on children. *Journal of Consumer Research*, 9(2): 200-205; cited in Hastings et al.(2003) op. cit

The Hastings review concluded that there is evidence that food promotion causes both brand switching and category effects with stronger support for the latter effect. Although no study provides a thorough comparison of the strength of both types of effect, both types of effect have been examined independently, and there is reasonably strong evidence that both occur. In other words, the effects of food advertising are not limited to brand switching.

How strong is the influence of advertising compared to other factors?

Overall, the Hasting's review concluded that food promotion or television viewing significantly influences children's food behaviour and diet independently of other factors known to influence children's food behaviour and diet. However, there was little evidence to show whether the influence of food promotion on children's behaviour is greater or lesser than that of other factors.¹⁵⁴

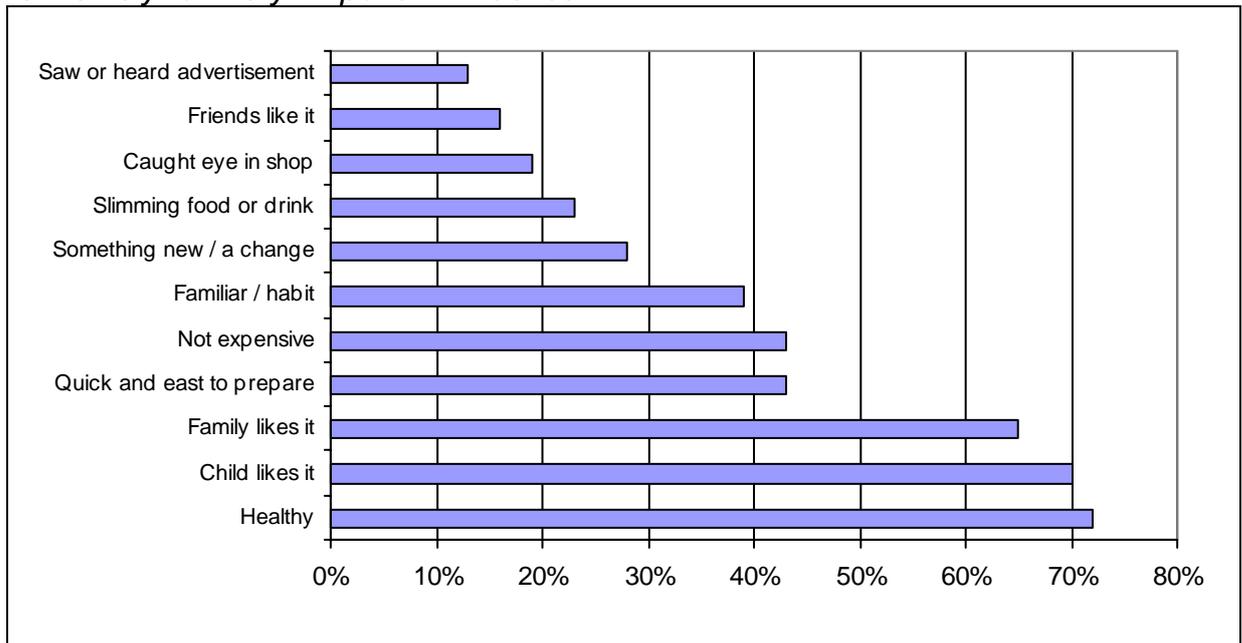
For instance, Norton et al.¹⁵⁵ found that television advertising was significantly associated with preferences for a small number of foods, and that this occurred independently of other motivational factors influencing food preferences, but highlighted that it was not possible herein to judge the strength of influence of advertising relative to the other influences examined.

The NOP survey suggests that when television advertising is put in the context of other influences, it does have an impact on food choice among both parents and children, but it is small compared to other influences.

¹⁵⁴ Hastings et al.(2003) op. cit

¹⁵⁵ Norton P.A., Falciglia G.A., Ricketts C. (2000) Motivational determinants of food preferences in adolescents and pre-adolescents. *Ecology of Food and Nutrition*, 39(3): 169-182; 2000; cited in Hastings et al.(2003) op. cit

Importance of various influences on food purchases - – percentage saying “extremely” or “very” important influence

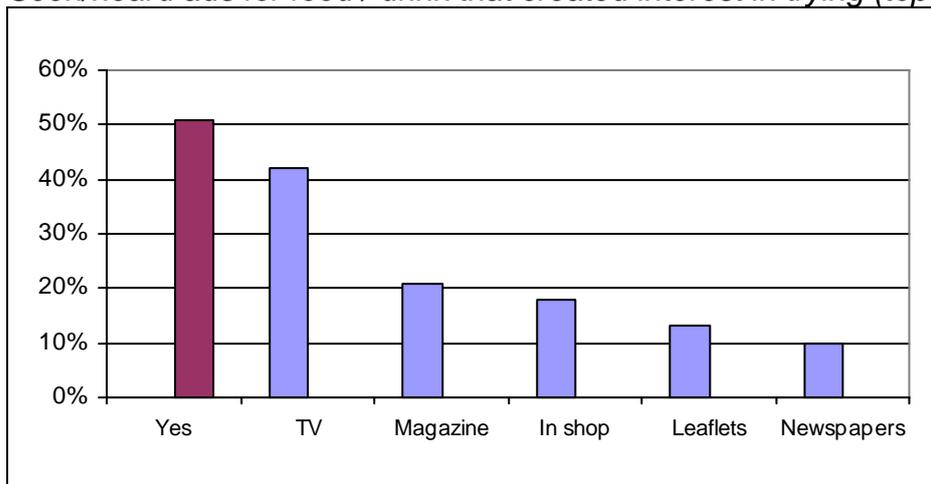


Source: NOP (2003) for Ofcom

To parent and child alike, the child’s health and own taste preferences are paramount and price and familiarity are also important. Peer pressure (My friends like it) is also a notable influence on food choice for children.

Nevertheless, when parents were asked upfront if they had recently seen any advertisements for food and drink that made them interested in trying the product advertised, approximately half (51%) of parents say they have as illustrated in the table below.

Seen/heard ads for food / drink that created interest in trying (top mentions)



Source: NOP (2003) for Ofcom

Putting together the evidence from Hastings, OfCom, and Livingstone, this suggests that advertising does have an effect on children’s food choices at both brand and category level, but the size of this is effect is not known, both absolutely, and relative to other factors.

4.7 Poorer socio-economic groups – a summary

Are children from poorer SEGs more likely to be obese?

There are a number of indicators of income, social class and deprivation. In general, obesity prevalence is higher for poorer socio-economic groups:

- Inner city: Children living in inner city areas are more likely to be obese (19.3%) than children living in all other types of area (14.3%-14.9%).
- Index of deprivation: Children in the most (top quintile) deprived areas are more likely to be obese (16.4%) than those in the least (bottom quintile) deprived areas (11.2%).
- Manual workers: Children with parents who are manual workers are more likely to be obese (16%) than those with parents who are non-manual workers (12.4%).
- National Statistics Socio-Economic Classification (NS-SEC): NS-SEC is a classification of social position that was introduced in the 2001 census. It is based on current or former occupation of the household reference person. There are five categories. Levels of childhood obesity were lowest among managerial or professional households (12.4%) and highest among semi-routine and routine household.

Likewise, the *Avon Longitudinal Study of Parents and Children*¹⁵⁶ found that “maternal education showed a clear, inverse association with child obesity, with a 3-fold risk in the least educated group.”

Do children from poorer socio-economic groups eat more foods that are high in fat and sugar?

Analysis of quantitative data was undertaken by NOP for Ofcom to determine whether or not families from lower incomes eat more foods that are high in fat, sugar and salt. The findings showed that children from both high and low incomes families had a high consumption of foods that are high in fat, sugar and salt. However, children from higher income, more middle-class homes with better-educated mothers also tend to consume more fruit and vegetables and consequently have a more balanced diet.

The National Food Survey, and the National Diet and Nutrition Survey confirms that children from less advantaged households are less likely to eat: raw carrots and “other” raw and salad vegetables, green beans, fruit juice, soft fruit, soft grain bread, fruit pies, semi-skimmed milk (boys only), cream, butter, cheese.

¹⁵⁶ Ness, A.R. (2004) The Avon Longitudinal Study of Parents and Children (ALSPAC) – a resource for the study of the environmental determinants of childhood obesity, *European Journal of Endocrinology*, 2004, 151

Research with 11 year olds in the West of Scotland showed that both 'less healthy eating' and 'unhealthy snacking' were more likely among:

- children living in more deprived areas - 45% of those from 'least', 57% from 'mid' and 65% from 'most' deprived areas were classified as 'less healthy eaters'
- children whose mothers had fewer qualifications - 64% of children whose mothers had no qualifications, 54% of those whose mothers had school or non-advanced qualifications and 41% of those whose mothers had advanced qualifications were classified as 'less healthy eaters'

Why do poorer socio-economic groups have a higher consumption of high in fat and sugar foods?

Lynn Stockley neatly sums up the reasons why poorer socio-economic groups have a higher consumption of high in fat and sugar foods.

“People on low incomes consistently say that the main influence on the food they buy is its cost. They want food that is going to fill them and their family up, be acceptable to others, and not spoil quickly. Fruit and vegetables are thus a ‘risky’ purchase. They deteriorate quickly, result in waste, and are not regarded as filling. Fruit in particular is seen as expensive. Vegetables are not so expensive, but are more likely to be rejected - especially by children. Many people also do not have cars, and so bulky fruit and vegetables either have to be carried on public transport or bought from local shops. The concern about waste means that people on low incomes are reluctant to experiment with new foods. When they go shopping, they may deliberately adopt tunnel vision, so that they are not tempted by new and different foods. Coping strategies for those who are not confident in their cooking include buying pre-packed food that can easily be divided into portions, and requires little preparation.”¹⁵⁷

People in lower socio-economic groups are aware that fruit and vegetables are an important part of a healthy diet, although they are less aware of the specific recommendations about numbers of portions per day. Within families, mothers are concerned that their children's diets are as healthy as possible. They are struggling with all of the tensions that affect food choice within most families, but in addition they cannot afford to have food rejected. In several studies women report going without food themselves to make sure that the rest of the family has enough.

In addition, it is argued that “healthy” food is relatively more expensive for poorer socio-economic groups. This particular issue is discussed below.

¹⁵⁷ Stockley, L. (2001) Influences on fruit and vegetable consumption: A review of qualitative and descriptive research, DH

Higher relative cost of “healthy” food.

Consumers in lower income groups are highly price sensitive. However, during the post-war period the prices of agricultural raw materials have declined relative to prices of other products in spite of the price-raising effects of agricultural policies. This, together with the growth in personal incomes, means that according to National Food Survey data, the proportion of income spent on food in the UK has declined from over 30% in the mid-1950s (i.e. after rationing) to 18% in 1995.¹⁵⁸

Nevertheless, the relative price of healthy foods compared to foods high in fat and sugar has created an incentive for the poorest groups to opt for the latter.

For the poorest fifth of the population, expenditure on food takes up just under a third of the household budget (30%), compared to the national average of just over a sixth (16%). One cohort study analysis that assessed the costs of different types of diet in 2001 concluded that a healthy diet costs over 50% more than an unhealthy diet, with expenditure on fruit and vegetables accounting for a significant proportion of this.¹⁵⁹

In an article in the British Medical Journal in 1997, James¹⁶⁰ makes the following argument to show how it is more difficult for poorer households to afford healthy foods than wealthier households:

- Over the past 15 years, food consumption and energy intakes have fallen, reflecting an increasingly sedentary lifestyle – but, as energy intakes decline, diets need to become more nutrient dense to compensate. Rich people have been better able to compensate than poor people.
- For families with children, expenditure on food per person in the bottom fifth of income is extraordinarily low (£1.64/person/day in lone parent families in 1997). Low socio-economic groups buy more efficiently than high income households, but these efficiencies lead to the purchase of foods richer in energy (high in fat and sugar) to satisfy hunger, which are much cheaper per unit of energy than foods rich in protective nutrients (like fruits and vegetables). The purchase of healthy options within mainstream eating patterns is likely to increase the food bill by 6-13%.

Shepherd, Pailey et al.¹⁶¹ have illustrated experimentally how income can change people’s purchasing behaviour. They assessed the diets of two groups of people, one where income increased, and one where it decreased. In the latter there was a decrease in the variety of quantity of foods

¹⁵⁸ British Nutrition Foundation (1999) op. cit.

¹⁵⁹ Upmeier, Cade et al. (2001) cited in Stockley, L. (2001) Influences on fruit and vegetable consumption: A review of qualitative and descriptive research, DH

¹⁶⁰ James, W.P.T. (1997) Socio-economic determinants of health: the contribution of nutrition to inequalities in health, British Medical Journal, 1997;314:1545

¹⁶¹ Shepherd, R.C., Paisley, at al. (1996) Constraints on Dietary Choice, the role of income, Nutrition and Food Science, 5, vol 6, no 5: 19-21

consumed, including a decrease in frozen veg and salad. There were no differences between the groups in terms of expectations of eating a healthy diet.

Section 4.3.1 discussed how inner city areas (which have higher rates of obesity on average and higher levels of social deprivation) have a higher density of convenience stores. Nevertheless, this increases the cost of buying food considerably. Although smaller shops can offer convenience to those who do not have access to a car, higher operating margins helps to explain why basic foodstuffs can cost almost 25% more in small stores than in the big supermarkets. If supermarket 'own brands' and value lines are taken into account, the difference may be as much as 60%.¹⁶² Prices at street markets also tend to be lower. One study has calculated that a household on benefits would need to spend 25% more of their income on food if they could not get to a supermarket or street market.

Is “health” less important to poorer SEGs?

Research by Mintel in 2002 for their report on *Children's Snacking Habits* showed that C2DE families attached slightly less importance to health, but not by a significant degree.

Percentage agreeing with health statements

	“I am keen to try new ideas and products for a healthy lifestyle”	“I try to keep up to date on the latest advice on healthcare and healthy lifestyles”
ABC1 families	46%	43%
C2DE families	41%	27%

Source: BMRB for Mintel (2003), *Children's Snacking Habits*

¹⁶² Piachaud, D. and Webb, J. (1996) *The Price of Food: Missing Out on Mass Consumption*. Suntory and Toyota International Centre for Economics and Related Disciplines, London: London School of Economics.

5. Physical activity

Summary of hypotheses tested and outcomes

Hypothesis	Outcome
Low levels of physical activity cause obesity	
Obese children in the UK do less physical activity than non-obese children.	Surveys do not show this to be the case. However, they may suffer from over-reporting of physical activity by parents of obese children who report the information.
Children with low levels of physical activity become obese.	The evidence is not unanimous, but it would be fair to say that there is a small to moderate relationship between body fat and activity in children.
Watching television and playing digital games too much leads to obesity.	There is plenty of evidence showing that sedentary behaviour such as watching television or playing digital games is predictive of obesity and overweight. It is not clear whether watching television and playing digital games actually substitutes physical activity.
Television watching and playing of computer games increased significantly.	On average, television watching by children has increased since the 1960s, but not in the past ten years. The proportion of children playing computer games has increased in the past ten years.
Obese children do less sport and exercise	There is no data available for this.
Obese children dislike sport	There is no data available for this.

In general, children do less physical activity than they used to		
	Most children currently do less than the recommended levels of physical activity.	No. 70% cent of boys and 49% of girls aged 7 to 10 meet the Chief Medical Officer's recommendation of doing one hour of moderate physical activity every day.
	Children do less physical activity than they used to.	<p>Yes, but marginally. Between 1997 and 2002, there was a very small increase in the proportion of young people doing less than 60 minutes of physical activity each day. Data does not go back further than this. Looking at individual types of physical activity:</p> <ul style="list-style-type: none"> • PE: The proportion of primary schools offering 2 hours per week of PE and sport to 6 to 8 year olds has declined from 32% in 1994 to 29% in 2002. The proportion offering this to 8 to 10 year olds declined from 46% to 32%. However, since 2003 this situation has improved slightly. • Extra-curricular sport: The proportion of young people participating in any extra-curricular sport has increased from 31% in 1994 to 41% in 2002. The biggest increase has been in football. • Sport outside of school: The proportion of 6 to 11 year olds that did <u>not</u> do sport (excluding walking) at least 10 times in the past year increased form 11% in 1994 to 12% in 2002. • Walking to school: Between 1989/91 and 1999/01, the proportion of children aged 5 to 10 who were driven to school increased fro 28% to 39%.
	If school offered more PE and more children walked to school, children's overall activity levels would be higher.	One study suggests this is not the case. Children who are driven to school or who do little PE at school compensate for this by being more active at other times of the day.

