Income and 'healthy' eating practices

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Summary

Diet has been identified as important in the aetiology of cardiovascular diseases, some cancers and obesity. Scotland has longstanding records of bad health, which have been slow to resolve, despite the efforts of health promotion. Dietary targets for the Scottish population have been set to encourage a shift in the incidence of preventable diet-related diseases. The main aim of this thesis has been to carry out original studies to add to the literature on the impact of income on "healthy" eating practices. The studies were carried out mainly in Scotland but may offer insights into associations between income and diet in other cultural contexts.

This thesis sought a greater understanding of the social variables that influence diet and dietary change using a repertoire of research methods. Original data were collected using retrospective and prospective methodologies, self-administered questionnaires, one-to-one interviews and clinical measurements, basic and sophisticated statistical methods. Sample populations included mothers of young children and adults aged 18-65 years in the Greater Glasgow Health Board area and a longitudinal study of adults aged 18 to 55 years old living in Glasgow and Reading, England.

The studies of the present thesis, like all studies, have methodological limitations and possible biases. However, after considering the problems of each study, it seems reasonable to make the following conclusions: 1) the poor were spending a greater proportion of their income on food, than people living on higher incomes; 2) providing food (and therefore health) for the family was the main responsbility of a woman in the household; 3) that all the individuals in the Income Change study were meeting their basic food needs; 4) there was a strong desire to maintain 'mainstream' or 'normal' social eating practices following an involuntary decrease in household income; 5) there is a 'inverted V' relationship between income and variety with £20,000 as a turning point; 6) lower income families focus on meals rather than on the individual value of individual foods and on cost and taste of the food rather than its nutritional content; 7) the impact of a change in income on meal patterns, although variable from one individual to the next, was significant in most cases; 8)

income was associated with dietary variety per se; 9) food changes evidence from the Income Change Study may support the view that less healthy eating in low-income groups may be a consequence of less healthy eating when a household income decreases involuntarily and 10) different subtle calculations of measures of income were found to have little notable impact on results and it was assumed that these measures could be used interchangeably in future studies as equivalence was good.

For future research into the area of income and 'healthy' eating practices, the following recommendations were made: 1) studies need to have a fully comprehensive list of income and outgoings; 2) dietary interventions and health promotion activities need to consider advocating variety at each mealtime whereever possible; 3) studies need to examine the possibilities that a change in income affects weight management in greater depth using objective tools where possible; 4) researchers who would wish to pursue this area further are recommended to utilise variables on seasonal consumption of foodstuffs and changes in the nation's wealth (when they are available) to control for the population changes on food choices and healthy eating practices and 5) future investigatons would benefit from a more systematic sampling frame and a greater 'power' achieved from a larger number of individuals followed up in the study over a longer period of time.

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Declaration of personal involvement and extent of collaborations in the present thesis

The present thesis represents a research training based around a range of studies employing a variety of methodologies that required large amounts of human data collection through questionnaires, in depth interviews, diet diaries and physical measurements. The research experience thus extended well beyond what could be achieved if one individual collected the data within three years. Therefore I acknowledge that the majority of studies were carried out with other investigators in multidisciplinary teams. In these studies my own role was to design and conduct all the secondary analyses, addressing the research aims of this thesis.

For the parents of young children study, I solely designed the recruitment methodology via the health visitors and collected the data but assisted Drs Paisley, Shepherd, Sparks (Institute of Food Research, Reading), Professors Anderson and Lean (Department of Human Nutrition, University of Glasgow) for questionnaire design.

With the same collaborators, I took the lead in the questionnaire and study design for the Income Change study and carried out the majority of the interviews and physical measurements in Glasgow. Dr Paisley carried out the interviews in Reading with some assistance.

Data from the dietary survey of Glasgow adults were made available through Professor Lean and Professor Anderson for the secondary analysis (n=160). Mrs Linda Maher, SRD, was the principal researcher responsible for data collection on the Dietary Survey of Glasgow adults. I joined the team to carry out the statistical comparison of Foodmeter (UK) 2 with COMP-EAT analysis (Anderson, Maher, Ha. Cooney, Eley, Martin, Vespasiani, Bruni and Lean, in press) and carried out the secondary analysis presented in this thesis with Foodmeter (UK) 2.

I am indebted to the medical, dietetic, epidemiological and psychological expertise of my colleagues. Through their goodwill it has been possible to present the studies of this thesis. **SUSAN ELEY**

Publication record from this thesis

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Refereed journal articles

Anderson AS, Maher, L, Ha, TK., Cooney, J., Eley, S., Martin M., Vespasiani G., Bruni M., Lean, MEJ Evaluation of a bar-code system for nutrient analysis in dietary surveys *Public Health Nutrition* in press

Shepherd, R., Paisley, C.M., Sparks, P., Anderson, A.S,. Eley, S., Lean, M.E.J., (1996) 'Constraints on dietary choice: The Role of Income' Nutrition and Food Science Vol 6. No 5, p 19-21

Published abstracts

Eley S, Anderson AS, Maher L, Lean MEJ Evaluation of a bar-code system for nutrient analysis in dietary surveys. *Proceedings of the Nutrition Society* in press

Eley, S., Anderson AS., Maher L., Lean MEJ Nutrient intake, income and dietary variety in adults. *Proceedings of the Nutrition Society* in press

Shepherd, R., Paisley, C.M., Eley, S., Sparks, P., Anderson, A., Lean, M.E.J., (1997) 'Healthier eating:Income, food intake and control' Proceedings of the Nutrition Society Vol 56, No 1A, 59A

Anderson, A., Eley, S., Lean, M., Paisley, C,. Sparks, P., Shepherd, R., (1997) 'Reported food consumption and food preferences of British adults following a change in household income' Appetite, 28, 3, p 283

Eley S., Anderson, A.S., Lean, M.E.J., Paisley, C.M., Sparks, P., Shepherd, R,. (1995) 'Socio-economic transition and the impact on dietary choice' Appetite Vol 24, No 3. pp 288

Dedication

I dedicate this thesis to David and to my parents Leslie and Janet, who have lovingly coached me through the process and have waited patiently for the final product.

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I would like to thank my supervisors Professor Michael E J Lean, Rank Professor of Human Nutrition and Head of the Department of Human Nutrition, University of Glasgow and his wife Annie S Anderson PhD, SRD, Research Fellow at the Department of Human Nutrition, University of Glasgow during her supervision of the studies and now Professor of Food Choice and Director of the Centre for Applied Nutrition Research, University of Dundee.

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Finally I would acknowledge my appreciation to my internal examiner Margaret E Reid PhD, Department of Public Health, University of Glasgow and to my external examiner Elizabeth Dowler PhD, Nutrition Policy Unit, London School of Hygiene and Tropical Medicine for their tireless commitment to higher standards.

Chapter One – Health, socio-economic status, income and the family

The main aim of this thesis is to carry out original studies to add to the literature on the impact of income on 'healthy' eating practices. The studies were carried out mainly in Scotland but it is hoped that they will offer insights into associations between income and diet in other cultural context.

Aims

This chapter will consider the evidence with regard to income, diet and disease and health inequalities. It also aims to provide information on the social processes underlying any work on 'healthy eating' in advance of the formal literature review of 'healthy' eating studies. It will identify clearly the place of income and class position in explaining inequalities in health.