There has been a decline in the quantity and quality of school PE		
	There has been a decline in school PE.	Yes, up to 2002. The government's PE School Sport and Club Links Strategy has been tackling this since 2003.
	Why has there been a decline?	<ul style="list-style-type: none"> • Expertise: In 2002, only 9% of primary schools had a full time PE specialist. Many newly qualified teachers have had very limited training to teach PE in the National Curriculum, which is leaving many ill-prepared to meet the challenges of the subject. • The focus on numeracy and literacy in primary schools since 1998 has also been said to put a squeeze on PE. • The quality of sports facilities in many primary schools is still sub-standard. • School playing fields: Before 1998, there were no barriers to school selling playing fields or building on playing fields in order to expand. Since 1998 the rules have been tightened.
	The situation will get worse.	No. The government's PESSCL strategy should address many of these issues over time, though resource constraints will limit the effectiveness.
There has been a decline in provision of extra-curricular sport organised by schools		
	There has been a decline in the number of children participating in extra-curricular sport.	No. The proportion of young people participating in any extra-curricular sport has increased from 1994-2002 from 31% to 41%.
	The situation will get worse.	Most primary school teachers in 2002 thought that the situation would get better. The Extended School programme will increase the number of after school clubs.
There has been a decline in sport outside of school		

	Less children under the age of 11 do sport outside of school.	Yes, marginally. In 2002, 12% of children aged 6 to 11 did not do any sport (excluding walking) at least 10 times in the past year. This has actually grown a very small amount from 11% in 1994. Encouragingly, there was a very slight increase in children aged 6 to 11 doing sports as a member of a sports club (not school) from 38% to 41% from 1994 to 2002.
	Parents are to blame for low levels of sport outside of school?	<p>Many studies have shown that children whose family members participate in sport are more likely to take part themselves.</p> <p>Some parents do not believe that physical activity contributes to children's rounded development and helps to provide a sense of self-identity. Instead, they are more concerned with meeting children's material needs. These attitudes are more important than the cost of sport (e.g. clothes, transport) and the cost of leisure facilities. Other barriers include parents lack of time, fear that of road accidents and abduction, and the parents' own poor sporting competence.</p>
	Children aged under the age of 11 do not like doing sport in their own time.	For most children, this is not the case. Seventy nine per cent of boys and 65% of girls aged 6-11 agreed strongly that they enjoy sport and exercise in their leisure time. Negative attitudes to sport become much stronger in adolescence, especially amongst girls. This may be the case for children that become obese, but there is no data to prove this.
	Young children are put off by sport because of the weather and getting hurt.	For significant proportions, this is true, but this does not put them off sport overall. When asked what is off-putting about playing sport, the most common answers for pupils aged 6 to 10 are: being kicked/hit/falling over (55%), having to go outside in cold weather (39%), getting cold and wet (35%), and getting hot and sweaty (32%).
	School PE puts children off sport	No. Seventy three per cent and 65% of boys and girls respectively enjoy PE in schools. This may be the case for children that become obese, but there is no data to prove this.

	Children who are badly co-ordinated do not like sport.	Yes. Forty six per cent of 6 to 10 year olds say they mind if they are “not as good as others” when they do a sport, 73% say they mind if they “get left out because they are not good enough”, and 38% say that they mind when “it takes you a long time to learn something in sport”.
	Children are put off by the competitiveness of sport.	In general, no, but they do mind not getting picked.
	Girls dislike sport.	Girls do participate less in sport, but not by large amounts in childhood relative to boys. Most girls like sport up to the age of 10. It is in the teenage years that many girls turn against sport.
Children play less than they used to		Children are restricted more than they used to be from playing in the street or visiting a playground independently. Parents and children do express anxiety about road accidents and abduction. This is a far more powerful factor in reducing play than the proximity or quality of local play spaces.

Less children walk to school than they used to, and this contribute to obesity		
	Less children walk to school than they used to.	Only 54% of children under the age of 11 walked to school in 2000, and only 1% cycled.
	Why do they walk less to school.	The rise cannot be attributed to distance to school. Over 90 per cent of 5 to 10 year olds and three-quarters of 11 to 15 year olds live within three miles of their school, but the key drivers are likely to be fear of traffic accidents , fear of other children, bad weather, working parents' like of time to walk their child to school, and parents' own aversion to walking.
	This contributes to obesity.	No. One piece of research showed that overall physical activity of 5 year olds did not differ significantly according to the mode of transport used for the "school run". This suggests that a rise in the proportion of children walking to schools would not necessarily have an impact on obesity.
Children help around the house less		No trend data

5.1 Does low level of physical activity cause obesity?

The evidence that a low level of physical activity is correlated to obesity in children is not conclusive. For example, the Chief Medical Officer¹⁶³ concluded that:

“The degree to which inactivity is responsible for the rising levels of obesity has not been established.There is also evidence that children who spend more time involved in sedentary pursuits such as television are more likely to have excess fat, although the strength of this association has been questioned. This issue is clouded by the positive associations reported between television watching and intake of energy-dense snacks.”

Likewise, the summary statement from the European Youth Heart Study Symposium in 2005 concluded that:

"Physical activity level is a weak predictor of overweight and obesity in children. Diet is also a weak predictor.....

Studies relating hours of TV viewing to physical activity level are largely inconclusive. However, TV viewing has been shown in some studies to be related to obesity".

Similar conclusions are drawn on adolescents, though the evidence on adults clearly shows that a lack of physical activity is a predictor of obesity (see Appendix 2). This section examines the evidence on children.

It is unclear how much physical activity children actually need for optimal health benefit. As with adults, different amounts of activity may be needed for different health end points. For example, the current recommended level of one hour of physical activity per day may be sufficient to promote cardio-respiratory health, but may be insufficient to prevent the onset of overweight and obesity.

¹⁶³ DH (2004) At least five a week: Evidence on the impact of physical activity and its relationship to health

5.1.1 Physical activity

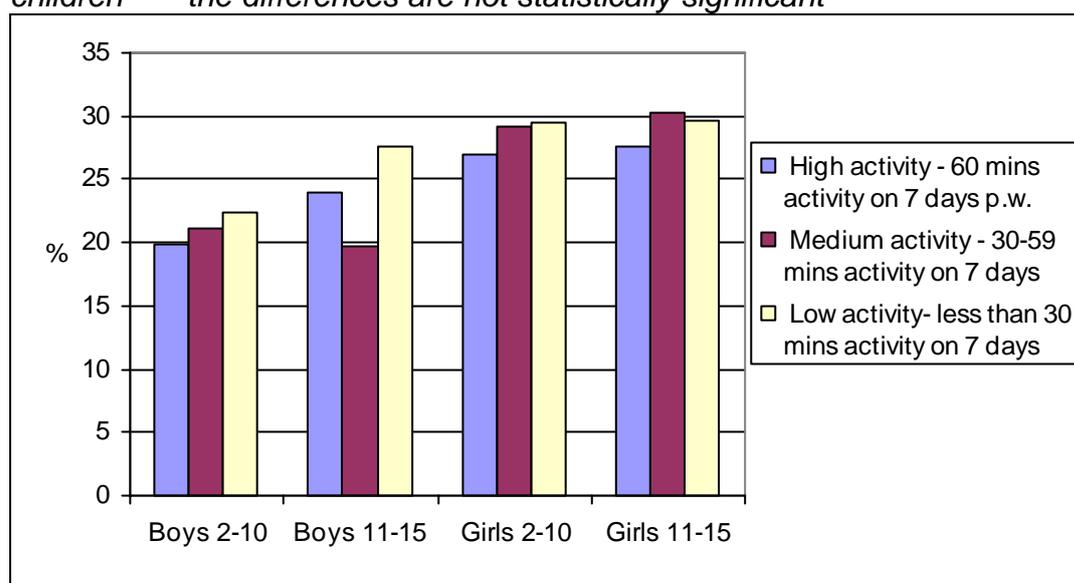
Do obese children in the UK do less physical activity than non-obese children?

The two key UK surveys that measure both physical activity and BMI show no correlation between obesity and physical activity.

Firstly, the Health Survey of England 2002¹⁶⁴ shows that the relationship between physical activity and overweight (including obese) prevalence is not as pronounced as is often suggested. The study concludes that:

“No apparent relationship was found between physical activity levels and mean BMI or obesity prevalence. When the relationship of overweight (including those who were obese) with overall activity levels were examined, weak inverse relationships were found for boys ($r=-0.23$, not significant) and for girls ($r=-0.20$, not significant).

Overweight (including obesity) prevalence, by overall physical activity levels of children¹⁶⁵ - the differences are not statistically significant



Source: Stamatakis, E. (2002) Physical Activity, in The Health of Children and Young People, Chapter 4, The Health Survey of England

The National Diet and Nutrition Survey also shows that for children aged 4 to 10 years old, there are not statistically significant associations between the level of reported activity and either BMI or Mid Upper-Arm Circumference (MUAC – another anthropometric measure sometimes used).¹⁶⁶

¹⁶⁴ Stamatakis, E. (2002) Physical Activity, in The Health of Children and Young People. Chapter 4, The Health Survey of England

¹⁶⁵ Ibid.

¹⁶⁶ FSA (2000) National diet and nutrition survey: young people aged 4 to 18 years. Volume 1: report of the diet and nutrition survey.

Finally, the NOP survey for Ofcom found that there were no significant differences between obese and non-obese children concerning a range of activities, including walking home from school, going for walks or cycle rides, going to a sports club, or playing ball in the street. Likewise, they do not play computer games, use the Internet, read, listen to the radio or watch television more often as measured by a frequency of activity scale (although the actual number of hours are not recorded).

However, there are two issues with this type of data. Firstly, obese children and their parents are notorious for under-reporting that amount of physical activity that they do. Secondly, it merely shows us how much physical activity obese children claim to do once they are obese. It does not tell us how much physical activity they did in the run up to becoming obese.

Do epidemiological studies show that low levels of physical activity lead to obesity

A number of studies have detected significant relationships between physical activity levels and percentage of body fat or overweight/obesity amongst children.¹⁶⁷ However, a number of other studies have not found any significant association.¹⁶⁸

A meta-analysis¹⁶⁹ of some fifty epidemiological studies covering the whole range of tools to measure activity (questionnaires, motion sensors, direct observation, heart rate monitors) was carried out and offers some explanation for the diverse results found in this research area. One of the main findings is that questionnaire studies indicate less of an effect than studies that use objective measures. With this in mind, the authors conclude from their analysis of the fifty studies that there is a small to moderate relationship between body fat and activity in children.

¹⁶⁷ Studies cited by Ofcom (2004) op. cit., the Health Survey for England (2002) and Burniat, W. (2002) op. cit include:

LeMura, L.M., Andreacci, J., Carlona, R., Klebez, J.M., Chelland, S. Evaluation of physical activity measured via accelerometry in rural fourth-grade children. *Percept Motor Skill*, 2000; 90: 329-337

Almeida, M., Fox, K. Preliminary evidence for an activity-fatness relationship in Portuguese adolescents. *J. Sport Sci*, 1998; 16: 31-32.

Rowlands, A.V., Eston, R.G., Ingledew, D.K. Relationship between activity levels, aerobic fitness, and body fat in 8- to 10-yr-old children. *J. Appl Physiology*, 1999; 86: 1428-1435:

Sallis, J.F., Taylor, W.C., Dowda, M., Freedson, P.S., Pate, R.R. Correlates of vigorous physical activity for children in grades 1 through 12: Comparing parent-reported and objectively measured physical activity. *Pediatr Exerc Sci*, 2002; 14: 30-44:

Berkowitz, R.I., Agras, W.S., Korner, A.F., Kraemer, H.C., Zeanah, C.H. Physical-activity and adiposity - a longitudinal-study from birth to childhood. *J. Pediatrics*, 1985; 106:734-738.

Janz, K.F., Golden, J.C., Hansen, J.R. Heart-rate monitoring of physical-activity in children and adolescents - the Muscatine Study. *Pediatrics*, 1992; 89: 256-261;

Raitakari et al. (1994) Effect of persistent physical activity and inactivity on coronary risk factors in children and young adults, *American Journal of Epidemiology*, 140;

Moore, L.L., Nguyen, U.S., Rothman, K.J. (1995) Preschool physical activity level and change in body fatness in obese children, *American Journal of Epidemiology*, 142;

Anderson, R.E., Crespo, C.J., Bartlett, S.J., Cheskin, L.J. and Pratt, M. (1998) Relationship of physical activity and television watching with body weight and levels of fatness among children: results from the Third Nations Health and Nutrition Examination Survey. *JAMA* 279: 928-942

¹⁶⁸ Likewise, Studies cited by Ofcom (2004), the Health Survey for England (2002) and Burniat, W. (2002) op. cit. include:

Maffeis, C., Talamini, G., Tato, L. (1994) Influence of diet, physical activity and parents' obesity on children's adiposity: a four-year longitudinal study. *Int J. Obesity*, 1998; 22: 758-764

Moussa, M.A.A., Skaik, M.B., Selwanes, S.B., Yaghy, O.Y., Binothman, S.A. Factors associated with obesity in school-children. *Int J Obesity*, 1994; 18: 513-515

Goran et al (1998), Longitudinal changes in fatness in white children: no effect of childhood energy expenditure, *American Journal of Clinical Nutrition*, 67

¹⁶⁹ Rowlands, A.V., Ingledew, D.K., Eston, R.G. (2000) The effect of type of physical activity measure on the relationship between body fatness and habitual physical activity in children: a meta-analysis

5.1.2 Does watching television and playing computer games too much lead to obesity?

Although there is no clear UK evidence that obese children are more likely to have low levels of physical activity compared to non-obese children, there is plenty of evidence showing that high levels of sedentary behaviour such as watching television or playing computer games is predictive of being obese and overweight.

There is plenty of evidence showing that excessive sedentary behaviour such as watching television or playing digital games is predictive of obesity and overweight. This could operate in any of four ways:

1. Watching television or playing computer games does not expend any energy
2. Watching television does not expend any energy, and even depresses the metabolic rate
3. Children watch television or play computer games instead of doing physical exercise
4. Children watch television whilst eating food and drinks that are high in fat and sugar.

Watching television or playing computer games does not expend any energy

Little of the research distinguishes between these four mechanisms. Most research correlates obesity to both lack of physical activity and watching television, whilst other research just correlates it to watching television or playing computer games.

- The classic study on television watching and obesity was undertaken by Dietz and Gortmaker in 1995.¹⁷⁰ This showed that the amount of time spent watching television was directly related to the degree of obesity in childhood.
- Epstein et al. have also shown more success for weight loss by reducing sedentary behaviour than through introducing more physical activity sessions.¹⁷¹
- Most recently, Hancox et al.¹⁷² found that those children who watch 4 hours or more television per day are the most likely to be overweight or

¹⁷⁰ Gortmaker, S.L., Must, A., Sobol, A.M., Peterson, K., Colditz, G.A. and Dietz, W.H. (1996) Television viewing as a cause of increasing obesity among children in the United States, 1986-1990, cited in Burniat W (ed) et al. (2002) op. cit.

¹⁷¹ Epstein L.H. et al. (1995) Effects of decreasing sedentary behaviour and increasing activity on weight changes in obese children, *Health Psychology* 14

¹⁷² Hancox R.J. and Poulton, R. (2005) Watching TV is associated with childhood obesity: but is it clinically important? *International Journal of Obesity* advance online publication 13 September 2005

obese, children who watch a maximum of 1 hour per day are least likely to be overweight or obese. The relationship between sedentary activities and overweight and obesity remained significant even when parental body-mass and socio-economic status were taken into consideration. They noted that although the effect size appeared small, it was larger than the effect sizes commonly reported for nutritional intake and physical activity.

- A study among children from Mexico City¹⁷³ also found that limiting sedentary activities could be beneficial to children's weight. It found that the risk of obesity increased by 12% for each hour per day spent watching television, and decreased by 10% for each hour per day spent doing moderate-to-vigorous physical activity.
- An Australian study of 5 to 13 year olds¹⁷⁴ also found that the odds of obesity increased with increased television watching, although there was no significant link with playing computer games at this age. A study of 7 to 11 year olds in Canada,¹⁷⁵ found that both watching television and playing computer games increased the risk of being overweight by 17-44% and being obese by 10-61% in children. A study in Japan¹⁷⁶ also found that overweight and obese children had played computer games for longer than children who were classified as ideal weight. However a study of 2,800 children aged 12 and under,¹⁷⁷ which used time use diaries, found a relationship between computer games and obesity, but felt that this was not linear. It also concluded that there was actually a lack of relationship between watching TV and the children's weight.
- On the other hand, one other study of 200 preschoolers in Texas,¹⁷⁸ found that although television watching was weakly, negatively correlated with physical activity levels. It was not associated with body composition.

¹⁷³ Hernandez, B., Gortmaker, S.L., Colditz, G.A., Peterson, K.E., Laird, N.M., Para-Cabrera, S. (1999) Association obesity with physical activity, television programmes and other forms of video viewing among children in Mexico City. *International Journal of Obesity* 23: pp 845-854; cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002), Childhood obesity: public-health crisis, common sense cure, *The Lancet* 2002; 360:473-482

¹⁷⁴ Wake, M., Hesketh, K., Waters, E. (2003) Television, computer use and body mass index in Australian Primary School Children, *J. Pediatr Child Health*; 39(2):130-4; cited in Sheng-Fei Oon (2004) Nintendo-isation: sedentary lifestyles, obesity and increasing health problems including Type 2 diabetes in modern day children and adolescents. *Trinity Student Medical Journal*

¹⁷⁵ Tremblay, M.S. Willms, J.D. (2003) Is the Canadian childhood obesity epidemic related to physical inactivity? *Int J Obes Relat Metab Disord*; 27(9):1100-5, cited in Sheng-Fei Oon (2004) op. cit.

¹⁷⁶ Shimai, S., Yamada, F., Masuda, K., Tada, M., (1993) TV game play and obesity in Japanese school children, *Percept Mot Skills*; 76 (3Pt 2): 1121-2; cited in Sheng-Fei Oon (2004) op. cit.

¹⁷⁷ Vandewater, E., Shim, M., Caplovitz, A. (2004) Linking Obesity and Activity level with Children's Television and Video Game Use, *Journal of Adolescence*, 27, 71-85; cited in Henry Kaiser Foundation (2004) The role of media in childhood obesity

¹⁷⁸ Ibid.

Does watching television suppress the metabolic rate?

Klesges et al. took this further in 1993¹⁷⁹ and showed that children's metabolic rate was actually suppressed whilst they watched television, reducing energy expenditure even further.

Does sedentary activity like watching TV replace physical activity?

The European youth Heart Study Symposium warns us against assuming that sedentary behaviour replaces physical activity. It notes that:

“Children's time use diary data indicate that physical activity and TV watching take place at different times of the day and that the substitution of one by the other is unlikely, although during the weekend day there are opportunities to be active in place of watching TV.”