Health and socio-economic status

Differences in socio-economic status and social deprivation have been closely linked with health both in poor as well as rich industralised countries (Aykroyd & Kevany 1973, Dando 1976, Forsdal 1977, Burnett 1979, Aro, Rasanen & Telama 1986, James, Ferro-Luzzi, Isaksson & Szostak 1988, Fox 1989, Barker 1992, Prätälä, Berg and Puska 1992, Rose 1992). The nature of SES-health differentials has been described as historical, a continuous gradient that fails to be explained by absolute poverty alone (Carroll, Davey-Smith & Bennett 1996).

In the United Kingdom (UK) and the United States of America (USA), SES-related health inequalities have proved resistant to post-World War II economic growth, and in the UK, the introduction of a National Health Service (NHS) (Carroll, Smith and Bennett, 1996). Persons of higher SES suffer substantially less from premature mortality than do their lower SES counterparts whether indexed by occupational status (e.g. Townsend & Davidson, 1982, Marmot, Shipley & Rose, 1984) or by income (e.g. Rogot, Sorlie, Johnson & Schmitt, 1993) or by material assets (e.g. Davey Smith, Shipley & Rose 1990, Goldblatt 1990) or by education (e.g. Kittagawa & Hauser, 1973; Pappas, Queen, Hadden & Fisher, 1993) or by area-level indices of

deprivation/affluence (e.g. Carstairs & Morris, 1991, Davey Smith, Neaton, Stamler & Wentworth, 1992). Although the interpretation of later studies using the Carstairs score and DEPCAT score (where 1 indicated affluence and 7 deprivation) must be cautious as Census data is only updated every ten years, during which time areas may change in population composition and service provision. Car ownership and unemployment rates have been suggested as alternative indicators of deprivation in these cases (Ellaway 1997). An illustration of the potency and consistency of the results obtained from health inequalities studies can be seen in the Whitehall Study and the Multiple Risk Factor Intervention Trial (MRFIT) which are described below.

One investigation from the Whitehall 1 Study (e.g. Marmot *et al* 1984, Davey-Smith *et al* 1990) examined the association between occupational status at baseline and all-cause mortality during the subsequent 10 years for over 17,000 male British public servants. Employment grade was categorised in descending order as administrative, professional or executive, clerical and 'other' grades (messengers, porters and other unskilled manual workers). Controlling for age and setting the mortality rate of the administrators at unity, the relative risk of mortality for the other grade displayed an orderly linear pattern: 1.6 for the professional and executive grade, 2.2 for the clerical grades and 2.7 for the 'other grades'. The results are striking, bearing in mind the homogeneity of the sample (same employer, resident in and around London, local access to NHS). Davey-Smith *et al* (1990) reporting on further analysis of the data including car ownership (an assets marker) found the mortality gradient was even steeper. Indeed, the age adjusted relative mortality risk between administrators who owned a car and 'other grade' employees who did not was 4.3.

The continuous SES-health gradient has also been shown from the MRFIT data Analysis which adopted area-based indicators of SES with a sample over 300,000 middle-aged American men. This showed a linear relationship between the median income of area of residence at time of entry to the study and age-adjusted all-cause mortality risk (Davey-Smith *et al* 1992). The enormity of these SES-mortality differentials are best expressed in terms of the consequent variations in life expectancy. At the age of 20, given the mortality rates operating around 1980, social

class I and II men in the UK can expect to live 5 years longer than social class IV and V men (Haberman & Bloomfield 1988). Even at age 65, there is still a 2.5 years' difference in life expectancy between these groups.

The relationship between SES status and mortality holds not only for all-cause mortality but also for most of the major causes-of-death groupings (Townsend & Davidson, 1982). Various indices of morbidity display analogous patterns of stratification (Blaxter, 1990; Marmot, Davey-Smith & Stansfield 1991). Further health variations with SES appear to typify women as much as they do men (Arber, 1989), blacks as much as whites (Pappas *et al* 1993), as well as appearing to be characteristic of all western countries studied in this context (Fox 1989). A major inference from the data is that SES differentials in health are not restricted to those in the lowest quintile of household income but as a continuous gradient into the more advantaged households. The delicate stratification or 'fine-grain' of mortality risk contingent on SES is demonstrated by the analysis of the Longitudinal Study, which followed up the 1971 UK census data. Findings indicated that non-manual workers who owned their homes and had one car suffered considerably higher mortality risk than non-manual homeowners with two cars (Goldblatt, 1990).

Is Scotland any different?

There are differences in health within Scotland and many studies have focused on the health differential between Glasgow and Edinburgh (Crombie, Smith, Tavendale and Tunstall-Pedoe 1990). The historical development of the two cities through the nineteenth century is one feature of the health differential, with Edinburgh developing into a financial, legal and administrative capital and its 'poor cousin' Glasgow experiencing the rise of heavy industry that encouraged immigrants (both from the Scottish Highlands and Ireland) and the drop in wages and quality of housing. The contemporary socio-economic profiles of the east and west of Scotland reflect the past with higher proportions of people in Glasgow who are unemployed, live in over-crowded accommodation and lack a car (Watt and Ecob, 1992).

In an ecological study of mortality overall in Scotland, the SES of small postal-code areas was indexed by means of a composite deprivation/affluence score derived from the following components: social class, male unemployment, household overcrowding and access to a car. Areas were assigned a score of one to seven, where one signified the most affluent and seven the most deprived areas. Results showed a continuous gradient of increasing mortality from the most affluent to the most deprived areas (Carstairs & Morris, 1991). For instance, it has been reported that such indicators of socio-economic explain 73 per cent of the geographical variation in coronary heart disease mortality within Scotland (Crombie *et al* 1990).

Explanations for the SES-health gradient

Proponents of 'social selection' theory hold the view that those in poor health tend to move down the social scale and those in good health move up and thus health determines socio-economic status (SES). For example, an employed person has a long term limiting illness and as a result loses their job has a reduced earnings capacity so s/he slides down the SES scale and has a higher mortality risk in the lower SES groups.

Evidence from the Whitehall 1 Study and the Office of National Statistics' Longitudinal Study (the LS) (Fox and Goldblatt 1982) suggest that health-related social selection, as a major explanation of the SES-health differentials is unlikely (Carroll *et al* 1996). Mortality differentials in the Whitehall 1 Study remained when analysis focused on those with no detectable disease on entry to the study, i.e. for whom downward drift due to poor health was unlikely (Marmot *et al* 1984). Mortality differentials among those not changing SES were similar to the overall mortality differentials in the LS (Goldblatt 1988, Goldblatt 1989). For the theory of social selection to be shown to hold true, differentials would need to be concentrated among the socially mobile. Social mobility is most likely during the time between entry to the labour market and around 40 years of age but this is a time that is characterised by low mortality (Carroll *et al* 1996).

The evidence from these large scale investigations, extremely rigorous due to the context of British politics and scientific scepticism in which they were conducted, suggest that social selection can be rejected as a major contributor to SES-health differentials. Alternative explanations are that the physical environments in which SES groups substantially contribute to the SES-health differentials or that unhealthy practices such as smoking and high fat diets (low in fibre, fruits and vegetables), are associated with the lower SES groups and higher mortality rates. A review of the evidence suggests that the physical factors in adult life offer an uncomplete explanation of the present day persistance of health differentials into the materially better off strata (Davey Smith *et al* 1996)

Income and class structure

The consideration of income and class structure arises from analyses testifying to an association between overall life expectancy in western countries and income distribution. Wilkinson (1990) compared data on income distribution and life expectancy for nine western countries (Australia, Canada Netherlands, Norway, Sweden, Switzerland, UK, US, West Germany). Whereas Gross National Product was poorly correlated with life expectancy at birth, income and benefit received by the least well-off 70 percent of 'families' yielded a substantial positive correlation (r 0.86). It is interesting to note that Wilkinson's analysis did not include Japan The Japanese now have the longest life expectancy in the world and also the most equitable distribution of income of any OECD (Organisation for Economic Co-operation and Development) country (Marmot & Davey Smith 1989).