No evidence has studied this for children under the age of 11 exclusively. A review of the health of children aged 11-14¹⁸⁰ for WHO across 34 European countries and the USA in 2004 found concluded that:

“Data does not support the view that high levels of sedentary behaviour are directly linked to low levels of physical activity, and imply that reducing hours spent in front of television may not have a substantial impact on energy expenditure.”

The authors also note that there are consistent gender differences. For girls, as physical activity decreases so television viewing increases. There is no such significant association for boys. They conclude that television viewing may contribute to obesity not because it is linked to reduced levels of physical activity but because it encourages increased consumption of food and drink.

Are obese children more likely to watch television whilst eating high fat food and drinking sugary soft drinks?

In a prospective study of 8/9 year olds children in the US study by Stanford University,¹⁸¹ researchers found that a significant proportion of children's daily energy intake is consumed during television viewing, and the consumption of high-fat foods on weekends may be associated with BMI in younger children.

¹⁷⁹ Klesges R.C., et al. (1993) Effect of television on metabolic rate: potential implications for childhood obesity. *Pediatrics* 91, cited in Burniat W (ed) et al. (2002) *Child and adolescent obesity, causes, consequences, prevention and management*, CUP

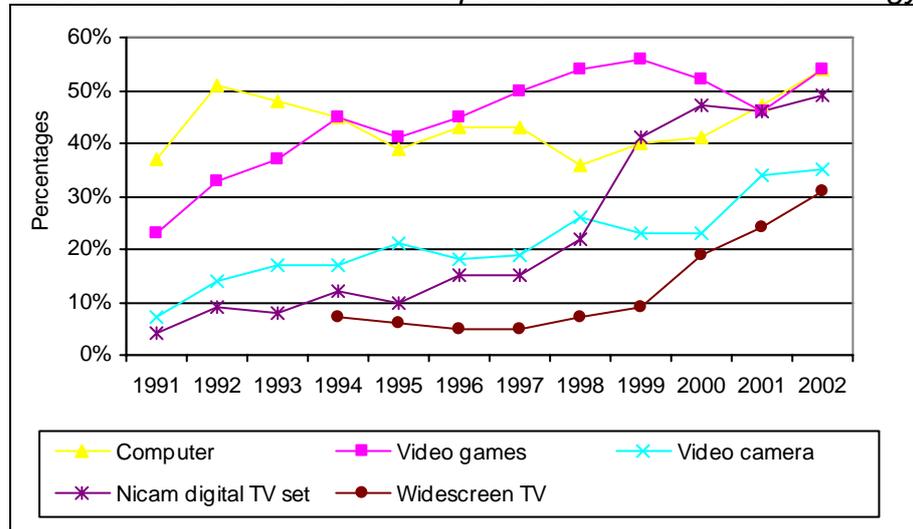
¹⁸⁰ Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O. and Barnekow Rasmussen, V. (2004) *Young people's health in context. Health behaviour in school-aged children (HSBC) study, International Report from the 2001/2 Survey*, WHO

¹⁸¹ Matheson D.M., Killen J.D., Wang Y., Varady A., Robinson T.N. (2004) Children's food consumption during television viewing, *Am J Clin Nutr* 2004; 6 (79): 1088-94

Has television watching and playing of computer games increased significantly?

Ownership of home entertainment technology has increased rapidly in the past decade in households with children.

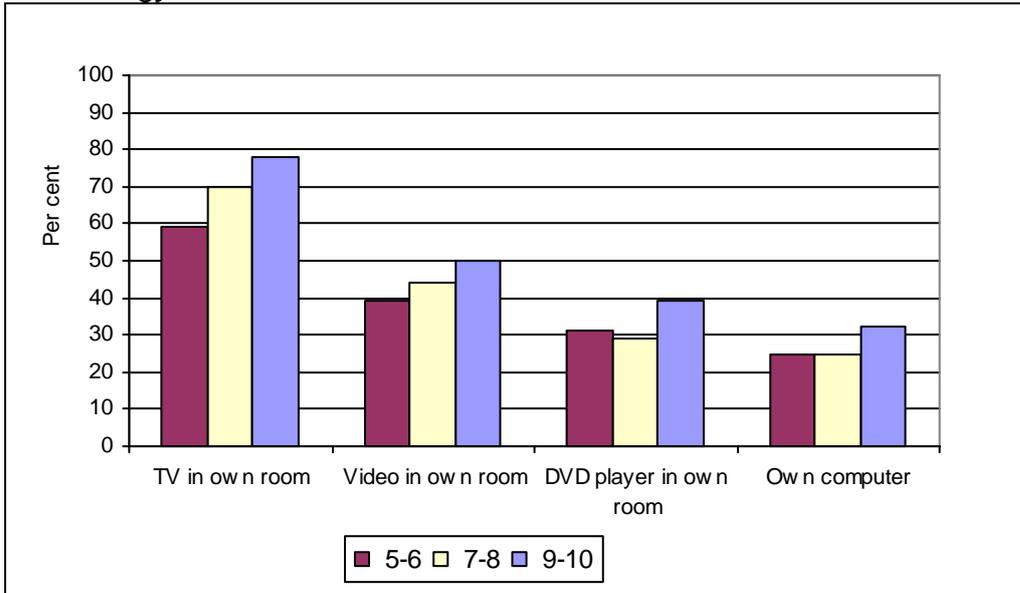
Households with children with specific entertainment technology in the home



Source: Future Foundation (2003), Changing Lives

In fact, almost 60% of 5/6 year olds have a TV in their own room, and 30% even have a DVD of their own.

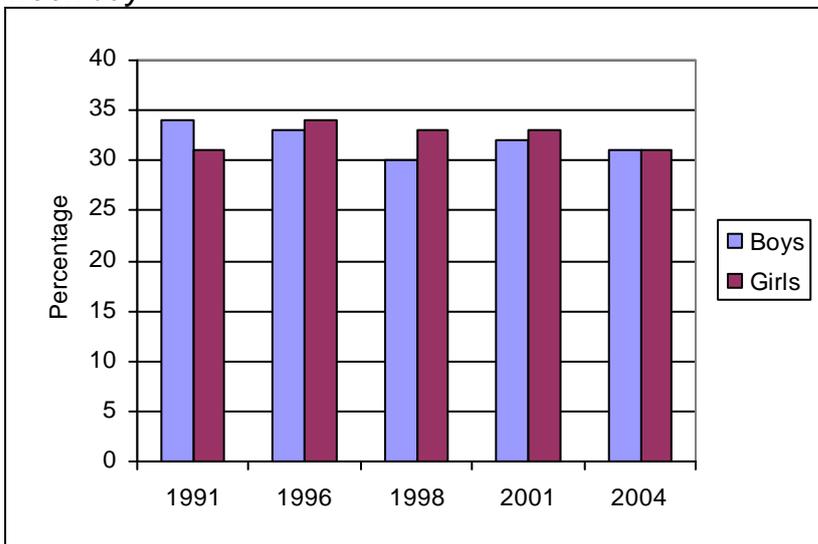
Technology in children's bedrooms



Source: ChildWise (2004) ChildWise Monitor

The amount of time 4-15 year olds spend watching television has doubled since the 1960s.¹⁸² However, the proportion of 12/13 year olds watching more than 2 hours of television per day (weekdays only) has not increased from 1991 to 2004 at a time when obesity has increased. This is in spite of the spread of multi-channel TV and the increasing proportion of children with TVs in their own rooms.

Proportion of 12/13 year olds watching more than 2 hours of television per week day

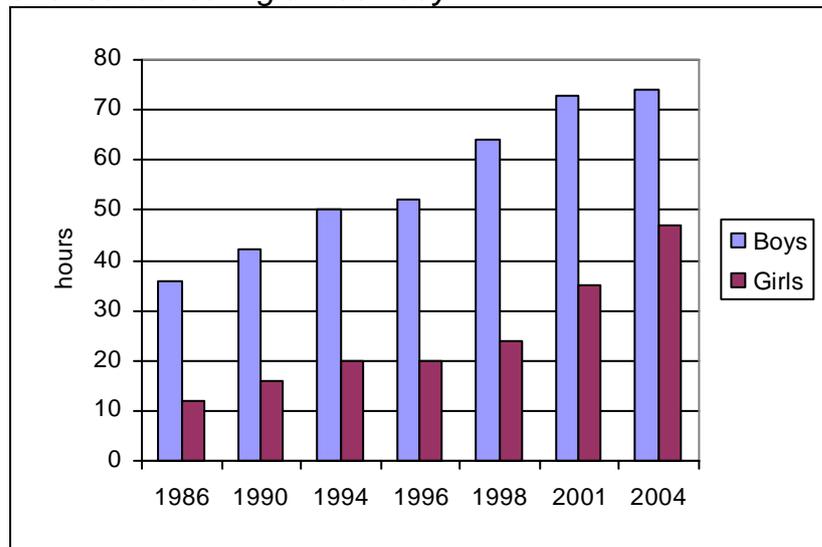


Source: Balding, J., Young People inseries, Schools Health Education Unit

On the other hand, the proportion of 12/13 year olds that spend any time playing computer games after school on a weekday has increased dramatically over the past twenty years.

¹⁸² Pullinger, J. (Ed) Social Trends 28, cited in Reilly, J.J. and Dorosty, A.R. (1999) The Epidemic of obesity in UK children, The Lancet 354 (9193), 27 November 1999

Percentage of 12/13 year olds who spent some time playing computer games after school during a week-day



Source: Balding, J., Young People inseries, Schools Health Education Unit

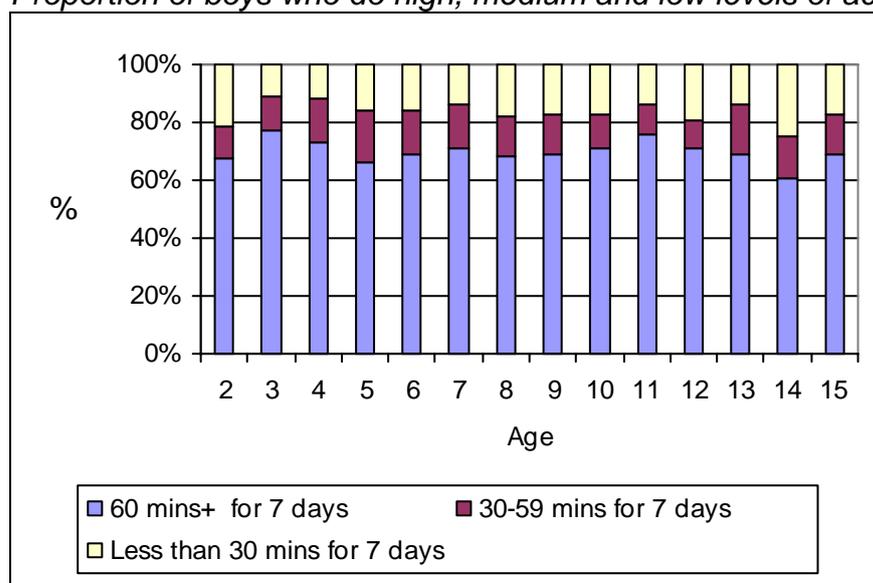
5.3 Do children currently do the recommended levels of physical activity, and has this been declining?

5.3.1 Current levels

The Chief Medical Officer recommends that children and young people should do one hour of moderate physical activity everyday.¹⁸³ The National Diet and Nutrition Survey shows that only 70% cent of boys and 49% of girls aged 7-10 do this.¹⁸⁴ A weaker recommendation is that less active young people should participate in at least 30 minutes of moderate physical activity each day. Boys are more likely to achieve this than girls, with 90% compared to 84%.¹⁸⁵

Similar levels are reported in the Health Survey of England (2002) as shown below.

Proportion of boys who do high, medium and low levels of activity by age



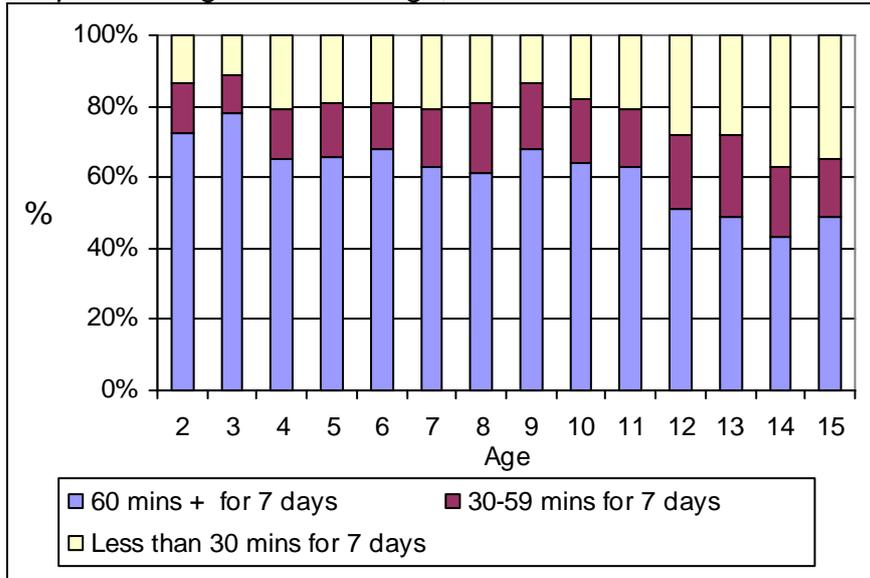
Source: Stamatakis, E. (2002) Physical Activity, in *The Health of Children and Young People*, Chapter 4, The Health Survey of England

¹⁸³ Chief Medical Officer (2004) At least five a week: evidence on the impact of physical activity and its relationship to health, DH

¹⁸⁴ FSA (2000) National Diet and Nutrition Survey: young people aged 4 to 18 years

¹⁸⁵ Ibid.

Proportion of girls who do high, medium and low levels of activity by age



Source: Stamatakis, E. (2002) Physical Activity, in The Health of Children and Young People, Chapter 4, The Health Survey of England

An alternative way to look at this is to examine the average amount of time spent on physical activities (excluding compulsory school PE, but including extra-curricular sport organised by school) by boys and girls. The Health Survey for England (2002) shows that on average, boys aged 2-11 spend around 14 hours of participation in physical activity in the last 7 days, while the corresponding figure for girls was around 12 hours.

Children’s overall activity levels do not vary by income group. Children in the most deprived areas do the least sport and exercise outside of school PE lessons.

Children who had participated in Sports and Exercise in the last week on at least one day, by Index of Multiple Deprivation quintile

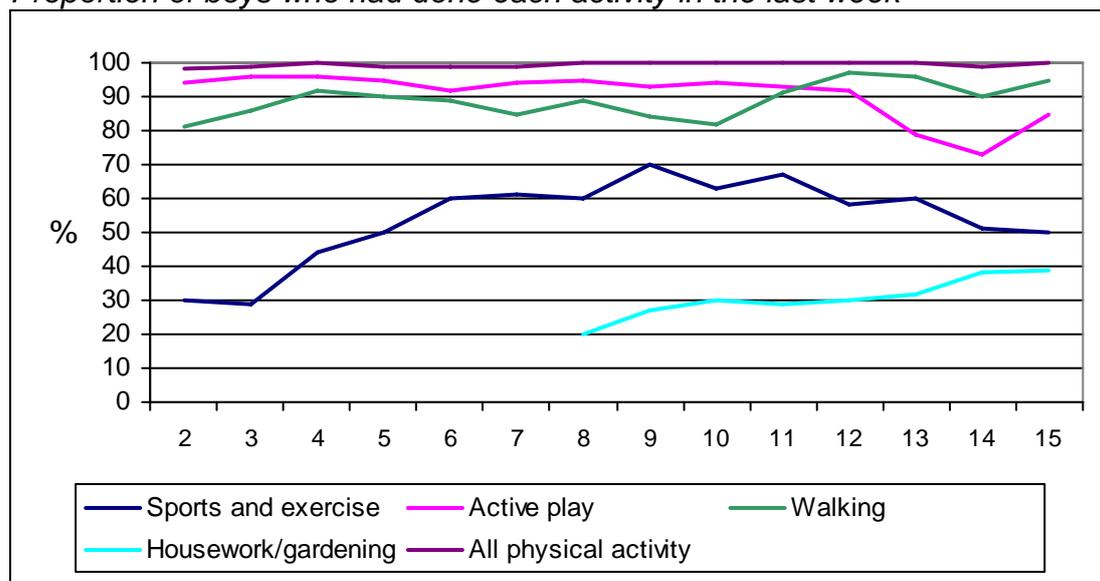
	1 st (least deprived)	2 nd	3 rd	4 th	5 th
Boys aged 2-10	61%	62%	57%	55%	47%
Boys aged 11-15	73%	66%	68%	63%	64%
Girls aged 2-10	64%	65%	59%	53%	43%
Girls aged 11-15	62%	62%	60%	55%	53%

Source: Stamatakis, E. (2002) Physical Activity, in The Health of Children and Young People, Chapter 4, The Health Survey of England

5.3.2 Types of physical activity

The graphs below show the proportion of children and teenagers who had participated in different types of physical activity in the least week, excluding compulsory school PE. Surprisingly it shows that only 70% of 8 year olds boys and 60% of 8 year old girls have participated in sport or exercise outside of school. Reassuringly, the figures for active play hover around 95% up to the age of 10.