Subsequent analyses of 12 European Community countries (Wilkinson 1992) indicate that for the years 1975-85, the annual rate of change in life expectancy was negatively correlated with the proportion of the population in relative poverty, defined as the proportion living on less than 50 per cent of the national average disposable income Again the correlation coefficient was substantial (r=-0.73), indicating that a more rapid improvement in life expectancy was enjoyed by those countries which has registered a fall in the prevalence of relative poverty. What these analyses appears to indicate is that for the majority of people in western countries, health hinges on

relative as well as absolute living standards, implying that psycho-social processes may be at work. As Wilkinson (1990) concluded

"It looks as if what matter about our physical circumstances is not what they are in themselves, but where they stand in the scale of things in our society. The implication is that our environment and standard of living no longer impact on our health primarily through direct physical causes, regardless of our attitudes and perceptions, but have to come to do so mainly through social and cognitively mediated processes (p 405).

Given the difficulties, which attend life expectancy as a measure, that it is substantially influenced by infant mortality rates, Wilkinson's conclusion may be somewhat overstated. Nevertheless, his analysis and the continuous character of SES-health gradients invite a search for mediating processes of a psychosocial nature. Recent reviews indicated possible psychological mediators to include psychological stress (Williams 1990, Carroll, Bennet and Davey-Smith 1993, Adler, Boyde, Chesney, Cohen, Folkman, Kahn & Syme 1994), personal control (Williams 1990, Carroll *et al* 1993), social support (Williams 1990, Carroll *et al* 1993, Adler *et al* 1994) and hostility (Adler *et al* 1994). In addition, evidence points to inequalities in the distribution of these psychosocial factors among different SES groups (Berkman & Breslow 1983, Barefoot, Dodge, Peterson, Dahlstrom & Williams 1989, Marmot *et al* 1991).

One perspective proposes that physical factors such as exposure to environmental hazards and health behaviours that compromise health are mediated by psychosocial factors throughout the lifecourse or 'career'. For illustration,

'A baby born to a lower-SES mother is more likely to register low birth weight or be premature or both. A child growing up in a low-SES household is more likely to be subject to a range of exposures: family instability, poor diet, damp and overcrowded accommodation and restricted educational opportunity. An adolescent from such a household is more likely to experience family strife, smoke cigarettes, leave school with few qualifications and experience unemployment before entering a low-paid and insecure occupation. As an adult this person is more likely to work in an arduous,

hazardous occupation, endure periods of unemployment, suffer the stress of financial insecurity, enjoy fewer psychological uplifts, experience negative social interactions and be able to exercise little control over their lives. A retired person from this sort of background is more likely to have difficulties meeting the costs of adequate clothing, heating and diet and be more likely to experience social isolation' (from Davey-Smith *et al* 1994 cited in Carroll, Davey-Smith and Bennett 1996).

This example serves to illustrate the longitudinal clustering that can occur but it must be stressed that work from this perspective is not making a basic assumption that the lifecourse is underwritten by either disadvantage or advantage. Rather the perspective recognises that the career of a clustered disadvantage such as that outlined above could be interrupted in late adolescence by success in education and subsequent high-income employment.

Income and Wealth in the UK

One of the aims of this chapter was to summarise the 'state-of-the-nation' with regard to income. Fortunately, the evidence, including data that has been become available since the Inquiry into Income and Wealth Distribution in the UK (Hills 1995), has been recently reviewed in a recent report Joseph Rowntree Foundation report 'Income and Wealth: the latest evidence' (Hills 1998) on which this section is largely based. The review of the evidence suggested that between 1979 and 1994/95 incomes grew between 60-68 per cent for the richest tenth compared to 10 per cent for the poorest tenth or a fall of 8 per cent after housing costs (an average increase of about 40 per cent). The report summarised that some of the key characteristics of people with a low income by 1994/95 include:

- Nearly 80 per cent of the population below half average income were non-pensioners (compared to just over half in late 1960s)
- But pensioners were still disproportionately in the poorest half, particularly the second fifth
- Three-quarters of lone parents and their children were in the poorest 40 per cent in 1994/95
- One-third of the poorest fifth had earnings; two-thirds did not.

- Three-quarters of those in social housing were in the poorest 40 per cent (compared to under half in 1979).
- The positions of different ethnic minority groups vary widely: two thirds of the Pakistani and Bangladeshi population were in the poorest fifth, in contrast to 25 per cent of the Indian population. (Hills 1998).

Technological change, reduction in trade union power, rising unemployment, price-linked benefits all contributed to income inequality growth in the UK between the late 1970s and early 1990s. Then, inequality growth slowed down between 1992/93 to 1994/95 when unemployment fell, earning differentials did not widen, growth in real earnings was small and the demographic trend of pensioners on welfare benefits had fallen. It is suggested that the top half of the income distribution was also heavily affected by the abolition of the Poll Tax and the tax rises between 1993 and 1995 (Hills 1998).

The exact distribution of income in the UK may not adequately be represented by these official figures. Incomes can be misreported, people may experience low income for a short period only (the work of Jarvis and Jenkins on this matter is discussed further below), data on self-employment may be unreliable and non-cash incomes were omitted from the calculations. Given all these factors, Hills (1998) concludes that 'the picture given by the main official Households Below Average Income series is a fair one, taking a balanced view between trends in income before and after housing costs and discounting some of the figures showing the most pessimistic picture for those at the bottom of the distribution.

The Trajectories of being poor

New data on income mobility (Hills 1998) shows that those who are poor in any one year are not necessarily the same as those who are poor the next. However this does not mean that concerns about income inequalities, seen at a particular time between different parts of the income distribution, can be dismissed on the grounds that they are offset by mobility. Hills (1998) lists seven summary points on the latest evidence on income and wealth.

- Data for a sample of 25-44 years olds in 1978-79 shows that the initially lowest paid fifth who had earnings in 1992-1993 increased their earnings faster than those higher paid to start with. However, this does not mean that the low paid are 'catching up': many of the lowest paid were out of the work at the end of the period and much of the movement reflects life-cycle effects.
- Looking at income in the British Household Panel Study (BHPS), 54 per cent of the poorest tenth in the first year had escaped it a year later. However, two-thirds were still in the poorest fifth, and two-thirds of the poorest fifth as a whole stayed there. Income mobility is mostly short-range. Some people drop back after an initial escape and others stick there. Thirty six per cent of the poorest tenth in Year 1 were also in the poorest tenth in year 5
- Allowing for life-cycle movements and the fall in inflation, earnings mobility appears to have fallen since the 1970s
- There are also many more long term Income Support recipients than in the 1970s although they represent a slightly lower proportion of all those on Income Support. This has ambiguous implications for mobility.
- Looking at data for families with children, income mobility rates do seem to be greater at the bottom in the early 1990s than in 1978-79, although the rise is not of the scale required to offset the growth in cross-sectional inequality, and the comparison is affected by the economic cycle.
- Most people's incomes do not follow the chaotic trajectories one would expect at random. More than three-quarters of low income observations represent either persistent low income, or are linked to other observations of low income with no apparent escape over a four year period. There is considerable persistence in low incomes despite year-to-year mobility.
- Allowing for dynamics by removing those who appear to 'escape' low income or are only temporarily poor (but include those who are temporarily out of a more persistent period of low income), the 'poverty problem' appears to be 80-90 per cent of the size suggested by cross-section surveys.

In Hill's view, one of the most exciting developments in the last five years has been Jarvis and Jenkins' results on identifying the trajectories that people's incomes follow

(Jarvis and Jenkins 1997) presented in a table overleaf. They divided the individuals with data in the first four years of the British Household Panel Survey (BHPS) into ten income groups in each year depending on the trajectory their incomes follow. An individual could be in any of ten groups in each of the four waves, giving a total of 10 000 possible combinations. These possibilities are grouped into five broad 'trajectory types'. **Table 1.1** states their prevalence in the income mobility patterns of 1991-95 (Jarvis and Jenkins 1997 cited in Hills 1998).

Flat trajectories, where the individual spends the four periods in two neighbouring income groups. This means that a small 'wobble' would not prevent someone' trajectory being classed as 'flat' just because a single boundary line was crossed. Within this category, individuals are classified as poor flat, if at least two observations are within the bottom two groups. Rising trajectories, where the individual crosses more than one boundary, and all movements from wave to wave are either upwards or flat. Those starting in the bottom two groups would be rising out of poverty. Falling trajectories, where more than one boundary is crossed, and all movements are downwards or flat. Those ending in the bottom two groups would be falling into poverty. Blips, where the basic trajectory is flat (within two neighbouring groups for three of the periods), but one observation is further away (excluding those already defined as 'rising' or 'falling'). This group includes: blips out of poverty (where the flat part of the trajectory is in the bottom two groups, or at least is so for two out of the three observations), and blips into poverty (where the blip is in one of the bottom two groups and the others are higher). Other trajectories, covering all possibilities not covered by the four types described above. These include trajectories with repeated poverty (two observations in the bottom two groups) and one-off poverty (one observation in the bottom two groups). But the conclusions that can be drawn from Jarvis and Jenkin's work on low income dynamics are that despite mobility from year to year, there is still considerable persistence in low income (Jarvis and Jenkins 1997). 'Someone's chances of being poor this year are greatly increased if they have been poor in recent years' (Hills 1998).

Table 1.1 Trajectories of low incomes

Trajectory type	Percentage of cases	Percentage of low income accounted for
Flat: non-poor	31	1
Flat: poor	9	43
Rising: non-poor	6	-
Rising out of poverty	4	9
Falling:non-poor	5	-
Falling into poverty	3	9
'Blip': non-poor	15	-
Blip into poverty	5	7
Blip out of poverty	4	13
Other: non-poor	8	-
Other: one off poverty	6	8
Other: repeated poverty	4	11

(Source: Jarvis and Jenkins 1997 cited in Hills 1998)

Finances and the 'family' in the UK

The General Household Survey defines the family as 'a married or cohabiting couple living alone or with their children, or a lone-parent with his or her children, in each case the children being never married' although there is a considerable debate over definitions (Tisdall and Donaghy 1995). This section of the review will examine the family in the UK and their finances as a backdrop to the forthcoming literature review on healthier eating and original studies in this thesis.

The figures in this section are presented with the recognition that although trends are identifiable over time, the individual families involved may move in and out of a variety of different family structures. Information on families is obtained through data collected on individuals and households. Data on registered events in the lives of individuals such as marriage, childbearing, divorce and remarriage indicate transitions between different family stages or types, whilst data on households provide a valuable insight into the structure of families.

Out of all households with children in the 1991 Census, 16% (90 937) were headed by one parent (17% of all children were in one-parent households). The vast majority of lone parents were women (93%). More than half of the households had children between the ages of 5 and 15 only (54%), while 28% had children under 4 years old only (General Register Office for Scotland 1993a). But these numbers from the Census are an underestimate, as they exclude households with children aged 16 and over and households with resident lodgers or relatives.

The most common type of household is a family without children according to the General Household Survey 1995 (Office for National Statistics Social Survey Division 1997). This category is made up of families with no children (28%) and families whose children are no longer dependent (refers to children under 16 or between 16 and 18 in full-time education) (10%). Just over three out of 10 households comprised a family with dependent children, of which 24% were headed by a married or cohabiting parents and 7% by a lone parent. Just 1% of household contained two or more families, with both families related in two-thirds of these cases. The 10% Scottish sample of the Census found of all Scottish households (2 020 050) in 1991, 29% were households with children aged 0 - 15 (575 369). Nearly half (45%) of such households had only one child. Twenty seven per cent of all households were single person households, nearly 6% more than in 1981 (General Register Office for Scotland 1993a). According to the 1991 Census, children in one-family households are most likely to be living with married parents (75%). Cohabiting couples make up 4.5% of other such households (General Register Office for Scotland 1993b). Compared with 10 years before, Scotland's families are smaller- the number of large families (three of more children under 16) decreased by 2% - and older- the number of households with a young family with at least one child under 5 decreased by 1% (General Register Office for Scotland 1993a).

The economics of family life have changed over the last 20 years. The fall in the number of families living solely on a man's wages and the corresponding rise in dual-earner families as more women enter and stay in employment have been key trends in

employment affecting families. While average weekly household gross income continued to rise in the UK (from £211.63 in 1987 to £350.11 in 1991), UK households as a whole continued to have higher incomes than Scottish households (£350.11 vs. £306.36 in 1991 Central Statistics Office 1992). Compared to Britain as a whole, Scotland had a higher percentage of full-time workers earning below average income (32% vs. 27%, 1992) (Scottish Low Pay Unit 1993).

Unemployment increasingly tends to be concentrated within certain families Between 1975 and 1993 the number of two-adult households with no work at all almost tripled from 4% to 11%. Indeed in households where the head is unemployed, other household members are less likely to be in employment. For example, in 1993/94, among households with employed husbands, 68% of wives were also in employment, whereas, where the husband was unemployed, 24% of mothers were in employment. The most likely reason for these unemployed-couple families are the negative effect of current social security rules on a wife's earnings and the tendency of men and women from similar work backgrounds to marry each other (Davies, Elias and Penn 1992). Periods of unemployment are also lasting increasingly longer: the proportion of non-employed two-adult households still out of work for longer than a year has risen from 40% in 1975 to 76% in 1993.

As of May 1994, Scotland's unemployment rate (9.4%) had decreased 6.2% from December 1992. This compared to an UK total of 9.5% and a higher in Northern Ireland of 13.3% (The Herald 19.05.94). Official unemployment rates do not give a full picture of those who are not in employment, due to the people considered 'economically inactive' - such as unpaid carers, disabled people who have exited the labour market or are on various benefits dependent on them not working and certain categories of students. At least 1 in 4 unemployed people in Scotland is aged between 16 and 25 (Shelter Scotland 1994). Recently there has been the increasing division between families where neither partner is working and families where both partners are employed. Whilst women whose partner is employed are now increasingly likely to be also in employment, the reverse, however, is not true: the employment rates of women with an unemployed or inactive partner have not

increased and amongst only about 2% of families with dependent children is the woman the sole breadwinner.

Women and employment

The proportion of working women in the labour force has been increasing steadily: in 1951, one in 10 (10%) married women were economically active (either in paid employment or unemployed). By 1951 this proportion has increased to three in ten (30%), to nearly half in the 1970s, and by 1992 it stood at 63%. Women continue to dominate particular areas of the workforce: more than 80% of the workforce in retailing, hairdressing, welfare services and certain clothing industries is female Female employment has only risen in household where the partner works (up to 73% from 1975 to 1993), and the biggest changes have occurred where women had low-earning partners (Gregg and Wadsworth 1994). In 1973, less than half (43%) of families had both parents in employment: by 1993, this figure had increased to 60%, leaving just under three out of 10 (30%) single earner families.