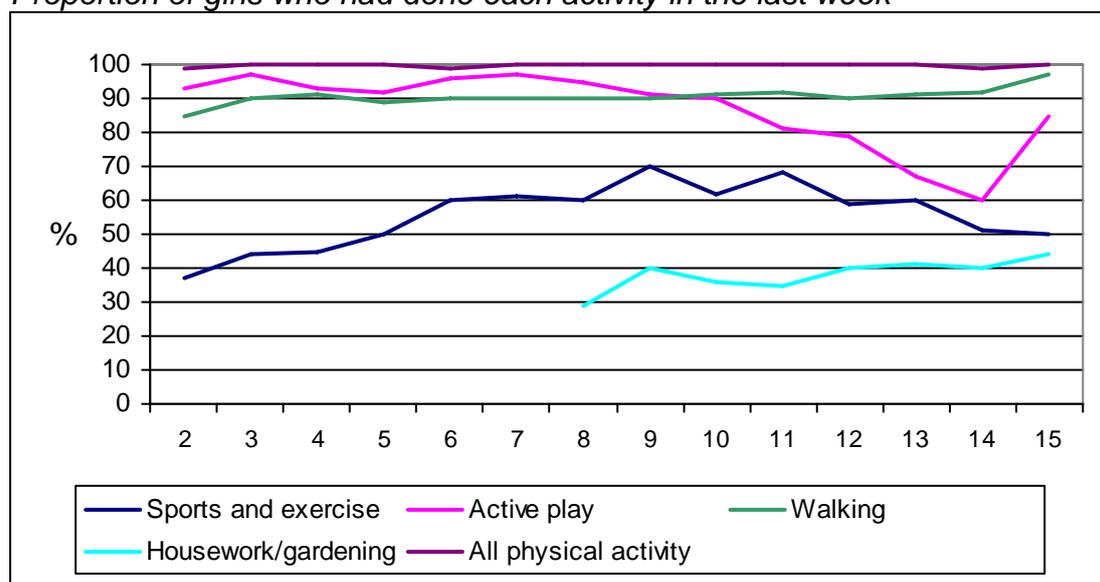
Proportion of boys who had done each activity in the last week



Source: Stamatakis, E. (2002) Physical Activity in The Health of Children and Young People, Chapter 4, The Health Survey of England

Active play is defined as "active things like ride a bike, kick a ball around, run about, play active games, jump around".

Proportion of girls who had done each activity in the last week



5.3.3 Trends in physical activity

The only trend data for all types of physical activity for children under the age of 11 that exists comes from the Health Survey for England.¹⁸⁶ This compares activity in 2002 with that in 1997 – so not a very long time lag.

Furthermore, the structure of the physical activity questionnaires for the survey was considerably different between 1997 and 2002. To make 2002 data comparable with the 1997 data, only activities that lasted at least 15 minutes were included in the trend analysis. Girls' activity time started to decline from age 9, while the time boys' spent in activity remained relatively stable through to age 15.

Nevertheless, the survey shows that between 1997 and 2002, there was an increase in the proportion of young people doing less than 60 minutes of activity each day. In particular:

- No differences between 1997 and 2002 were found in the proportions of boys and girls aged 2 to 10 and 11 to 15 meeting the higher target of the physical activity recommendations for at least 60 minutes of activity per day (Group 3). Among boys aged 2 to 15, 54% in 1997 and 55% in 2002 met this target.
- Differences were more pronounced when the lower target of the recommendations was considered: the proportion of those who did less than 59 mins of activity per day increased by 9 % for boys aged 2 to 15 (from 64% in 1997 to 73%) and by 14 % for girls aged 2 to 15 (from 51% in 1997 to 65% in 2002). These increases over time were statistically significant for both sexes (p<0.0001).

Proportions of children meeting the higher and lower recommendations of the physical activity guidelines: 1997-2002

Recommendation	Type of child	1997	2002	Change
Higher: 60 mins on 7 days	Boys aged 2-15	54%	55%	+1%
	Girls aged 2-15	39%	43%	+4%
Lower: less than 60 mins on 7 days	Boys aged 2- 15	64%	73%	+9%
	Girls aged 2- 15	51%	65%	+14%

Source: Stamatakis, E. (2002) Physical Activity in The Health of Children and Young People, Chapter 4, The Health Survey of England

The Health Survey for England does not publish data for trends in participation in sport and exercise. However, the Sport England surveys discussed in the subsequent sections show that:

- PE: There was a decline in the proportion of children doing at least 2 hours of PE in primary schools. The proportion of primary school offering this to 6 to 8 year olds has declined from 1994 to 2002 from 32% to 29%. The proportion offering it to 8 to 10 year olds declined

¹⁸⁶ Sproston, K. and Primatesta, P. (2003) Health survey for England 2002 – the health of children and young people

from 46% to 32%. However, since 2003 this situation has improved slightly.

- Extra-curricular sport: The proportion of young people participating in any extra-curricular sport has increased from 1994-2002 from 31% to 41%. The biggest increase has been in football.
- Sport outside of school: In 2002, 12% of children aged 6 to 11 did not do any sport (excluding walking) at least 10 times in the past year. This has actually grown a very small amount from 11% in 1994.
- Walking to school: Between 1989/91 and 1999/01, there was an 11% increase in the number of 5 to 10 year olds driven to school (from 28-39%).

However, one analysis of children's activity suggests that if children's activity is suppressed at one part of the day (e.g. school) they will compensate for it during another part of the day.¹⁸⁷ For example, using accelerometers, they found that children who walked to school did not expend less energy overall compared to those that were driven because they compensated for this by being more active during other parts of the day. Likewise, children who did less PE at school than others were more active after school. This would suggest that encouraging more children to walk to school or expanding time for PE in school would not have an impact on total energy expenditure and therefore not prevent obesity.

¹⁸⁷ Metcalf, B. et al. (2004) The regulation of physical activity in young children, *Education and Health* 61

5.4 PE and sport in school

Sections 5.1 to 5.3 suggested that there was some evidence to show that children who became obese did less physical activity than those who were ideal weight. However, there is not yet complete agreement on this. The evidence that high levels of sedentary activity are correlated to obesity is much stronger.

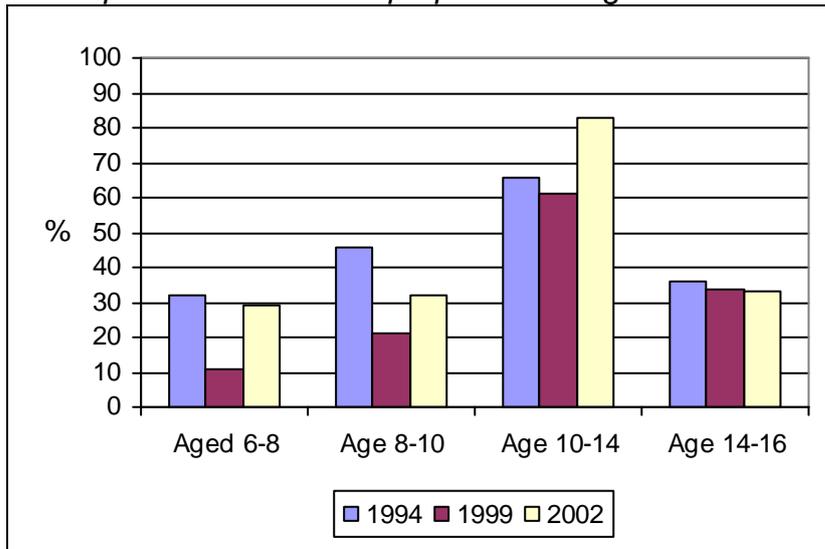
The following sections analyse trends in different types of physical activity, namely PE and sport in school, extra-curricular sport, sport outside school, active play, walking to school and helping round the house. These are trends for the whole population of children. There is no data on the different types of physical activities that obese children do relative to non-obese children. We cannot therefore associate trend changes in different types of activity with trend changes in obesity. For example, the analysis below shows that the proportion of children doing 2 hours worth of PE declined from 1994 to 2002. We do not know if children who became obese were less likely to do PE.

5.4.1 Trends and existing levels

Currently all schools in England have to offer two hours of PE a week either within or beyond the curriculum.

However, since 1994, most primary schools were not offering this. The Sport England surveys show that in 1994 and 2002, only 32% and 29% of primary schools were offering this to 6 to 8 year olds, and only 46% and 32% were offering it to years 8 to 10 year olds. In other words, there had been a decline.

Time spent in PE lessons: proportion doing two hours or more



Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

Furthermore, from 1994 to 2002, the proportion of primary school pupils who had not done sport at least 10 times in the past year in school had actually risen from 11% to 16%. There had also been little improvement in the variety of sports that pupils had done. For example, the proportion doing athletics had declined from 72% to 60%.

Proportion doing types of sport in PE lessons at least 10 times in the past year: Years 2-6 (age 6 to 10)

Sports	1994	1999	2002
Games	52%	56%	55%
Team games	51%	55%	52%
Racquet games	8%	10%	14%
Swimming, diving, lifesaving	47%	43%	48%
Dance and ice skating	12%	11%	10%
Athletics and gymnastics	72%	66%	60%
Outdoor and adventurous activities	8%	7%	8%
Any sport excluding walking	89%	86%	84%
No sport at least 10 times in last year	11%	14%	16%

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

In response to this sort of problem, the DfES set up PE School Sport and Club Links strategy to improve school sport. However, by 2004/5, even in those primary schools participating in this scheme, only 64% of primary school pupils were doing 2 hours of sport per week.¹⁸⁸

5.4.2 Why do young people not do enough sport at school?

Expertise

The lower level of sport in primary schools is partly attributed to the fact that many primary school teachers are generalists, and their individual expertise in PE is often limited.¹⁸⁹ Only 9% of primary schools have a full time PE specialist, compared with 98% of secondary schools.¹⁹⁰ Therefore the vast majority of primary schools (93%)¹⁹¹ rely on class teachers and other staff to teach PE.

Many long-serving teachers have had very limited professional development. Additionally, many newly qualified teachers have had very limited training to teach PE in the National Curriculum, which is leaving many ill-prepared to meet the challenges of the subject.

¹⁸⁸ TNS (2005) The results of the 2004/5 school sport survey, Sport England

¹⁸⁹ TNS (2005) The results of the 2004/5 school sport survey, Sport England

¹⁹⁰ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

¹⁹¹ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

A review of PE in primary schools by Ofsted during 2003/5 noted that things are improving:

“The quality of teaching is good or better in nearly *two thirds* of all lessons across both key stages. The effectiveness of teaching is reduced by weaknesses in teachers' subject knowledge and understanding of the full range of the programme of study, and in their use of assessment.”

This is an improvement on 1998/9 when 44% of lessons in primary schools were good or better.¹⁹²

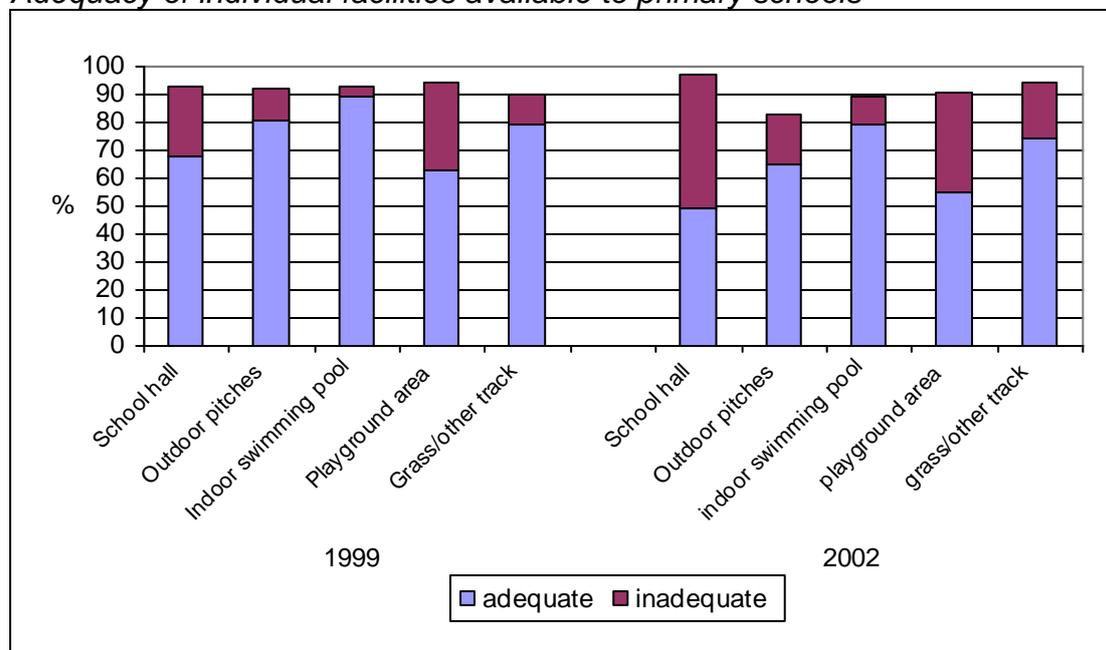
Numeracy and literacy

The introduction of the National Literacy Strategy and National Numeracy Strategy in 1998 and 1999 with their corresponding numeracy and literacy hours created a new emphasis on these subjects. It is argued that this was often at the expense of other subjects such as arts, history, as well as PE.

Facilities

Primary schools have a smaller range of sports facilities available to them than secondary schools. Facilities are often in the form of non-sports related facilities such as school halls and playgrounds.¹⁹³ However it is these two facilities which are deemed most inadequate by PE teachers.¹⁹⁴

Adequacy of individual facilities available to primary schools



¹⁹² Ofsted (2005) The annual report of her majesty's chief inspector of schools, 2004/5

¹⁹³ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

¹⁹⁴ Ibid.

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

When asked to comment on the adequacy of sports facilities available to the school,¹⁹⁵ only 27% of primary PE teachers said that the facilities were “on the whole adequate.” Thirty one percent thought the facilities were “fairly adequate,” 21% thought they were “fairly inadequate” and 19% thought they were “on the whole inadequate.”

School playing fields

Before 1998, there were no barriers to school selling playing fields or building on playing fields in order to expand.

Since 1998, schools can only sell or lease playing field land if it is genuinely surplus to school and community sports needs. Local authorities and schools in England need permission from the Secretary of State for Education and Skills before they can sell off any school playing fields. All proceeds from any playing field sales must be returned to improving sports and education facilities.

Since this law was introduced, the number of playing field sites sold has reduced dramatically, though there is strong disagreement between the DfES and the National Playing Fields Association on how the figures are calculated.

5.4.3 What is the government doing to address this?

Two government strategies feed into PE and sport policy in England.

1. PE and School Sport and Club Links
2. Extended Schools

These programmes are outlined briefly below.

PE and School Sport and Club Links (PESSCL)

In April 2003, the government launched the National PE, School Sport and Club Links Strategy (PESSCL). Elements that affect primary schools are as follows:

Training primary school teachers

As outlined earlier, primary school teachers in particular lack expertise and the low motivation of some pupils is often attributed to the way PE is delivered in school. Two strategies are being followed to address this:

- Specialist Sport Colleges. These are English secondary schools with additional resources and special expertise for teaching sport. The

¹⁹⁵ Ibid.

colleges act as centres of excellence and create partnerships (called School Sports Partnerships) with local primary and secondary schools, which work to improve both the quality and quantity of after-school sport and inter-school competition. A typical School Sport Partnership consists of a Partnership Development Manager (PDM) in the Specialist Sport College, up to eight School Sport Co-ordinators (SSCOs) in other local secondary schools and 45 link teachers in primary and special schools. A key role of the PDM is to train primary school teachers to improve the quality of sport in local primary schools. There are 17,600 primary schools in England, and the DfES aims to have three quarters of these involved in this network by now.

- In addition, both form teachers and sports co-coordinators are receiving training in delivering specific sports.

However, the Ofsted review felt that sports co-ordinators benefited in primary schools far more than class teachers, and that there was too great a reliance on simply exchanging lesson plans:

“The PESSCL strategy is, however, helping to provide additional support for many class teachers and subject leaders, most commonly in subject leaders' courses and training for specific sports. These courses are helpful in developing teachers' confidence, particularly where they engage in the 'team teaching' process. Occasionally, however, they fail to address the school's own needs and development of its core provision. The support offered to primary link teachers involved in the school sport partnerships programme increasingly involves the sharing of schemes of work and lesson plans. This is helping teachers to improve the structure of their lessons, raise their expectations and increase the pace of learning. However, without accompanying support or training for class teachers, lesson plans alone can be problematic in terms of understanding the nature of the content and its relation to health and safety requirements. Thus, while the strategy is having tangible benefits in many schools, some provision remains, at best, satisfactory.”¹⁹⁶

Sporting Playgrounds

The Sporting Playgrounds initiative helps primary schools to re-design their playgrounds so that they tackle the inactivity, boredom and poor behaviour which are often evident in schools.

School club links

School Club Links aims to strengthen the links between schools and local sports clubs and by doing so increase the number of children who become members of accredited sports clubs. By 2004, 28% of pupils in the PESSCL initiative said they participated in a sports club.¹⁹⁷

Inter-school competitions

As part of PESSCL, schools are being encouraged to offer pupils the chance to play in inter-schools sports competitions. These competitions could be in a

¹⁹⁶ Ofsted (2005) The annual report of her majesty's chief inspector of schools, 2004/5

¹⁹⁷ TNS. (2005) The results of the 2004/5 school sport survey, Sport England

whole range of sports including football, rugby and athletics. These competitions are most likely to take place after school hours. By 2004, 41% of pupils in the PESSCL initiative said they participated in inter-school competitions.¹⁹⁸

Swimming

Swimming and water safety are statutory activities at Key Stage 2 (pupils aged 6 to 10), designed to ensure children are able to swim unaided over a distance of at least 25 metres. As part of PESSCL, a swimming charter was created to outline what pupils need to be able to achieve at each Key Stage.

A national top up swimming programme is also being launched to provide additional lessons to those who were likely to reach the end of their primary schooling without being able to swim.

Extended schools

The government are currently promoting and developing 'extended schools'. Extended schools are schools which will open earlier and close later to help meet the needs of parents, pupils and the local communities. They include breakfast clubs at the start of the day and after-school clubs at the end of the timetabled day. This should reinforce the expanding provision of after-school sports clubs. By 2010, all primary schools should be able to offer this "wrap-around" care from 8 a.m. to 6 p.m.