Almost all of the increase in female employment has been in part-time employment, with both parents working full-time in only one in five families with dependent children. In 1993, 63% of mothers (refers to mothers of children under 10) worked part-time compared with 44% of all women and 6% of men. Although part-time employment is generally a conscious choice for mothers (92% of mothers working part-time did not want a full time job in 93/94), as it enables then to combine work and domestic responsibilities more easily, it often means low status and low paid work. In 1994, the average hourly earnings of women working part-time was £5.08 (£6 08 for part-time male employees) compared with £6.89 for full-time work (£8.61 for full-time male employees). Catering and cleaning, followed by clerical work, are the largest source of employment for female part-time workers (Scottish Low Pay Unit 1993b).

Amongst families with low incomes, women's earnings help to keep families out of poverty: in 1990/1 poverty rates amongst couples would have been up to 50% higher without women's pay. Part of the reason why women's wages are needed to sustain

the families income is that wages, in real terms, need to be higher than 30 years ago to maintain living standards, mainly as a result of changes in fiscal and housing policies and also because of higher unemployment and job insecurity. There has been a dramatic increase in child poverty in recent years. There are a number of different ways of defining poverty and one common measure is based in how many people have less than half the national average income. In 1979, 10% of the child population in the UK lived in households with an income of 50% or less of the national average By 1990/91 this further had risen to 31% (3.9 million children). The proportion is even higher in Scotland at 38% (Tisdall and Donaghy 1995).

The previous sections have shown that the trends in income distribution of a widening gap between the advantaged and the disadvantaged is paralleled by demographic trends in families such as dual earning families and women as a sole breadwinner The literature review presented in the next chapter will discuss in-depth the implications for diet choice of working patterns. This chapter has covered the social and environmental factors associated with health. The relationship between diet and income has been alluded to and is *the* primary focus of this thesis. The next section will summarise the links between diet and disease and the historical background to the promotion of dietary change.

Diet and Disease

Diet is often linked to geographical, educational, lifestyle and other socio-economic differences in disease prevalence and mortality pattern (Pietinen, Nissinen, Vartianinen, Tuomilento, Uusitalo 1988, Castelli 1990, Cannon 1992, La Vecchia, Negri, Franceschi, Parazzini, Decarli 1992, Donnan, Thomson, Fowkes, Prescott & Housley 1993, Kant, Schatzkin, Harris, Ziegler & Block 1993, Hansson, Nyren, Bergstrom *et al* 1993, Zheng, McLaughlin, Gridley *et al* 1993), despite of improvements in social conditions and health in rich industrialised countries including the United Kingdom (Fox 1989, Blaxter 1990) The reports Scotland's Health (Scottish Office Home and Health Department, 1992) and The Scottish diet (Scottish Office Home and Health Department 1993) first detailed the modern evidence that indicates how the Scottish population carries the highest burden from

preventable ill health in the Western world. Premature death in Scotland is twice as likely as in many Western European Countries. The rates in women substantially exceed those in most other Western societies (World Health Organisation 1990) Scottish women have shown the least improvement in premature death rates over the last 20 years. The bulk of the problem relates to heart disease, stroke and cancer, which account for 65% of the premature deaths in men and 66% in women (**Table 1.2** from the Scottish Office Home and Health Department (1993)). The frequency of heart disease is beginning to fall, but the rate of decline is less than in other countries

Table 1.2 Proportion of all deaths below 65 caused by each disease

	Female (%)	Male (%)
Coronary disease	16.6	31.0
Cerebrovacular disease	6.9	4.8
Other cardiovascular disease	4.1	4.3
Malignancy	38.5	25.5
Other causes including respiratory, digestive, infectious and parasitic disease, accidents and violent deaths etc.	33.9	34.5

Source: CVEU Dundee 1992 from RG data cited in The Scottish Diet Report (Scottish Office Home and Health Department 1993).

Cancer rates remain high and tobacco causes more cancers in the context of a British diet, probably because of low fruit and vegetables consumption and consequently low anti-oxidant intake (Bolton-Smith, Smith, Woodward and Tunstall-Pedoe 1991a). Scotland has one of the highest rates of stroke in the Western world, reflecting diet components and inactivity; 75% of adults Scots have total cholesterol levels above the acceptable range of 5.2 mmol/l, and overweight affects over half of the middle aged adults. The Scottish Diet Report states that 'many of these diseases have a clear nutritional basis or are promoted by inappropriate diet' (Scottish Office Home and Health Department 1993). A recent systematic review presented **Table 1.3** to summarise the excess disease rates in lower socio-economic classes and their relation to diet in Britain (James, Nelson, Ralph and Leather 1997).

Table 1.3:Excess disease rates in lower socio-eocnomic classes and their relation to diet in Britain

Excess disease	Risk factors	Dietary contributors
Anaemia of pregnancy	Low iron; folate status	Low intake of vegetables and fruit, low intake of meat, physical inactivity
Premature delivery	Lower folate; lack of n-3 fatty acids	Low intake of vegetables, fruit, and appropriate oils and fish
Low birthweight or disproportion	Adolescent pregnancy; lower folate; lack of n-3 fatty acids, low weight gain in pregnancy; smoking	Low intake of vegetables, fruit and possibly trans fatty acids
Anaemia in children or adults	Iron; folate; vitamin C and B-12 deficiency	Possibly premature use of cow's milk; low intakes of vegetables and fruit, low intakes of meat; diet low in nutrients, with low intake linked to physical inactivity
Dental disease	Low fluoride content of drinking water	Sweet snacks and rinks between meals
Eczema/asthma	Parental smoking; air pollution	Low breastfeeding rates
Insulin dependant diabetes mellitus	Viral infections	Low breastfeeding rates
Obesity in childhood and adults	Poor recreational facilities, intense traffic, excessive television watching	Physical inactivity; energy dense (high fat) diets
Hypertension	Process foods, low birthweight; adult weight gain	Salty, energy dense foods with high sodium and low potassium, magnesium and calcium content; alcohol; low intake of vegetables and fruit, inactivity
Lipid abnormalities high cholesterol	Excess weight gain	Excess dairy fats and some (hydrogenated) vegetable oils
Low high density lipoprotein or high triglcerides	Excess weight gain	Physical inactivity, energy dense diets, low intake of fish
Non insulin dependent diabetes	Excess weight gain	Physical inactivity; energy dense diets
Coronary artery disease	Hypertension; lipid abnormalities, smoking, low folate and antioxidants	Salty, energy dense foods with high sodium and low potassium, magnesium, calcium; alcohol; poor intake of vegetables, fruit and fish; low activity
Peripheral vascular disease	Smoking; low folate; lipid abnormalities	Poor intake of vegetables and fruit and possibly fish
Cerebrovascular disease	Hypertension; low folate; high cholesterol	Salt, energy dense foods high in sodium and low in magnesium, calcium, potassium, alcohol , low vegetables and fruit
Cancers, lung, stomach, oropharynheal, oesophagus	Smoking with excess alcohol intake	Low intake of vegetables and fruit
Cataracts	-	low intake of vegetables and fruit
Bone disease in elderly people	Vitamin D deficiency, confined living and travel opportunities	Physical inactivity, calcium poor diet

Source: James, Nelson, Ralph and Leather (1997)

So this section has summarised the links between diet and disease in the Western world countries with particular references to Scotland. The past decade has seen a movement in public health nutrition to set population goals or 'targets' to resolve steadily the burden of ill health for the next century. But scientific discourse on nutrition and dietary change has been evident throughout this century, which much attention focused on socio-economic factors. The next section borrows heavily from (Smith 1998).