5.5 Extra-curricular sport

Trends and current levels

Extra-curricular sport refers to sport organised by a school, but taking place outside of lessons. Young people will participate in these sports on a voluntary basis, usually in after-school clubs.

According to findings from an HSBC study,¹⁹⁹ those pupils who are involved in school clubs are more likely to reach the recommended level of physical activity each week, than those who did not get involved with school clubs.

Ninety one per cent of primary schools offered extra-curricular activities to pupils in 2002. The proportion of young people participating in any extra-curricular sport has increased from 1994-2002 from 31% to 41%. The biggest increase has been in football.

¹⁹⁸ Ibid.

¹⁹⁹ Health Development Agency (2004) HSBC briefing, Physical activity and young people. Draft report, cited in BHF (2004) Couch Kids: the continuing epidemic

Proportion of 6-10 year olds participating in extra-curricula sports, by type of sport

	1994	2002
Football	12%	18%
Netball	6%	7%
Athletics	3%	5%
Cricket	3%	5%
Rounders	3%	4%
Hockey	1%	2%
Tennis	2%	3%
Basketball	1%	2%
Gym, gymnastics, trampolining	3%	4%
Rugby	2%	1%
Dance classes	3%	4%
Cross country, jogging, road running	2%	3%
Swimming, diving, lifesaving	3%	3%
Climbing, abseiling, pot-holing	0%	2%
Participate in any extra-curricular sport	31%	41%

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

Fifty nine per cent of 6-11 year olds have done no extra-curricular activities in the last year. Of those children who had taken part in extra curricular activities, the majority had done it for just 1 or 2 days.²⁰⁰

Overall, girls are less likely to take part in extra-curricular activities than boys aged 6 to 8, but this reverses at age 6 to 10.

Percentage of children who took part in extra-curricular sport

	Aged 6-8	Age 8-10
Boys	40%	49%
Girls	28%	55%

Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

It might be the case that children that become obese do not like or participate in extra-curricular sport, but there is no data to prove this either way.

Reasons for increase in extra-curricular sport²⁰¹

Forty three per cent of primary PE teachers believe that the number of sports arranged out of schools lesson time had increased in the three years up to 2002, and around a third believed it had stayed the same.

²⁰⁰ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²⁰¹ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

More commitment by existing and new staff and increased involvement from coaches, specialists and sport organisations were felt to be the main reason for the increase in the number of sports and physical activities arranged by the school out of lesson time over the last three years. An increased number of sports and facilities offered along with more involvement in competitions were also seen as prominent drivers.

Increased workloads and fewer staff helping or willing to take clubs were the main reasons cited for a decrease in the number of sports and activities arranged out of school time in the three years up to 2002.

When asked if they felt that there would be an increase in extra-curricular sport over the next three years, 42% of primary PE school teachers felt that it would increase, and 42% believed it would stay the same.

PE teachers in 2002 expected increased involvement from coaches, specialists and sport organisations to act as a catalyst for an increase in the number of sports arranged out of lesson time over the next three years after 2002. However, a greater drive to encourage pupils to participate was seen as more instrumental in future increases than the reasons for increases in the past three years.

These positive trends can only be expected to improve over the next five years as the government's "Extended Schools" programme is rolled-out. This will expand provision of after-school clubs in primary schools in order to provide activities for pupils who are receiving "wrap-around" care.

Those few PE teachers in the Sport England survey who felt that there had been or would be a decrease in the number of pupils taking part in sports out of school or the number of sports available to them, said increased workloads and fewer teachers helping out or willing to take clubs, were the main reasons for this.

5.6 Sport outside of school

5.6.1 Trends and current participation

In 2002, 12% of children aged 6 to 11 did not do any sport (excluding walking) at least 10 times in the past year. This has actually grown a very small amount from 11% in 1994. Over this period there had been a slight increase in the proportion doing racquet games, swimming and dance at least 10 times in the past year, but a slight decrease in those doing team games, athletics, gymnastics. There was a significant drop in those doing outdoor/adventurous activities such as cycling or orienteering.

Proportion of 6-10 year olds (Years 2-6) participating in sport outside of school at least ten times in the past year, by type of sport

	1994	2002
Games	60	61
Team games	54	53
Racquet games	24	26
Other games	10	16
Swimming, diving, lifesaving	60	63
Dance and ice skating	13	16
Athletics and gymnastics	53	53
Outdoor and adventurous activities	73	66
Any sport excluding walking	89	88
No sport at least 10 times in last year	11	12

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

Time spent doing sport and exercise per week out of lessons during term time: Years 2-6

	1994	2002
Usually no time in a week during terms	6	5
Up to 1 hour	11	9
1 -5 hours	42	45
5-10 hours	22	23
10 – 15 hours	10	12
15+	10	7
Less than an hour a week	16	14
10+ a week	19	18

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

Encouragingly, there was a very slight increase in children aged 6 to 11 doing sports as a member of a sports club (not school) from 38% to 41% from 1994 to 2002.

Young people aged 6 to 10 who did sports as members of a sports club, outside school, not organised by the school, percentage

	1994	2002
Football	10%	14%
Swimming, lifesaving	12%	12%
Judo, martial arts (karate/aikido)	7%	7%
Tennis	3%	4%
Gymnastics	5%	6%
Dance classes	4%	4%
Cricket	2%	3%
Rugby	2%	2%
Athletics – track or field	1%	1%
Did sport as a member of a sports club	38%	41%

Source: MORI (2003), Young people and sport in England: Trends in participation 1994-2002, Sport England

Which aspects of sport are attractive?

For this young age group, the main motivator for doing sport is spending time with their friends. For just over half of young people (52%), one of the key factors which encourages them to participate in sport and exercise is the fact that they want to be with their friends.²⁰²

5.6.2 Reasons for a lack of sport outside of school

Parental values and support

In a recent study, researchers from Arizona State University found that children who copied their parents' sedentary lifestyles which were dominated by watching television and playing computer games were 33.3% more likely to become overweight or obese as young adults. The researchers examined approximately 6,400 children in 1995, and then again in 2001-2002.²⁰³

In fact, many studies have shown that children whose family members participate in sport are more likely to take part themselves,²⁰⁴ and that children's sports participation is particularly influenced by the participation status of their same-sex parent. The results have not been unequivocal,

²⁰² MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²⁰³ Cited by NICE - Obese children "copy" their parents

²⁰⁴ Jambor, E.A. (1999). Parents as children's socializing agents in youth soccer, *Journal of sport behavior* 22/3 350-359; Wold, B. & Anderssen, N. (1992). Health promotion aspects of family and peer influences on sports participation, *International Journal of Sports Psychology*, 23/4, 343 – 359; Yang, X., Telama, R. & Laasko, L. (1996). Parents' physical activity, socio-economic status and education as predictors of physical activity and sport among children and youths: a 12-year follow-up study, *International Review of the Sociology of Sport* 31/3, 273 – 87; all cited in Kay, T. (2004) The family factor in sport: a review of family factors affecting sports participation, Sport England

however: for example, Wold and Anderssen²⁰⁵ found that children's sports participation correlates more strongly with their peers' participation than their family's, especially as children age. On the other hand, many friendships formed between 'sporty' children may themselves be building on their prior socialisation into sport within their families.

The 2002 survey by Sport England showed that those young people who enjoy sport and take part most frequently are most likely to receive parental encouragement to take part. Those who are reluctant to take part in sports receive the least amount of parental encouragement.²⁰⁶ On the whole, three-quarters of young people said that their parents had encouraged them to take part in sport. Boys appear to receive slightly more encouragement than girls.²⁰⁷

Family encouragement to do sport by typology, percentage²⁰⁸

	<Most sporty				Least sporty>
	Sporty types	Un-tapped potential	Un-adventurous	Couch potatoes	
Agree strongly	63	56	39	26	34
Agree slightly	24	26	27	38	35
Disagree slightly	7	8	15	21	15
Disagree strongly	4	4	10	12	11

Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

Parents influence children's participation in a number of ways:

- By passing on a belief that sport is to be valued
- By organising sporting occasions, from signing their child up to classes through to driving their child back and forth the sporting events or classes

Valuing sport

A study on attitudes to physical activity by low participants in Scotland²⁰⁹ found two types of parents:

- Parents that believe physical activity contributes to children's rounded development and helps to provide a sense of self-identity. They will therefore actively try to present their children with opportunities to participate in physical activity.

²⁰⁵ Wold, B., Anderssen, N. (1992) Health promotion aspects of family and peer influence on sports participation, *International Journal of Sports Psychology*, 23/4, cited in Kay, T (2004) *The family factor in sport: factors affecting sports participation*, Sport England

²⁰⁶ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²⁰⁷ Ibid.

²⁰⁸ Ibid.

²⁰⁹ Scott Porter Marketing Research (2002) Attitudes to physical activity by low participants, Physical activity Taskforce, Sport 21, Scotland

- Other parents, however, do not make the connection between achievement in later life and involvement in physical activities and try to deliver a quality of life to their children through education and material needs. Many will also believe that children naturally get enough physical activity through play. This group do not see, or see less of a role for physical activity in achieving their quality of life goals for their child. Physical activity is not viewed as overtly involved in the development of a child's personality. The role of physical activity is seen to relate to weight loss / weight maintenance / general fitness levels (and overall health). These parents are also more likely to have little interest in physical activity themselves, which in itself becomes a barrier for their children.

Studies in Australia²¹⁰ and the UK²¹¹ suggest that middle class parents are more likely to organise structured, organised after-school sport for their children because they attach greater importance to the developmental and health/safety benefits of sport. Lower income parents are more concerned with keeping the family together through shared leisure activity rather than organising and facilitating the sport and leisure interests of individual family members.

Barriers for parents

Parents' time

Parents who value sport for their children will clearly "make the time" for sport, though clearly this is easier for some than others. For example, single parent households cannot share parenting tasks in the same way as couples. One-parent households now constitute around a fifth of all households with children in the UK. Secondly, the average working week has increased in the UK. From 1983 to 1999, average weekly working hours increased from 42.3 to 43.6 hours. A Henley Centre survey in 2002 found that 45% of people agreeing with the statement "I am so tired in the evening that I often don't have energy to do much."

Own competence

Those who do not have a personal history of involvement in physical activity, are further inhibited due to lack of confidence in their own skills in this area.

Awareness of guidelines

²¹⁰ Harrington, M. (2003). Leisure Patterns and Purposive Leisure in Middle and Lower Income Families, Australian Institute of Family Studies conference, Melbourne, February 2003, cited in Kay, T. (2004) The family factor in sport: a review of family factors affecting sports participation

²¹¹ MORI (2001) UK youth too busy to get physical, British Heart Foundation

Research in Scotland also found that those parents who were less inclined to value sport also did not know what was the appropriate level of sport for children.²¹²

Fear

More traffic on the roads, perceptions that street crime is increasing, and high profile cases of child abductions are leading to concerns about safety (see section 5.7.2 for more detailed evidence on parents' fears).²¹³ Over 80% of parents surveyed by MORI in 2000²¹⁴ said "children today get less exercise because parents are afraid to let them go out alone." Consequently this leaves children even more dependent on their parents to ferry them to and from sporting events or clubs at a time when parents complain that they have too little time. If facilities are not local, this creates an even greater barrier.

Access to local facilities?

The amount of physical activities young people can take part in, is reliant to some extent on the facilities they have available to them. When asked about the sports facilities near by, 4 in 5 young people said they have a swimming pool and football facilities near by, whilst 3 in 5 said they have tennis facilities near by.²¹⁵

However, even though young people have some sports facilities near by, parents may still have concerns about letting their children travel alone. Therefore parents often think that it is safer for them to drive the children to the swimming pool, for example, but parents do not always have enough spare time to do this, which results in the children not using the facilities even though they are near by.

Cost of local leisure centres?

From the late 1980s onwards, an increasing number of local authorities provided discounts to families through Passports to Leisure/Leisure Cards. A review of these by Collins²¹⁶ found that they were poorly marketed, provided discounts that were too small to make a difference to poorer households, and provided discounts to only a limited amount of sports. He also found that take-up of such cards average 5% of the population, or at best one in six of the poor population.

²¹² Scott Porter Marketing Research (2002) Attitudes to physical activity by low participants, Physical activity Taskforce, Sport 21, Scotland

²¹³ Ibid.

²¹⁴ MORI (2000) Sport and the Family

²¹⁵ ChildWise (2005) The ChildWise Monitor

²¹⁶ Collins (2004) Driving up participation: Social inclusion, Sport England

One parent families in particular are more likely to struggle with the costs of leisure centres, with a weekly average disposable income two fifths of that of two parent households (£260 versus £632).²¹⁷

However, a review of the impact of entrance charges to leisure facilities in Scotland suggested that for those who do not put a value on sport, lowering entrance charges will have little impact.²¹⁸

Other costs of sport

Sports' participation requires adequate disposable income to pay for fees, kit and equipment, and transport to training and competition venues. As the level of support required from families increases, so too does the likelihood of children from certain families missing out: children from lower social class groups are especially under-represented as sports participants at high levels of performance.^{219 220}

However, some sports are more accessible to children from some ethnic populations and lower social groups because of tradition and culture, and because they are available locally, thus reducing transport costs and logistics, and they are relatively affordable in terms of fees and equipment. Other sports are accessible to only a small proportion of children, mostly from the AB social groups, again because of tradition and culture, and also because they are relatively expensive.²²¹

Practical support

Coakley²²² has drawn attention to the extent to which children's sport participation at all levels is dependent on the family's ability to invest the necessary resources of money, time and personal involvement. Parents may also make a practical contribution to running their child's sport²²³ by organising activities, officiating at events, coaching, providing group transport, and contributing to fundraising events.

In the UK, findings from a number of recent qualitative studies²²⁴ have shown that even at a young age, a child's involvement in competitive sport can

²¹⁷ ONS (2005), Family Spending, 2004-2005, A Report on the 2004-2005 Expenditure and Food Survey, ONS

²¹⁸ Coalter, F. (2004) Entrance Charges and Sports Participation, A review of evidence, Centre for Leisure Research Edinburgh University for Sport Scotland

²¹⁹ Rowley, S. (1992). TOYA (Training of Young Athletes Study): Identification of Talent, London: The Sports Council; cited in Kay, T. (2004) op. cit.

²²⁰ Sport England (1997). Development of Sporting Talent, London: English Sports Council

²²¹ Kirk, D. (2004) Sport and early learning experiences, Sport England

²²² Coakley, J. (2001). Sport in Society: Issues and Controversies, Seventh Edition, New York: McGraw-Hill; cited in Kay, T. (2004) op. cit.

²²³ Kay, T. (2004) The family factor in sport: a review of family factors affecting sports participation

²²⁴ Hepworth, C. (1999). Family support for sporting excellence, unpublished M.Sc. thesis, cited in Kay, T. (2004) op. cit.

become a commitment that gradually absorbs the whole family unit, until it determines family activities and behaviour to such an extent that it becomes the defining characteristic of family life.

Is sport viewed negatively by children in general?

The surveys by Sport England show that most children aged 6 to 11 actually have a positive attitude to sport

Percentage of 6-11 year olds agreeing that they enjoy sport and exercise in their leisure time

"I enjoy doing sport and exercise in my leisure time"	Boys	Girls
Agree strongly	79%	65%
Agree slightly	16%	24%
Disagree slightly	2%	4%
Disagree strongly	1%	2%
Don't know	2%	4%

Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

Negative attitudes to sport become much stronger in adolescence, especially amongst girls.

A typology²²⁵ of children aged 6 to 16 who play sport suggested there were 6 groups.

1. *Sporty types* (25%) – these young people enjoy sport and have high participation rates. disproportionately male (66%) but composed of roughly equal numbers of primary and secondary pupils.
2. *Untapped potential* (37%) – this consists of pupils who are not averse to sport and its trappings (for example getting wet or dirty) but who spend relatively small proportions of their time, either inside or outside school, actually taking part in it. Demographically, members of the group tend to be younger, or of primary school age, and female.
1. *Unadventurous* (14%) – these young people do not mind playing sport, but have lower participation rates than the untapped potentials. The cluster is composed mainly of secondary school pupils and in particular girls aged 11 to 14.
2. *Reluctant participators* (24%) - these young people dislike sport. The participation of this group is lower than the unadventurous, and is made up of a high proportion of females aged 13 to 16.
 - o *Tolerators* (15%) – this group dislike sport but have a higher than average participation. The group tends to be demographically representative.

²²⁵ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

- *Couch Potatoes* (9%) – this group dislike sport immensely and have the lowest participation of all groups. This group has a high proportion of secondary school girls.

Unfortunately these are not split out by age. However, according to this model, children under the age of eleven are most likely to be in the following typologies: “sporty”, “untapped potential”, and “tolerators”. Again, this reinforces the view that the overwhelming majority of children under the age of 11 enjoy sport. Typologies such as the “unadventurous” or “couch potatoes” only really emerge strongly in the teenage years.

Does school PE put children off sport?

A number of commentators²²⁶ consider that the approach to teaching sports both in and out of schools in England has focussed too much on practicing skills and drills, and creates an environment where success depends on being better than others. They suggest the children aged 5 to 14 should be given as many opportunities to “sample” different sports as possible with the emphasis on “playing the game” for fun. They encourage sports such as Kanga Cricket (played in Australia) where all players regardless of ability get to bowl, bat, wicket keep and field the same amount of time.

Nevertheless, the Ofsted report into PESSCL found that:

“Pupils’ attitudes in primary schools towards PE and school sport, and their behaviour in lessons, were overwhelmingly positive. In secondary schools the picture was more variable.”

Likewise, according to the 2002 Sport England survey, 73% and 65% of boys and girls respectively enjoy PE in schools.

²²⁶ Supporters of this approach from the academic sports world include A.G. Launder, M.W. Metzler, D. Kirk, D. Bunker, J.Côté

Percentage of boys and girls aged 6 to 10 agreeing that they enjoy PE and games in school

I enjoy PE and Games lessons in school	Boys	Girls
Agree strongly	73%	65%
Agree slightly	23%	27%
Disagree slightly	3%	4%
Disagree strongly	1%	1%
Don't know	1%	3%

Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

It might be the case that children that become obese do not like PE, but there is no data to prove this.

As might be expected, boys and girls take part in, and enjoy, different sports. The sport that boys aged 6 to 10 enjoyed the most was football, followed by rounders and then swimming. For girls of the same age, rounders and swimming were enjoyed the most, followed by athletics.²²⁷

Top 20 sports for young people in primary schools listed in rank order of percentages participating at least once in lessons in the last year

	Boys			Girls		
	Participated	Enjoyed	Not enjoyed	Participated	Enjoyed	Not enjoyed
Other games skills (e.g. hoops, throwing and catching)	73%	17%	6%	78%	17%	7%
Athletics	75%	27%	6%	73%	24%	10%
Rounders	66%	36%	3%	75%	40%	5%
Swimming, diving, lifesaving	67%	29%	4%	67%	37%	4%
Gym, gymnastics, trampolining	56%	5%	3%	62%	16%	3%
Football	59%	51%	3%	42%	18%	11%
Aerobics	43%	3%	6%	54%	10%	3%
Tennis	38%	14%	3%	44%	15%	5%
Cricket	45%	23%	4%	36%	11%	7%
Hockey	33%	8%	3%	37%	8%	10%
Cross country, jogging	29%	2%	3%	32%	2%	4%
Netball	19%	4%	5%	38%	16%	4%
Dance classes	25%	1%	11%	32%	10%	4%
Basketball	23%	7%	2%	21%	6%	3%
Walking: on walks of an hour or more, hiking	21%	1%	1%	22%	1%	1%
Rugby union	22%	8%	3%	14%	3%	4%
Cycling/riding a bike	10%	1%	*	13%	1%	-
Orienteering	10%	1%	*	12%	1%	1%

²²⁷ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

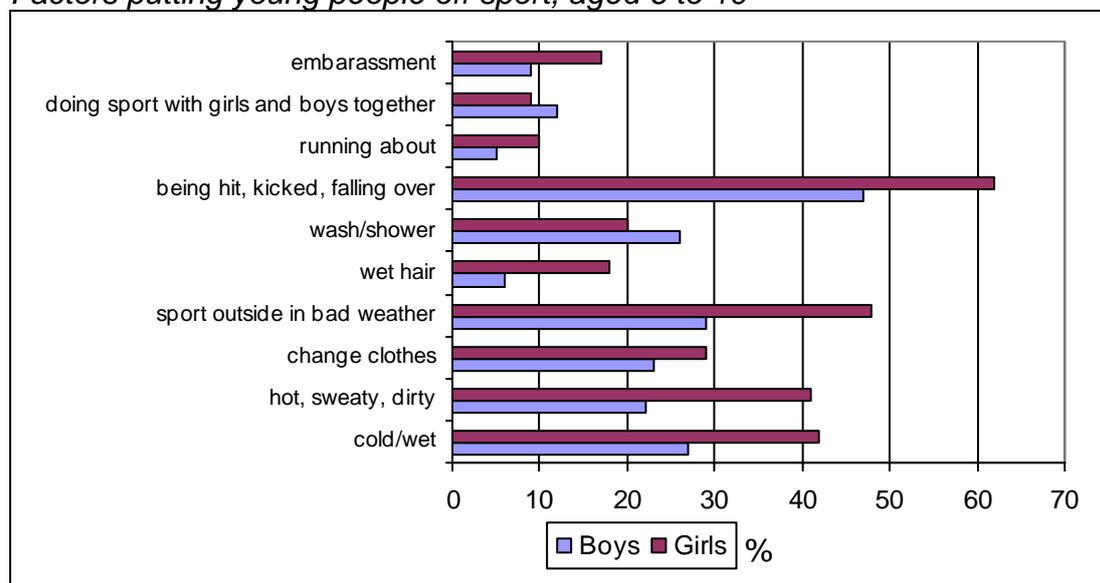
Volleyball	9%	2%	*	10%	2%	2%
Climbing	9%	1%	*	11%	3%	*

Barriers to sport for children to do with being uncomfortable

When asked what is off-putting about playing sport, the most common answers for pupils aged 6 to 10 are: being kicked/hit/falling over (55%), having to go outside in cold weather (39%), getting cold and wet (35%), and getting hot and sweaty (32%). Girls were significantly more likely to mind these things than boys.²²⁸ Of slightly lesser concern were: changing in to and out of sports kit (26%), having to wash (23%) and getting wet hair (13%).²²⁹

Another assumption often made is that young people do not enjoy taking part in sports with the opposite sex. In actual fact only 11% of young people aged 6 to 10 feel this way.²³⁰

Factors putting young people off sport, aged 6 to 10



Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

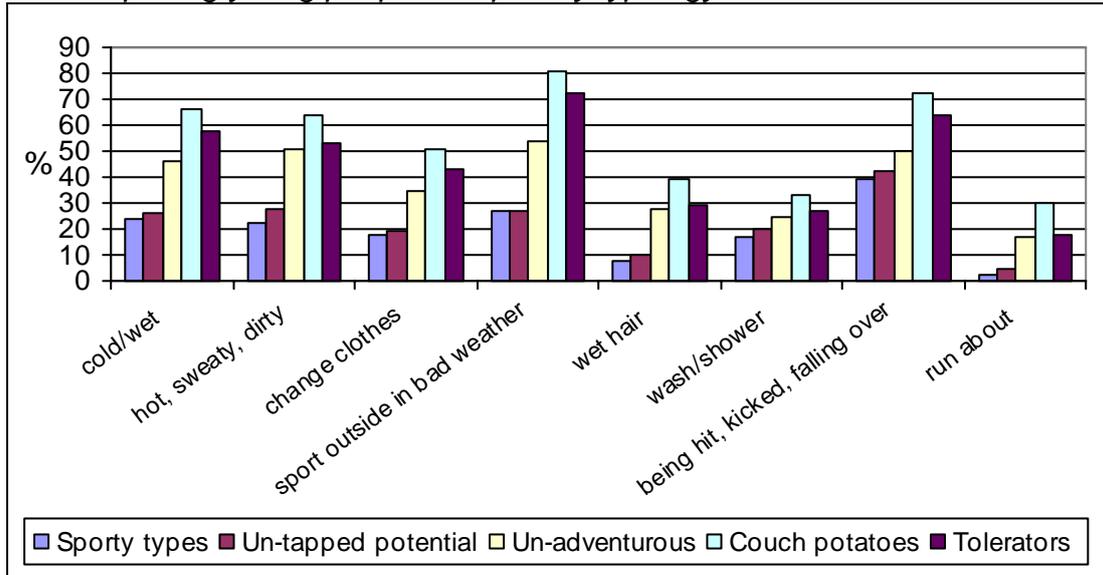
Turning to typologies of young people, the most off-putting element of sport for the couch potatoes and tolerators are bad weather, getting hot/sweaty/dirty, and getting hurt (note this is for all 6 to 16 year olds)

²²⁸ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²²⁹ Ibid.

²³⁰ Ibid.

Factors putting young people off sport by typology²³¹



MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

Is physical competence a barrier for children?

A common hypothesis is that many children dislike sport because they lack natural ability. Most educationalists agree that some children do have more “innate” ability than others, but that all children can be taught to improve their “physical literacy” if taught properly. In particular, they should be taught basic movement before they are expected to use complex movements in any sport, yet this is often lacking.

Physical literacy is in turn functions of all the other factors discussed in this section, such as the amount of encouragement and support that children get in sport from parents, opportunities in school, and access to facilities.

However, up to the age of 8, some psychologists²³² suggest that children equate effort with ability – they feel can accomplish most physical tasks if they try hard enough. From 8 to 12 they begin to recognise that their abilities may be limited regardless of the effort they put in. It is also at this age that children begin to enter into more organised sport where children begin to compare how good they are compared to each other. At 11-14, attitudes towards ability in sport become fixed. Consequently, lack of ability only really begins to become a barrier to sport at the end of the age range that we are exploring.

This is consistent with findings from the Sport England surveys. At age 6 to 10, 80% of children say that they are “good at sport and exercise”, but this falls to 74% at 11 to 16.

²³¹ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²³² Lee, A. et al (1995) Children’s conceptions of ability in physical education, *Journal of Teaching Physical Education*, 14 (4); cited in Kirk, D. (2004) Sport and early learning experiences, Sport England

Nonetheless, lack of ability does affect children's enjoyment of sport at this age. Forty six per cent say they mind if they are "not as good as others" when they do a sport, 73% say they mind if they "get left out because they are not good enough", and 38% say that they mind when "it takes you a long time to learn something in sport".

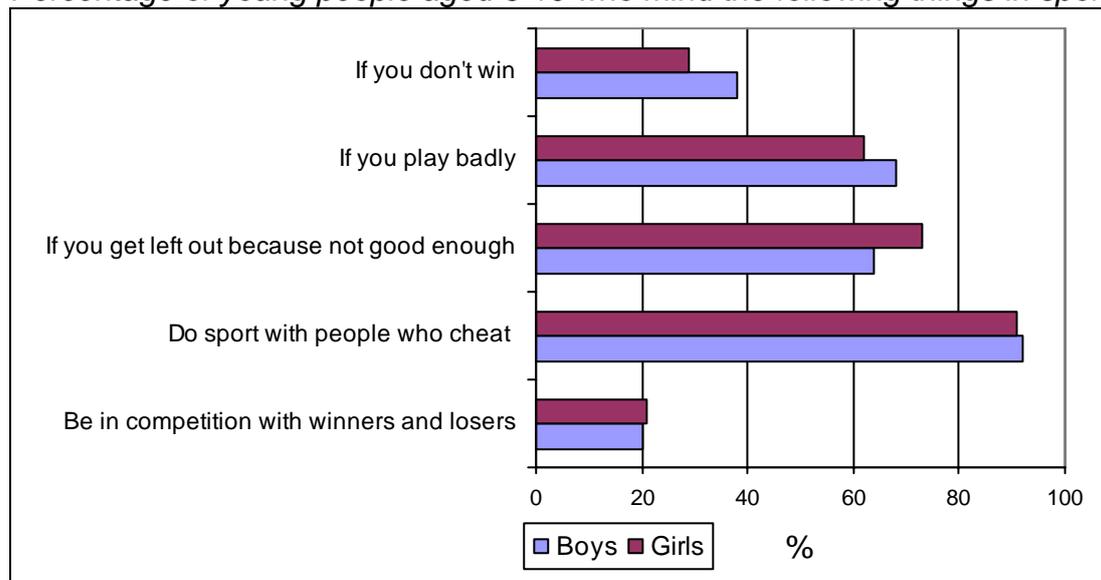
Do children dislike competitiveness?

There is often concern about the competitiveness of sport and how young people feel when they lose or get left out when being picked for a team.

However, at this age, young people do not take sport too seriously and think that taking part is actually more important than winning. Seventy seven percent of young people say that they do not mind being in a competition where there will be winners and losers, and 67% say they do not mind being a loser.²³³

Being left out is more important. Between 60% and 80% of children aged 6 to 10 do mind it when they get left out because they are not good enough.

Percentage of young people aged 6-10 who mind the following things in sport



Source: MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

²³³ MORI (2003) Young people and sport in England. A survey of young people and PE teachers, Sport England

Do children lack time for sport?

In a survey²³⁴ concerned with seven to sixteen year olds' opinions of physical activity, one in six young people said that they did not have enough spare time to do physical activities. They thought that it was more important to spend time studying than to spend time doing physical activities. This was the case for all age groups, although it was more prevalent at the older end of the group.

Crucially, if children can find an average of 2.5 hours a day to watch television during week days, it is hard to argue that they do not have enough time for sport.

5.6.3 Girls and sport

Do young girls do less sport than boys?

National Diet and Nutrition Survey

The NDNS²³⁵ shows that as early as age 4 to 6, boys do more physical activity than girls. At this age 43% of boys are reported to be very active, compared to only 29% of girls.

At age 7 to 18 years, boys on average spend 0.4 hours per day in very rigorous or vigorous intensity activity, compared with girls who spend 0.3 hours per day. However, girls aged 7 to 14 years spent more time doing very rigorous or rigorous intensity activity than those aged 15 to 18 years old.²³⁶

Only 49% of girls aged 7 to 10 managed to do the recommended one hour of physical activity every day, compared with 70% of boys of the same age. Also, more boys than girls managed to complete the weaker recommendation that those young people unable to do a whole hour's physical activity should do 30 minutes, 83% boys versus 73% girls.

Health Survey for England

The Health Survey for England²³⁷ looked at the amount of time young people aged 2 to 15 spent doing different physical activities outside school. The percentage of 2 to 9 year olds who did not spend any time doing sport and exercise each week was similar for boys and girls. However, from the age of 10 to 15, on average, 9% more girls than boys spent no time doing sport and exercise.

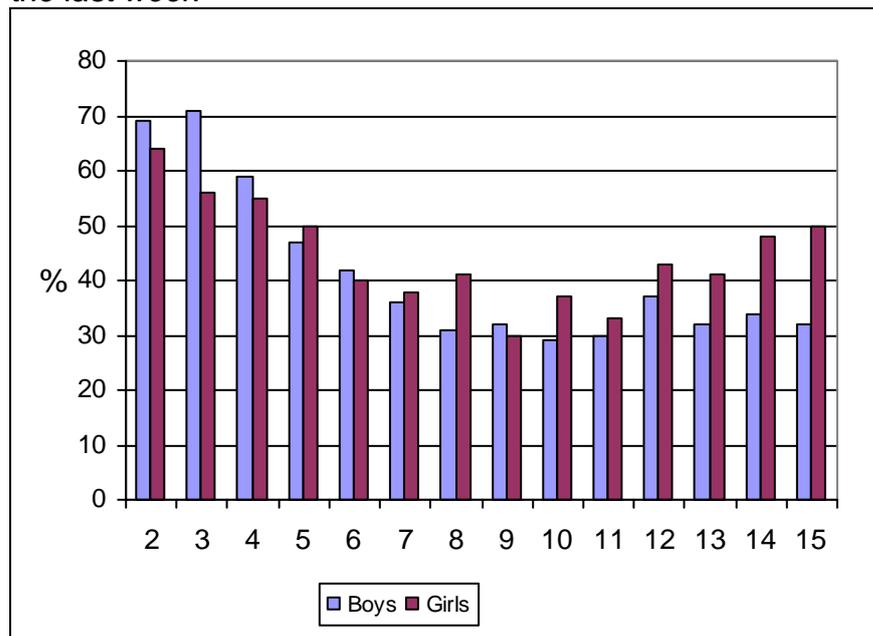
²³⁴ MORI (2001) UK youth too busy to 'get physical', British Heart Foundation

²³⁵ FSA (2000) National diet and nutrition survey: young people aged 4 to 18 years. Volume 1: report of the diet and nutrition survey.

²³⁶ Ibid.

²³⁷ Primatesta, P., Sproston, K.. (2002) Health Survey for England, 2002, DH

Percentage of young people who spent no time doing sport and exercise in the last week

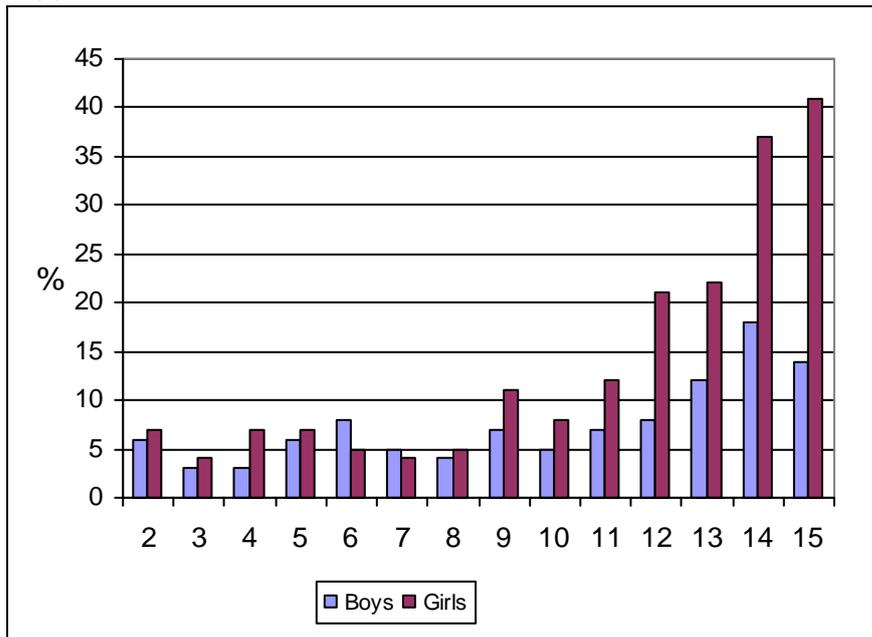


Source: Stamatakis, E. (2002) Physical Activity in The Health of Children and Young People, Chapter 4, The Health Survey of England

For active play, girls aged 2 to 11 were on average 3% more likely to have spent no time doing any active play than boys. As young people get older, girls are far less likely to take part in active play. Girls aged 12 to 15 are 17% more likely to have spent no time doing any active play than boys.²³⁸

²³⁸ Primatesta, P., Sproston, K.. (2002) Health Survey for England, 2002, DH

Percentage of young people who spent no time doing active play in the last week



Source: Stamatakis, E. (2002) Physical Activity in The Health of Children and Young People, Chapter 4, The Health Survey of England

Why do girls do less sport than boys?