Promoting the need for dietary change

After the First World War, the activities of the nutrition scientists Cathcart, Paton, Greenwood, Boyd Orr, le Gros Clark and Yudkin significantly contributed to the promotion of the need for dietary change in the UK. 'Some believed changes in dietary habits would simply follow the dissemination of nutritional knowledge; others emphasised the great complexities in bringing about dietary change' (Smith 1998, p 312).

Several years after the Ministry of Health and its Food Department was established in 1918, evidence of income differentials in access to a healthy diet were presented in a Medical Research Council (MRC) Special Report (Cathcart, Paton and Greenwood 1924). Cathcart *et al* (1924) carried out a study of miners and their families. It was hypothesised that starvation was prevalent in the mining communities because of the high unemployment and pay cuts. A total of 140 families were studied in five areas Little evidence of a direct relationship between the weight of children and calories consumed was found. Comparisons between children from mining families and non-mining families were small. However, a correlation was found between higher incomes and increasing calories in the diet. The authors reported 'quite apart from differences of income there are variations of diet. which suggest that housewives could be helped to secure a more adequate return for their expenditure by a better dissemination of knowledge both of the economic and hygienic aspects of diet (Cathcart *et al* 1924 p 47). The following years witnessed nutrition become a subject for public debate as a series of claims and counter claims were made about the effect of the economic depression on the incidence of malnutrition (Webster 1982).

John Boyd Orr, Director of the Rowett Research Institute, Aberdeen, reported that the adequacy of diets depended largely on income, and that about half the UK population were consuming nutritionally deficient diets in 'Food, Health and Income (Boyd Orr 1936). The assertion that the poor nutrition was caused by the ignorance of the poor was raised by some scientists. Boyd Orr's data was also presented in the film Enough to Eat?, directed by Edgar Anstey. In the film, G.C.M. M'Gonigle asserted opposition to a 'ignorance' argument saying that
'the average working class housewife by rule of thumb methods knows pretty well which food stuffs to buy to feed her family...as her income increases she approaches more and more nearly to a really satisfactory diet. But there are hundreds of thousands of housewives who cannot afford to buy enough of the high-grade protective foods' (cited by Smith 1998).

During the Second World War, Frederick le Gros Clark started to advocate the development of a new 'field of science' called 'social nutrition' of 'food sociology' through his editorship of the Wartime Nutrition Bulletin. "Food Sociology deals... with the actual manner in which human beings, under varying conditions of culture and custom, choose, prepare and consume their food with the more or less fixed patterns of food habits and traditions, with prejudices and taboos, with the relations between domestic feeding and communal feeding" (Wartime Nutrition Bulletin 1945 cited in Smith 1998). The Bulletin continues to state that research could form the foundation for effective use of nutritional knowledge. "We should doubtless like ..[Man] to be a creature who does without question all that the dietetic expert advises... Few if any of us do that. We have therefore to study ourselves as food consumers and both accumulate knowledge about ourselves and apply it towards a steady and irreversible improvement in our nutritional levels (Wartime Nutrition Bulletin 1945).

After May 1951 the Nutrition Bulletin was incorporated into the Health Education Journal and Frederick le Gros Clark who had encouraged the Bulletin to be a vehicle for 'food sociology' largely failed in his ambitions for nutrition and food sociology (Smith 1998). It was John Yudkin, who placed the social aspects of nutrition on the

research agenda in the 1960's. Professor Yudkin had his BSc degree in Nutrition formally approved in for its first intake in 1953 at the Queen Elizabeth College, University of London. Social scientists were actively involved in the teaching of the nutrition students and in 1959 J.C. McKenzie, was appointed Research Fellow in the Sociology of Nutrition. A 'Social Nutrition Unit; was established and in 1963 a conference on 'Changing Food Habits' was held at Queen Elizabeth College. Yudkin's drive for the study of the 'determinants of food habits' was evident and with Mckenzie, he commented on the lack of relationship between nutritional knowledge and food choice:

Our ..observations suggest that nutritional knowledge - correct or incorrect - does not effect the choice of many people other than those unusually preoccupied with their health. Nutritional value is more commonly used as a rationalisation for a choice that has already been made; for example, that sweets and sugar are especially good sources of energy (Yudkin and Mckenzie 1964 p 136). As part of the New Scientist's '1984 series', Yudkin wrote that the major problem to be solved in the 'impoverished countries' was

'how to persuade people to eat what is good for them and how to prevent them from eating what is bad for them. In other words the first problem is to persuade people accustomed to eating a narrow range of nutritionally poor foods to widen their choice so as to include the nutritionally poor foods to widen their choice so as to include the nutritionally more desirable foods, especially those rich in protein. We will need, for this purpose, information about what determines the food habits and how people can be influence to eat unaccustomed foods" (Yudkin 1964 p 273). Professor Arnold Bender later became head of the Nutrition Department at Queen Elizabeth College and continued the emphasis on the 'sociological and psychological aspects of nutrition (Smith 1998). The debate surrounding the links between dissemination of scientific findings and dietary change is still continuing. The next section will consider the Scottish Office policy on dietary change this decade.

The modern Scottish Office policy

In the 1980s the publication of the National Advisory Committee on Nutrition Education (NACNE 1983) report and the COMA publication Diet and Cardiovascular

Disease in 1984 (Department of Health and Social Security 1984) stimulated national and local health promotion activities. The previous section on Diet and Disease has summarised the challenging Scottish profile of diet-related disease such as coronary heart disease, stroke and some cancers. The Scottish Diet report (Scottish Office Home and Health Department 1993) set a series of nutritional targets aimed at decreasing intake of the percentage energy derived from fat, saturated fats and sugar and increasing the percentage of energy derived from starchy carbohydrates, fibre fruit and vegetables (see **Table 1.4** below).

Table 1.4 Scottish Diet report – nutrient targets for 2005

	Current average intake	Direction of change	Proposed average for the Scottish Diet
Vegetables and fruit (g) (excluding potatoes)	181.0	⇑	> 400
Carbohydrates			
Starch E%	25.3	⇑	> 40
Fibre (g) (as non-starch polysaccharide)	10.5	⇑	> 16
Sugars E%	16.3	⇓	< 10
Total fat E%	40.7	⇓	< 35
Saturated	16.6	⇓	< 11
Salt consumption as sodium (mmol)	163.0	⇓	100
Potassium consumption (mmol)	62.0	⇑	80

Source: Scottish Home and Health Department (1993)

The Scottish Diet report was followed by the publication of the 'Eating for Health: A Diet Action Plan for Scotland' (Scottish Office 1996) which proposed a set of food targets for 2005 (ibid p.79) presented in the **Table 1.5**. Similar to the policy activities of other countries e.g. Norway, these food goals and targets are largely developed for planners as they should be comprehensible to all agencies involved in the 'food

network' (Hurren and Black 1991) to facilitate dietary change (Anderson, Milburn and Lean 1995).