There is a clear trend that as girls get older their levels of physical activity declines. There are a number of reasons often cited for girls' lower levels of physical activity. Of these, the only factor relating to young girls is the first:

- Family gender bias: Research into the very early play activities of young children has shown that parents adopt gendered practices towards girls and boys from infancy, contributing to a deeply-rooted set of gender expectations that pose obstacles to many girls' sports involvement in later years. There is often a common belief that boys have more energy which they need to get rid of. Fathers see it as normal to play football with their son, but not with their daughter, and mothers are less likely to see playing sport with their either their daughter or son as part of their role.²³⁹
- Gender differences reinforced by school: Some writers argue that the gender differences that begin in home are reinforced by PE in schools which offer different sports to boys and girls.²⁴⁰

²³⁹ Rogers, L. (1999) Sexing the brain, cited in Bailey, R., Wellard, I. and Dismore, H. (2005) Girls and physical activities: a summary review. *Education and Health* 23(1)

²⁴⁰ Evans et al (1996) Teachers, teaching, and the social construction of gender relations. *Sport, Education and Society*, 1(2), cited in Kirk, D. (2004) Towards girl-friendly physical education, Youth Sports Trust and Institute of Youth Sport

- Friends: Physical activity becomes less important to girls as they are pressured by their peers to do activities which are perceived to be more feminine.²⁴¹
- Clothing: Many teenage girls dislike the practical requirement of having to alter their dress and appearance, in a way which conflicts with their images of femininity, in order to take part in sport and PE.²⁴²
- Changing rooms: These can be a context for bullying, which creates anxiety around PE and therefore sport.
- PE lessons: Girls who have a positive experience in PE lessons are likely to have lifelong physical activity habits. However, negative experiences and inappropriate provision could have a negative effect and potentially have an effect on how much physical activities girls do as they move through life.²⁴³
- Perceived barriers: The Sports England 2002 survey shows that as girls enter their teenage years, the following become much stronger barriers: unsuitable weather, reluctance to get hot and sweaty.
- Independent mobility: Research has shown that boys often experience far greater freedom to be active than girls.²⁴⁴

²⁴¹ Hargreaves (1994) *Sporting Females: critical issues in the history and sociology of women's sport*: Routledge, cited in Kirk, D. (2004) *op. cit.*

²⁴² Flintoff, A., Scraton, S. (2001) Stepping into active leisure? Young women's perceptions of active lifestyles and their experiences of physical education and sport, *European Journal of Physical Education*, cited in Kirk, D. (2004) *op. cit.*

²⁴³ Bailey, R., Wellard, I. and Dismore, H. (2005) Girls and physical activities: a summary review. *Education and Health* 23(1)

²⁴⁴ *Ibid.*

5.7 Active Play

5.7.1 How much play do they do?

The 2002 Health Survey for England showed that over 90% of boys and girls aged 2 to 10 participated in active play in the last week, where active play is defined as “active things like ride a bike, kick a ball around, run about, play active games, jump around”.

Proportion of boys who had done active play in the last week

Age	Boys	Girls
2	94	93
3	96	97
4	96	93
5	95	92
6	92	96
7	94	97
8	95	95
9	93	91
10	94	90
11	93	81

Source: Stamatakis, E. (2002) Physical Activity, in *The Health of Children and Young People*, Chapter 4, *The Health Survey of England*

A survey by NOP World for the Royal Bank of Scotland and the charity Groundwork in 2004 came up with the startling statistics that more than one-third of children aged 7 to 12 never play outside.²⁴⁵

A survey published by the Policy Studies Institute in 1994 compared children today with a similar survey of twenty years ago. It concluded that children have seen their freedom to play in their neighbourhoods severely restricted. It was found that a child of nine and a half years today is allowed to play outside to the same extent as a seven year old in the previous survey. It claimed that a child in 1994 was five or six times less likely to be allowed out to play than a child in 1974 (but original source not cited).²⁴⁶

It has also been calculated that the free play range of children (the radius around the home to which children can roam alone) has, for nine-year-olds in the UK, shrunk to a ninth of what it was in 1970.²⁴⁷

²⁴⁵ <http://www.groundwork.org.uk/news/2004/040916-supergrounds-launch.htm>

²⁴⁶ Cited by Fair Play for Children

²⁴⁷ Wheway R. and Millward A. (1997) *Child's Play: Facilitating Play on Housing Estates*, London: Chartered Institute of Housing

5.7.2 What are the barriers to active play?

Fear

Of traffic

The survey published by the Policy Studies Institute showed that by far the most important factors restricting play opportunities was parents' fear that children will have road accidents, either from playing in the street or from walking/cycling to a playground.²⁴⁸ This is confirmed by a number of other studies.²⁴⁹ Aside from accompanied visits to a playground or leisure venues, this restricts them to playing in the garden (if they have one) or inside.

The rise in car ownership and attempts to improve the flow of traffic certainly have made roads busier. The patchiness of cycle lanes, and the placing of cycle lanes on road (as opposed to sections of pavements) also puts parents off from letting their child cycle to play spaces. Analysis of transport statistics on the volume and speed of traffic in 1999 showed that in the last 20 years car traffic had almost doubled and that of lorries had increased by a half. Furthermore, over two in three car drivers and one in two lorry drivers in 1999 exceeded the 30mph limit.²⁵⁰ Around 174,000 children aged 0 to 14 had a road accident in 2002 (1.5% of the population).²⁵¹ Some analysts argue that although tragic, this is a very low proportion given the volume of traffic. Others counter this noting that the explanation for this decrease in children's road accident fatalities is that roads have become so dangerous that children have been progressively withdrawn from them.²⁵²

Of abduction

It is extremely rare for children to be harmed by a stranger in any public space. On average 8 have been killed in the last five years. Nevertheless, this has not affected parents' perceptions.²⁵³ The second most commonly cited fear by parents which restricts their child's movement is fear of abduction by strangers. For example, a study in the London Borough of Camden found that 90 per cent of parents are 'very' or 'quite worried' about the possible abduction or molestation of their children, and 60 per cent about the risk of

²⁴⁸ Hillman M., Adams J., Whitelegg J. (1990) *One False Move: A study of children's independent mobility*, Policy Studies Institute; and Whewey, R., Millward, A. (1997) *Child's Play: Facilitating play in housing estates*, Chartered Institute of Housing and Joseph Rowntree Foundation; all cited by Whewey, R. *Urban Myths about children's playgrounds*, Child Accident Prevention Trust

²⁴⁹ McNeish, D., Roberts, H. (1995) *Playing it Safe*, Barnado's; and Hillman M (ed), *Children, Transport and the Quality of Life*, Policy Studies Institute, 1993

²⁵⁰ Cited by Hillman, M. *The impact of transport policy on children's development*, Policy Studies Institute

²⁵¹ Royal Society for the Prevention of Accidents

²⁵² Adams, J. (1993) *Risk compensation and the problem of measuring children's independent mobility and safety on the roads*, in Hillman, M. (ed) (1993) *Children, Transport and the Quality of Life*, Policy Studies Institute

²⁵³ DCMS (2004) *Getting Serious About Play - A Review of Children's Play*

them being bullied.²⁵⁴ Following the Soham murders in 2002, research by MORI for the NSPCC found that 71% were now more fearful for their children's safety, and a similar number (68%) felt more intense pressure to supervise their children. The research also showed three in five parents (60%) were now less likely to let children out of their sight to play or see their friends.

Child abduction or murder by a stranger is remarkably rare and occurrence rates have remained largely unchanged for the past 50 years. In the UK, there are on average seven deaths and 60 abductions a year.²⁵⁵ It is far more common for them to be murdered by a person known to them.

Of accidents whilst playing

Some researchers also argue that parents are concerned about children having accidents whilst playing, and will only allow children to play whilst being directly observed. They argue that some parents are over-protective, and do not allow children to take risks.²⁵⁶ In fact, around 900,000 children aged 0 to 14 have an accident each year severe enough to be recorded.²⁵⁷

Of other children

Parents are also concerned about who their children will play with if unsupervised. They do not want their child to fall in with the wrong sort.²⁵⁸

Facilities

The discussion above shows that distance to local play facilities has become more of an issue, more because parents are not prepared to let their children to travel unaccompanied, than because of the actual physical distance itself from the home to a play space.

The safety of the equipment is also important to parents, but research suggests that for parents, it is far more important that their children are "socially safe" from other unpleasant children.²⁵⁹ Research for the Joseph Rowntree Foundation shows that parents want public play spaces for their children such as parks, green spaces and playgrounds where they can see them.²⁶⁰

²⁵⁴ DiGuseppi, C. and Roberts, I. (1997), *The Daily Journey to School: A Survey of Primary School Children in Camden*, Camden Accident Prevention Alliance

²⁵⁵ Families for Freedom, *The Kids Are Alright!*, London: Families for Freedom Factsheets on Children's Safety, 1997

²⁵⁶ Lindon, J. (1999) *Can children be too safe?*, *Let's Play* (magazine), cited in DCMS (2001) *Realising the potential of cultural services – the case for play*

²⁵⁷ Royal Society for the Prevention of Accidents

²⁵⁸ McKendrick, J. (2000) *The dangers of safe play*, Children 5-16 Research briefing for the Business of Children's Play, Glasgow University,

<http://www.hull.ac.uk/children5to16programme/briefings/mckendri.pdf>

²⁵⁹ Wheway, R., Millward, A. (1997) *Facilitating play on housing estates*, Joseph Rowntree Foundation

²⁶⁰ *Ibid.*

Play spaces that are dirty, broken and vandalised are also off-putting to both parents and children. There is an implicit admission in the DCMS play review that local authorities have reduced funding for public play spaces as priorities have shifted.²⁶¹

Nevertheless, there has been considerable concern that the quality and quantity of play spaces for children in areas of deprivation are inadequate to such an extent that £200m of National Lottery Funding was made available in 2002-3 to improve children's play facilities in these areas. Opportunities for supervised play have also been expanded through the Sure Start programme in deprived areas.

²⁶¹ DCMS (2004) Getting Serious About Play - A Review of Children's Play

5.8 Other physical activity

5.8.1 Break time

Around 24% of the infant school day and 21% of the junior school day are taken up by break times.²⁶² This provides opportunities both for sport and unstructured play. A MORI survey in 2001 for the British Heart Foundation found that when asked how they spent their break times at school, 70% of 7-10 year olds say they play actively compared with only 3% of 14-16 year olds.

The WHO suggests that activity at break times in school could contribute significantly to the recommended daily activity.²⁶³ Many primary schools are taking steps towards increased activities at break time to help increase activity levels and to address other problems such as bullying.²⁶⁴ The Sporting Playgrounds initiative (part of PESSCL) is also improving the facilities for active play in school playgrounds.

5.8.2 Walking to school

Trends and current levels

In a study which considered school travel means of British children in 1971 and again in 1990,²⁶⁵ it was found that the number of children who were driven to school had risen almost four times to 36% in 1990. In 1990 almost 90% of children owned a bicycle, but only a quarter were allowed to cycle on the road and fewer than five percent cycled to school – compared to 60% of children who cycle to school in other European countries.

A more recent survey by the Department of Transport²⁶⁶ which considered modes of transport to school in 1989/1991 and 1999/2001 also found that the number of children driven to school increased over the 10 year period, although not by such drastic proportions. Between 1989/91 and 1999/01, there was an 11% increase in the number of 5 to 10 year olds driven to school (from 28 to 39%). As a result, the number of children of this age who walked to school dropped by 8% and the number who took the bus dropped by 2%. For 11 to 16 year olds, the pattern was a little different. There was just a three

²⁶² Blatchford, P. (1998) Social life in school – pupils' experience of breaktime and recess from 7-16 years; cited in Ludvigsen, A., Sharma, N. (2004) op. cit.

²⁶³ Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O. and Barnekow Rasmussen, V. (2004) Young people's health in context. Health behaviour in school-aged children (HSBC) study, International Report from the 2001/2 Survey, WHO; cited in BHF (2004) Couch Kids: the continuing epidemic

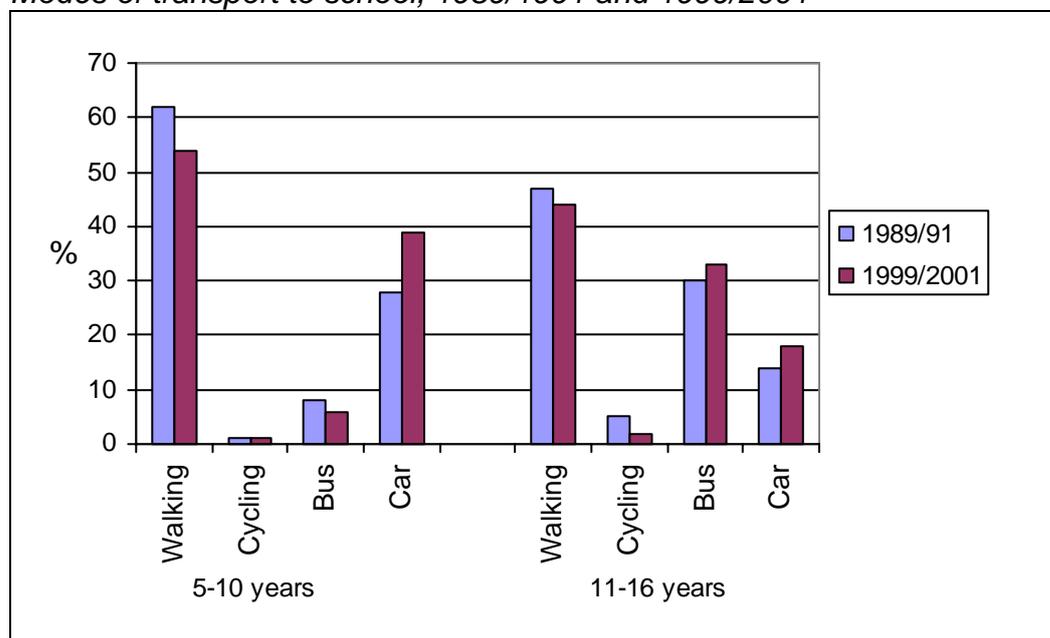
²⁶⁴ Sharp, F. and Smith, P. (1993) Tackling bullying: the Sheffield project, cited in BHF (2004) Couch Kids: the continuing epidemic

²⁶⁵ Hillman, M. (1993) One false move ... an overview of the findings and issues they raise, in Hillman, M (ed) Children, transport and the quality of life, cited in British Nutrition Foundation (1999) Obesity. Blackwell Science.

²⁶⁶ Department for Transport (2004) National Travel Survey 2002

percent fall in the number of young people who walked to school and only a 4% increase in those young people driven to school during this 10 year period. There was also a three per cent increase in bus journeys to school.

Modes of transport to school, 1989/1991 and 1999/2001



Source: Department for Transport (2004) National Travel Survey 2002

Barriers to walking to school

Distance

The fall in walking to school cannot be simply attributed to the distance of schools from the home, except possibly for children in rural areas where there are no pavements. National Travel Survey from the Department for Transport shows that over 90 per cent of 5 to 10 year olds and three-quarters of 11 to 15 year olds live within three miles of their school.²⁶⁷ The average distance to school for a primary school child was 1.4 miles in 2001. Nevertheless, 16% of children who live less than a mile away from school are taken there by car. Trips to school are longer for children in rural areas, so 41% of children aged 5 to 10 walk to school in rural areas, compared to an average of 61%.

Other reasons: fear?

No other specific research on this issue was identified on barriers to walking to school, though the obvious answers would be:

- Fear of traffic accidents from crossing the road
- Fear of accidents on bicycle, especially given the nature of UK cycle lanes
- Fear of other children, especially bullies

²⁶⁷ Cited Hilman, the impact of transport policy on children's development, Policy Studies Institute - <http://www.spokeseastkent.org.uk/mayer.htm>

- Bad weather
- Working parents' lack of time to walk their child to school
- Parents' own aversion to walking

Does being driven to school reduce overall physical activity?

One piece of research showed that overall physical activity of 5 year olds did not differ significantly according to the mode of transport used for the "school run."²⁶⁸ This suggests that a rise in the proportion of children walking to schools would not necessarily have an impact on obesity.

5.8.3 Helping out around the house

The Health Survey for England in 2002 showed that 20-30% of boys and 30-40% of girls aged 8 to 11 did housework or gardening in the last week.

However, there is no tracking data suggesting that young people in the past did more or less housework than those in recent years. Therefore it is not possible to make conclusions about changes in this sort of activity over time.

5.8.4 Part time jobs

The law states that children cannot have a part-time job until they are 13. Young people are only allowed to work for two hours on a school day and not during school hours. They can only work for a maximum of two hours on a Sunday. However, on Saturdays, 13 to 14 year olds can work for a maximum of 5 hours and 15 to 16 year olds can work for a maximum of 8 hours. They are not allowed to start work before 7am or finish work after 7pm, regardless of the day of the week.

²⁶⁸ Metcalf, B. et al (2004) The regulation of physical activity in young children, Education and Health, 61

5.9 Why have sedentary activities become attractive?

Section 5.1.2 showed that there was considerable evidence linking obesity with high levels of sedentary activities such as TV watching and playing digital games. Over 60% of 5/6 year olds even have a TV in their own room.

The amount of time 4 to 15 year olds spend watching television has doubled since the 1960s, yet the proportion of 12/13 year olds watching more than 2 hours of television per day (weekdays only) has not increased from 1991 to 2004 at a time when obesity has increased. However, overall sedentary activity has increased on average because of time spent playing digital games. The proportion of 12/13 year olds that spend any time playing computer games after school on a weekday has increased dramatically over the past twenty years.

As mentioned earlier, fear of traffic accidents, accidents in playgrounds, unsafe playgrounds, and abduction have also led parents to ensconce their children within the bounds of their own homes. This has led parents to ensure that there is sufficient entertainment in the home to prevent children becoming bored.