Table 1.5 Dietary Targets for Scotland for the year 2005

Fruits and Vegetables	Average intake to double to more than 400 grams per day.
Bread	Intake to increase by 45% from present daily intake of 106 grams, mainly using wholemeal and brown breads.
Breakfast cereals	Average intake to double from the present intake of 17 grams per day
Fats	Average intake of total fat to reduce from 40.7% to no more than 35% of food energy
Salt	Average intake to reduce from 163 mmol per day to 100 mmol per day
Sugar	Average intake of NME sugars in adults not to increase. Average intake of NME sugars in children to reduce by half i.e. to less than 10% of total energy
Breastfeeding	The proportion of mothers breastfeeding their babies for the first 6 weeks of life should increase to more than 50% from the present incidence of around 30%.
Total Complex Carbohydrates	Increase average non-sugar carbohydrates intake by 25% from 124 grams per day, through increased consumption of fruits and vegetables, bread, breakfast cereals, rice and pasta and through an increase of 25% in potato consumption.
Fish	White fish consumption to be maintained at current levels. Oily fish consumption to double from 44 grams per week to 88 grams per week

Source: Scottish Office (1996)

This section has sought to outline the historical and current position on promoting dietary guidelines in the UK. This is summarised in anticipation of a fuller discussion throughout the following chapters of the thesis. This chapter ends with a final word on some recent political developments that will shape income-related research.

A change in UK government and ideology.

The Labour government's consultation paper *Working Together for a Healthier Scotland* published in February 1998 may start with a platitude 'Good health helps us each to live life to the full', but is breaks new ground in openly talking about the effect of life circumstances on health (Scottish Office Department of Health 1998). The present government has revisited the premise of the Inequalities in Health or Black Report published in 1980 (Townsend and Davison 1982). As part of the Scottish manifesto, they have promised that 'We will aim to improve public health in Scotland with new initiatives on preventative health care that recognise the impact that poverty, poor housing, unemployment and a polluted environment have on health" (Scottish Office Department of Health 1998, p 1).

The Conservative Party, with the political ideology of individual (rather than state) responsibility and market forces, were in government from 1979-1997. Therefore it should be noted that all the studies presented in this thesis were designed and carried out under the auspices of the Ministry of Agriculture Fisheries and Food (MAFF) 'Food Acceptability and Choice' and 'Dietary Surveys' food research requirements 1994-96 directed by the policy priorities of the Conservative government of that time However, the dissemination of the findings arises under the auspices of Centre-left political ideology of the Labour Government. I wish to thank MAFF for their sponsorship of these studies and state that they bear no responsibility for the interpretation of the data.

Chapter Two - Literature Review

Aims and Scope

This review will consider 'the state of the nation' with regard to income, diet and nutrition. It will identify particular challenges to the understanding and promotion of healthier eating currently unmet by the published studies, including potential barriers to healthier eating of the three A's: availability, affordability and attitudes. Priorities for further research will be identified.

Search strategy

Published studies for the review were identified through a combination of systematic searching of biomedical, psychological, sociological and anthropological bibliographic databases and checking of reference lists of identified research and review articles. The majority of studies were identified using the databases MEDLINE (Index Medicus National Library of Medicine, USA), EMBASE (Excerpa Medica), PsychLIT (American Psychological Association) and Science Citation Index through BIDS. Additional databases searched were Social Science Citation Index, HEBSweb (Health Education Board for Scotland), CINAHL (Royal College of Nursing), and MIDIRS (Midwifery Information and Resource Service). Most journal articles were found using Medline and an example search strategy is outlined below.

Medline search terms

The MEDLINE search relied on MeSH index terms plus a limited amount of free text searching. As advised on the Glasgow Royal Infirmary Medical Library's course 'Finding the Evidence', all terms were exploded where ever possible to include all subheadings. A typical strategy might look like:

Set 1

'NUTRITION'/all subheadings

'DIET'/all subheadings

explode 'DIET-ATHEROGENIC'/all subheadings

explode 'DIET, - FAT-RESTRICTED' /all subheadings

explode ' DIETARY-FATS'/ all subheadings

explode 'DIETARY-FIBER'/all subheadings

explode 'FOOD-HABITS'/all subheadings

explode 'FOOD-PREFERENCES'/all subheadings

Set 2

ATTITUDE-TO-HEALTH/all subheadings

Explode 'KNOWLEDGE,-ATTITUDES,-PRACTICE/all subheadings

Explode 'NUTRITION-POLICY'/all subheadings

Set 3

Explode SOCIO-ECONOMIC FACTORS/all subheadings

Set 4

Set 1 and Set 3

Set 5

Set 2 and Set 3

Other databases

The other databases searched are less well indexed. The general approach was to use the appropriate terms for nutrition, attitudes and socio-economic factors. For several databases the search was confined to text searching only using word such as 'nutrition', 'diet', 'food', 'health', 'unemployment', 'job loss', 'economic' and 'income'. The majority of book chapters were identified using PsycLIT. Higher degree theses were identified through Silver Platter and from known sources of library catalogues. As some journals were known not to appear on the databases e.g. Journal of Human Nutrition and Dietetics, back issues were hand searched for relevant articles. Unpublished works were found by following up references from key articles, trade journals or from personal communication. The possibility remains that some relevant studies were missed due to the diversity of the field of income and diet and the variety of terms used in describing and indexing such studies.

Diet and Disease

The role of diet in the causation and prevention of chronic diseases has been described earlier in Chapter One. Across all age groups the Scottish diet is *"low in cereals, vegetables and fruit, and rich in confectionery, fat-enriched meat products, sweet and salty snacks, baked goods of inappropriate composition accompanied by*

excessive amounts of sugary drinks and alcohol. The Scottish diet also combines an excess of fat, saturated and trans fatty acids, refined sugars and salt" (Scottish Office Home and Health Department 1993). These dietary characteristics have been implicated in the aetiology of all major disease conditions. In addition, national figures (Gregory *et al* 1990) show that 45% of British men and 36% of British women are overweight (BMI>25kg/m^2) a condition which in itself may be physically and emotionally debilitating as well as predisposing to other disease states such as diabetes and gall-bladder disease.

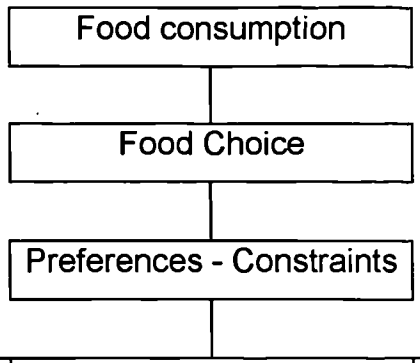
The Scottish Diet Action Plan (Scottish Office 1996) stated that *" Eating well is a long term investment in health, which is within the reach of most Scots. Yet the image, and too often the reality, of a Scotch pie and chips, washed down by a sugary drink or a beer, is the reverse. The conditions to which poor diet and obesity give rise are, in health terms, burdensome to treat, poor in outcome, and more common in Scotland than almost anywhere else. In human terms, they account for diminished lives, pain and stress. Children form tastes early: building from what we know of their present diet, prospects for their health in the middle and old age look bleak."* (p. 7)

Of all lifestyle factors targeted for change, consumption of a healthy diet has probably provoked most debates. Whilst there is general consensus (Department of Health 1991, Cannon 1992) amongst nutritionists on the quantitative composition of a healthy diet in terms of conventional nutrients expressed as a proportion of total energy, there is no such consensus on the quantity and type of food that should be consumed. However, the Scottish Diet Report (Scottish Office Home and Health Department 1993), discussed in Chapter one, has broken new ground in promoting dietary targets that specify the average weight and frequency of particular foods that should be consumed by adults. This approach has widened the debate on the practical implications of achieving a healthy diet, factors influencing food choice and the relationship between income and diet.