The most obvious other reasons for the increased ownership of TVs and games consoles is increased personal disposable income and the production of new technologies. Furthermore, as households upgrade to new televisions (e.g. to digital, flat-screen, wide-screen), parents often give the old models to their children to put in their bedrooms.

The draw of television for children is well understood. However, digital games, especially games consoles, are a more recent phenomenon. The draw of digital games are explained below.

What elements makes digital games compelling?

Prensky²⁶⁹ has identified a number of reasons why digital games engage. These attractions contrast strongly with some of the limitations of sport and active play for children:

- Fun and entertainment – they are typically fast and more responsive, and provide a rich variety of graphic representations to generate a wide range of options and scenarios that is hard to replicate in the same way in sport, board games, and outdoor play.

²⁶⁹ Mitchell, A. and Savill-Smith, C. (2004) The use of computer and video games for learning: A review of the literature, ELSPA

- They allow mastery – the promise that with enough energy and concentration you can win. As you improve, you are taken through higher levels according to your ability.
- They provide infinite amounts of content and levels of challenge.
- Many digital games contain a storyline that players can become involved in and shape.
- They deploy techniques that encourage players to achieve and maintain a state of intense concentration and involvement – the “flow state.”
- They can be played against real people anywhere in the world or against the computer, which means that multiplayer games can be played at any time.
- Competition, challenge and excitement stimulate adrenalin.

6. Do children who do a lot of physical activity eat differently?

Obese families over-eat and do too little physical activity

Most epidemiological studies on childhood obesity focus either on energy intake or energy expenditure. Studies that look at both are less common. Research by Wardle et al.²⁷⁰ in 2002 compared both food and activity preferences in a large sample of young children from obese/overweight and ideal weight families. They found that children from the obese/overweight families had higher preferences for fatty foods in a taste test, a decreased liking for vegetables, and an eating style that fell more into the “over-eating” type. They also had a stronger preference for sedentary activities, and spent more time in sedentary past-times. There were no differences in speed of eating or reported frequency of intake of high-fat foods.

Physically active children have more balanced diets

A recent data of French children²⁷¹ suggest that daily energy expenditure acts not only directly on energy balance but also indirectly through affecting food choices. The most active children in a population of 10 year olds had the same BMI as their less active peers. However, they ate much more. The nutrient source that was significantly higher in the most active children was carbohydrate. These children had larger breakfasts and afternoon snacks. They ate more cereal and dairy products. Since they consumed more carbohydrate, the percentage of fat in the diet was lower and, consequently, the proportion of fat, protein and carbohydrate in their diets was closer to recommendations.

Although it is not possible to claim any causal effects, it can be hypothesised that higher needs in the more active children led to different food choices, at different times during the day, and that rapid energy sources such as carbohydrate were often preferred to high fat foods.²⁷²

²⁷⁰ Wardle, J. et al. (2002) Food and activity preferences in children of lean and obese parents, *International Journal of Obesity*, 2002, vol 1, Number 27

²⁷¹ Deheeger, M., Rolland-Cachera, M.F., Fontvieille, A.M. (1997) Physical activity and body composition in 10 year old French children: linkages with nutritional intake? *International Journal of Obesity*, 21; cited in Burniat, W. (2002) op. cit.

²⁷² Burniat, W. (2002) op. cit

Physical activity normalises appetite

There is no evidence to suggest that exercise results in eating any more or less food than would be expected in order to compensate for the extra energy expenditure.

In contrast, the evidence is stronger that exercise may normalise the appetite response because of an asymmetry in appetite control, in which the hunger drive operates more powerfully and precisely than the satiety drive. Thus, active people whose energy needs generally exceed the societal norm for food intake will regulate by means of a more efficient physiological mechanism (hunger) than sedentary people, who have to regulate by means of satiety and restraint.²⁷³

²⁷³ Blundell, J.E., King, N.A. (1998) Effects of exercise on appetite control: loose coupling between energy expenditure and energy intake, *International Journal of Obesity*, 22 (Suppl. 2), cited in British Nutrition Foundation (1999) op. cit.

7. Pregnancy and early childhood

A number of factors around pregnancy and early infancy have been shown to predict adult obesity. However, this obesity is not usually expressed in childhood. For completeness, however, they have been included in this review.

A number of studies suggest that intrauterine life, infancy and the pre-school period are critical period during which the long term regulation of energy balance may be balanced. If this system is disrupted, it may lead to the body to permanently lay down excessive fat cells or permanently disrupt the operation of hunger and satiety. The body therefore becomes “programmed” incorrectly.

7.1 During pregnancy

Programming and foetal nutrition

An adverse nutritional environment in the uterus may cause defects in the development, structure and function of organs, which interacts with later diet and environmental stresses to cause obesity.

There are two potentially critical periods for the development of obesity in the uterus. In early gestation, when the hypothalamic centres are most susceptible, exposure to over- or under-nutrition may affect regulation of appetite and growth, and hence predispose to later obesity. In late gestation, when differentiation and hyperplasia of fat cells (adipocytes) occurs, and the foetus accumulates fat, differential effects may protect against or promote later obesity.

Over-nutrition by the mother during pregnancy

Whitaker and Dietz²⁷⁴ advanced the hypothesis that prenatal over-nutrition might affect lifelong risk of obesity. According to this hypothesis, maternal obesity increases transfer of nutrients across the placenta, inducing permanent changes in appetite, neuro-endocrine functioning, or energy metabolism.

Results of observational studies show a direct relation between maternal obesity, birthweight, and obesity later in life; however, the relative

²⁷⁴ Whitaker R.C., Dietz W.H. (1998) Role of the prenatal environment in the development of obesity. *J Pediatr* 1998; 132: 768-776, cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002) op. cit.

contributions of shared maternal genes versus intrauterine factors are difficult to differentiate.²⁷⁵ Findings of studies in animals indicate the potential long-term consequences of maternal obesity per se—the offspring of female rats with diet-induced obesity were heavier than the offspring of rats with the same genotype but without obesity.²⁷⁶

Under-nutrition by the mother during pregnancy

Under-nutrition at important stages of foetal development can also induce permanent physiological changes that result in obesity, as indicated by an analysis of the Dutch famine cohort.²⁷⁷

During the winter of 1944-45, the cities of north west Holland were blockaded. This meant the population was subjected to famine conditions for 9 months, until the advance of the Allied forces lifted the blockade. Data from cohorts born around the time of the Dutch famine have provided some of the most convincing evidence that both early and late gestation are critical periods of the subsequent development of obesity. Compared to a control group (who were not exposed to the famine), the prevalence of obesity was significantly higher in those whose exposure to famine coincided with the first two trimesters of pregnancy.

However, prevalence of obesity was significantly lower in those whose exposure to famine was in the third trimester, or shortly after birth. It is suggested that this is because fat cell (adipocyte) numbers and fat accumulation were irrecoverably reduced.

Smoking

Medical records were reviewed of 17,000 thirty three year olds born in 1958. The analysis showed that those whose mother's smoked had almost a 40% increased chance of being obese, and more than a 300% increased chance of having developed type 2 diabetes at an early age.²⁷⁸ More recently, the Avon Longitudinal Study of Parents and Children found a similar correlation.

The mechanism by which maternal smoking causes childhood obesity is not yet understood.

²⁷⁵ Whitaker R.C., Dietz W.H. (1998) Role of the prenatal environment in the development of obesity. *J Pediatr* 1998; 132: 768-776, cited in Ebbeling, C, Pawlak, D. Ludwig, D. (2002) op. cit.

²⁷⁶ Levin B.E., Govek E. (1998) Gestational obesity accentuates obesity in obesity-prone progeny. *Am J Physiol* 1998, cited in Ebbeling, C., Pawlak, D., Ludwig, D. (2002) op. cit.

²⁷⁷ Ravelli G.P., Stein Z.A., Susser M.W. (1976) Obesity in young men after famine exposure in utero and early infancy. *N Engl J Med* 1976; 295: 349-353, cited in Ebbeling, C., Pawlak, D. Ludwig, D. (2002) op. cit.

²⁷⁸ Montgomery, S.M. (2002) Smoking during pregnancy and diabetes mellitus in a British longitudinal birth cohort, *BMJ* 2002;324:26-27

7.2 Early childhood

Bottle feeding rather than breast-feeding

A possible causal link between methods of infant feeding and subsequent obesity has been debated for some time. Several studies have shown a protective effect of breastfeeding on childhood obesity.^{279 280} Only two studies seem to have followed this up to adulthood: one suggested no lasting effect²⁸¹ whereas the other suggested an adverse effect.²⁸² Recent reviews suggest that once social class, mothers' BMI and mothers smoking in pregnancy factors had been controlled for, any effect seen in adulthood is insignificant or undetectable.²⁸³ Another recent review of the literature concludes that eight out of eleven studies show a lower risk after controlling for confounding factors – the effect is probably small compared with other obesity risk factors, but may still be of public health significance.²⁸⁴

The protective effect of breast feeding against later obesity may not last through to adulthood, but obesity in later childhood is itself a predictor of adult disease, even if weight is lost and the adult is not obese. Therefore if breast feeding protects against childhood obesity, that in itself may reduce the risk of adult diseases such as heart disease.

High protein diets

As noted in section 4, Rolland-Cachera and Bellisle²⁸⁵ note that very young children derived much higher proportions of their energy from protein in the 1980s than in the 1960s. They hypothesise that the over-consumption of protein during infancy could stimulate the infant's hormonal system to develop too much high-plasma insulin-like growth factor-1 (IGF-1), which in turn stimulates the production of too many fat cells. They also hypothesise that excess protein intake in childhood can under-stimulate the production of growth hormone, which in turn reduces the burning of fat for energy.

Early adiposity rebound

²⁷⁹ Gillman M.W., Rifas-Shiman S.L, Camargo C.A., et al. (2001) Risk of overweight among adolescents who were breastfed as infants. *JAMA* 2001; 285: 2461-2467, cited in Ebbeling, C., Pawlak, D. Ludwig, D. (2002) op.cit

²⁸⁰ von Kries R., Koletzko B., Sauerwald T., et al. Breast feeding and obesity: cross sectional study. *BMJ* 1999; 3: 147-150, cited in Ebbeling, C., Pawlak, D. Ludwig, D. (2002) op.cit.

²⁸¹ Poulton, R., Willaims, S. (2001) Breast feeding and risk of overweight, *JAMA* 286, cited in cited in British Medical Association (2005) Preventing childhood obesity, A report from the BMA Board of Science

²⁸² Power, C., Lake, J.K., Cole, T.J., (1997) Body mass index and height from childhood to adulthood in the 1958 British born cohort, *Am J Clin Nutr*, 66: 1094-101, cited in cited in British Medical Association (2005) op. cit.

²⁸³ Clifford T.J. (2003) Breast feeding and obesity, *BMJ* 327; cited in British Medical Association (2005) op. cit.

²⁸⁴ Dewey, K.G. (2003) Is breast feeding protective against child obesity? *Journal of Human Lactation* , 19:9-18, cited in British Medical Association (2005) op. cit.

²⁸⁵ Rolland-Cachera and Bellisle (2002) Nutrition, chapter 4 in Burniat W. (ed) et al. (2002) op. cit.

The natural pattern of adiposity during childhood is a period of rapid fat deposition during the third trimester of pregnancy and the early months of postnatal life, peaking at about nine months and then going into reverse for several years. During this period, there is a net loss of adipose tissue despite the increasing size of the child. A second stage of fat deposition starts at about six years (“the adiposity rebound”) and continues into adulthood.

The timing of this rebound has been shown to relate to adult fatness, with an earlier rebound being associated with greater fatness in later life.²⁸⁶ This may reflect physiological differences around the age of 5 to 7 years, or it may simply mean that during a period of generally increasing fatness, those start earlier tend to end up fatter.

Size and growth during infancy

A review of reviews²⁸⁷ on infant size and growth found that both size and growth during infancy are related to obesity in children and adults. Most studies of infant size show that infants who were defined as obese were more likely to develop obesity in childhood and adolescence, or early adulthood than other infants. The evidence relating to infant growth was also consistent across most studies. Infants who grew more rapidly (usually measured as weight gain) were more likely to be obese in childhood, adolescence and early adulthood than other infants. There was no evidence to suggest that exposure at a particular time during infancy was critical – larger size or a rapid phase of growth at a range of intervals during the first and second year of life predisposed to later obesity. However, no clear mechanisms have been yet proven to explain this association.

Duration of sleeping

A curious finding from the Avon Longitudinal Study of Parents and Children was that children who had a short sleep duration (less than 10.5 hours) at age 3 were more likely to be obese. There could be a number of explanations for this finding. It could be that the ones who do not go to bed early are staying up doing sedentary things instead like watching TV, and consuming food so they are not only less active, but eating more. Or it could be that children who sleep longer are more active and so are physically tired. Or it could be that children who sleep longer are more active and so are physically tired.

²⁸⁶ Rolland-Cachera M.F. et al (1984) Adiposity rebound in children: a simple indicator for predicting obesity, *American Journal of Clinical Nutrition*, 39; cited in Burniat W. (ed) et al. (2002) op. cit.

²⁸⁷ Baird et al. (2005) Being big or growing fast: systematic review of size and growth in infancy and later obesity, *BMJ* 2005;331:929; cited in British Nutrition Foundation (1999) op. cit.

Appendices

Appendix 1: Average energy intake

Up to 1970, average energy intake was measured by the National Food Survey, though participants tended to under-report their energy intake. From 1992, the energy from alcoholic drinks, soft drinks and confectionery were included in the survey, and from 1994, energy from food eaten out was included. From 2000, the National Food Survey became the Expenditure and Food Survey, and used a new methodology that dealt with much of the under-reporting.

Average energy intake from household food and drink has shown a long-term decline from 2534 kcal in 1974 to 2077 kcal per person per day in 2003-04. Although the inclusion in 1992 of contributions from confectionery, soft drinks and alcoholic drinks brought into the household resulted in an increase of approximately 170 kcal, the average energy intake in 2003-04 is 18 per cent lower than that in 1974. However, the decline is slowing significantly in recent years with only a 1.1% decrease in 2003-04 compared with 2002-03.²⁸⁸

Different estimates of energy intake

Survey	Elements	1940	1974	1980	1990	1992	1995	2000	2001	2002	2003
National Food Survey	Excl asc*	2355	2320	2230	1870	1780	1750				
	Inc asc*					1960	1881	1881			
	aligned with EFS		2354	2439	2058	2225	2143	2152			
	NFS eating out						240	230			
Expenditure & Food Survey	H'hold								2089	2099	2077
	Eating out								212	210	205
	Combined								2301	2309	2281
Combined series	H'hold	2355	2534	2439	2058	2225	2143	2152	2089	2099	2077
	Eating out						240	230	212	210	205
	HH + EO	2355	2534	2439	2058	2225	2383	2382	2301	2309	2281

Source: DEFRA, Expenditure and Food Survey ("Family Food"), 2003/4

* "asc" is alcohol drinks, soft drinks and confectionery

²⁸⁸ DEFRA (2005), Family Food in 2003/4

Appendix 2: Physical activity as a predictor of obesity in adults and adolescents

Adults

Physical activity

A number of studies show that obese adults who do less physical activity are more likely to become obese.

An investigation into the trends of decreasing energy intake and increasing the prevalence of obesity across Europe by Martinez Gonzalez in 1999,²⁸⁹ concluded that physical inactivity and a sedentary lifestyle may be one of the key determinants of the growing rates of overweight and obesity in Western populations.

French et al. studied behavioural predictors of body weight over a two year period in an intervention study for smoking cessation and weight control. Dietary variables such as increased consumption of high-energy foods independently predicted increases in body weight in women, and an increase of one walking session per week predicted a decrease in body weight of 0.8 kg. The addition of one high intensity activity session per week predicted a 0.6kg weight loss over 2 years. Equivalent figures for males were 0.4kg and 1.6kg. Participation in sports or an active job did not significantly predict weight loss.

Likewise in 1994, Schulz and Schoeller²⁹⁰ found a correlation between physical activity and body fat.

Watching television

A study by Prentice and Jebb in 1995²⁹¹ found a strong relationship between the number of hours spent watching television and the number of cars per household and obesity in Britain. Similar findings were found when total energy consumption and fat intake were considered. Both of these findings show that reduced energy expenditure is a major contributor to overweight and obesity.

Adolescents

²⁸⁹ Martinez-Gonzalez, M.A., Martinez, J.A., Hu, F.B., Gibney, M.J. and Kearney, J. (1999) Physical inactivity, sedentary lifestyle and obesity in the European Union. *International Journal of Obesity*. November 1999, 23 (11), pp 1192-1201

²⁹⁰ Schulz and Schoeller (1994), cited in British Nutrition Foundation (1999) op. cit.

²⁹¹ Prentice, A.M., and Jebb, S.A (1995) Obesity in Britain: gluttony or sloth? *BMJ*, 311: 437-43

Physical activity

Surprisingly, the scientific community has been unable as yet to either prove or disprove that adolescents who do more physical activity are less likely to become obese than those who do less.

A study of 133 non-obese, and 54 obese, sixth grade children (aged 11/12) in the US,²⁹² found that the obese children took part in significantly fewer daily moderate and vigorous physical activities and significantly fewer bouts of moderate-to-vigorous physical activity. The study also identified that the obese children were less likely to be involved in organisations which promoted physical activity and were less likely to report that their father, or male guardian, were physically active. However, it is not clear if they became physically active after they became obese (or even as a result of it), or whether a lack of physical activity contributed to them becoming obese.

Watching television, playing computer games

On the other hand, there is plenty of evidence that adolescents who watch television or play computer games a lot are more likely to be obese or overweight than those who watch less. Much of this data is also true for children under the age of 11 and is covered in section 5.1.2.

²⁹² Trost, S.G., Kerr, L.M., Ward, D.S. and Pate, R.R. (2001) Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity*, June 2001, 25(6), pp 822-829

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