Factors affecting food choice

In the Scottish Diet report, factors influencing food choice were outlined as below (Scottish Office Home and Health Department 1993). Access and availability of a range of good quality food at reasonable cost are considered essential to obtaining a healthy diet. These will be influenced by area of residence, car ownership, public transport, shopping facilities and storage facilities. As the following sections review the methodologically diverse evidence on 'access' (including availability), the pervasive role of income as a determinant of food choice will become clear.

Table 2.1 Factors influencing dietary intake



Characteristics of the Individual	Characteristics of Food	Characteristics of Environment
Age	taste	season
Sex	seasoning	unemployment/home
Education	appearance	shift work
Income	texture	mobility
nutrition knowledge	food type	urbanisation
cooking skills	meal/time context	household size
attitudes to health	cost	family age
attitudes to change	storage	illness in family
Illness	preparation method	social pressures
Teeth	health connotation	health pressures
	symbolic content	role models
	cultural value	
	ecological value	

Source: Scottish Office Home and Health Department 1993, p 71

It is acknowledged that the following sections of this chapter has been influenced heavily in structure and content by the short literature review *Constraints on dietary choice: Implications for health policy* by Anderson, Eley, Lean, Paisley, Sparks and Shepherd (1995) and systematic literature review *Opportunities for and barriers to good nutritional health in women of childbearing age, pregnant women, infants under 1 and children aged 1 to 5* (Reid and Adamson 1998).

The 'Access' literature

Recent trends in shopping for food

Nearly 70% of all food sales are now made from large supermarkets (SHHD 1993) and even in remote parts of the UK national food retailers provide a wide range of food. These tend to be in purpose built shopping centres and often at out of town sites at a considerable distance from major local authority residential areas. Of the remaining 30% of food sales a high proportion are lower income consumers who have to rely on local shopping areas which have often been run down, providing fewer total food shops, with less small supermarkets and independent stores (Henson 1992). The Low Income Project Team Report (LIPT 1996) presented data to support the recent trends in the distribution and availability of food shops outlined by the London Food Commission (LFC): a growth in the market share for food by the 'Big Four' multiples; a growth in the average size of a food shopping retail outlet caused by shift from small shops to larger superstores and a decrease in absolute numbers of food retail outlets. The recent data showed that the number of food retail outlets decreased by 35% between 1980 to 1992 from 121,6000 to 78,606 mainly at the expense of small grocery outlets and specialist shops such as butchers and green grocers while the average store size increased from 6,924 sq. ft in 1980 to 12,850 ft in 1994 (LIPT 1996).

The last decade has witnessed an increasing polarisation between the large scale out-of-town 'multiple' superstores offering wide purchasing opportunities and the local independent retailers tending to stock basic foods, a large proportion of which are processed or canned and a limited supply of poor quality fruit and vegetables. In

essence the supermarkets seemingly offer better quality products at cheaper prices but any calculation of 'cost' must take account of transport to and from the superstore. People on low incomes rate shopping near to home as the second most important factors of food shops after 'low price' (Henson 1992). Furthermore, a study conducted in two socially contrasting localities in Glasgow found that those in the more affluent areas were less likely to say location and price were very important in their households choice of food shops than those in the more deprived area (Forsyth and Macintyre 1993). Living in bed and breakfast has been associated with the highest use of small shops due to the lack of storage facilities such as fridges and freezers (Health Education Authority 1989).

Consumers travelling to large stores may take considerable longer time, effort and cost if public transport is used, compared to local shopping. Only 20% of shopping journeys are on foot and 12% by bus (LIPT 1996). The Health Education Survey reported that the difficulty of travelling with young children without a car prevented many single parents in the sample from using the cheaper supermarkets or discount stores and to be more dependent upon the local shops and nearby supermarkets, often paying higher prices. Small local shops were consistently reported to be the most expensive places to shop and were only used by respondents for perishable items and in emergencies (Health Education Authrority 1989). It is unclear how many women have access to a car although considerably less females aged 17 and over hold a full driving licence (53% compared to 81% of males aged over 17 years between 1991-93) (Central Statistical Office 1995). While 32% of households are without regular use of a car (Central Statistics Office 1994), those who do have access to a car for food shopping are travelling, on average further and more often to the shops. The number of shopping journeys by car has increased from 44.9% in 1975/76 to 64.1% in 1991/93 and the average distance has increased from 13.7 miles in 1989/91 to 15.3 miles in 1991-93 (LIPT 1996).

Food shopping and the division of labour

While much attention has focused on the division of labour in food preparation and cooking (which is discussed later), food shopping and division of labour have been

practically overlooked by researchers. Some indications can be drawn from two studies with different samples and methodological strengths (Charles and Kerr 1988, Warde and Hetherington 1994).

The questionnaire study of Warde and Hetherington (1994) posed the question 'who did the task last' and reported that 30% of their sample of couple households reported sharing the shopping, 54% reporting that women did the shopping and 14% men doing the main shopping. The researchers reported that, in their experience, questionnaire responses to a general question of who usually does the shopping 'underestimated women's actual contribution' (Warde and Hetherington 1994). Two hundred women participated in the qualitative study of Charles and Kerr (1988). While these women were less affluent and younger than the sample of Warde and Hetherington (1994) just under half (46%) the sample said that they were wholly responsible for the shopping, 41% did most of the shopping with the help from partner (e.g. the partner driving them to the supermarket) and 10.5% shared the task with their male partner (Charles and Kerr 1988).

Bearing in mind the earlier discussion of recent trends in distribution of food shops, women may face a double jeopardy of inequality: living on lower incomes and not having access to car (or a driver) may act as barriers to healthier eating through a lack of access to the superstores offering high quality low cost food. As Charles and Kerr note, "class profoundly influences... the options that are open to (women) in terms of providing food for the family" (Charles and Kerr 1988, 167).

Availability of foods promoted as 'healthier eating'

The cost of a healthy diet is often cited as one of the major barriers in changing to a healthy diet (Scott and Pill 1983, Cole-Hamilton and Lang 1986, Durward 1988, Health Education Authority, 1989). It has been argued that foods promoted for healthier eating are more expensive in some shops compared to others and vary by area of residence. Until recently, 'shopping basket' surveys have been the most widely used methodology to assess the availability of foods promoted as 'healthier eating' in local communities across the UK (Scotland, England and Wales).

"Shopping basket approaches" to assess food costs and availability suggest that foods currently advocated as healthy, cost more in a poor area than a better area are relatively more expensive than a "less healthy" selection (Mooney 1990, Burrows 1991, National Children's Home 1991, Sooman, Macintyre and Anderson 1993). Other research have shown that a healthy diet is more expensive than a standard diet and that this expense is very often well beyond the spending capacity of people on income support (Cole-Hamilton & Lang 1986, Welsh Consumer Council 1990). Unfortunately, such approaches have not always taken account of actual food preferences and choices, food quality, food quantities, availability of resources for preparation. They also provide no indication of food distribution within households.

The 'shopping basket survey' carried out as part of the West of Scotland Twenty-07 study in Glasgow by Sooman *et al* (1993) noting the limitations of comparing items in terms of weight, quality, quantity, size and brand (Sooman *et al* 1993). Sooman and her colleagues found that not only were 'healthy foods' more available in the middle class area of Glasgow but their costs was greater in a more socially disadvantaged area than in the better off area (Sooman *et al* 1993). Sooman's team focused upon the lack of availability of what the authors term 'healthy foods' in a socio-economically deprived areas (Sooman *et al* 1993) they also noted the good availability of fresh fish and fruit and vegetables in middle class areas, the prices for the items being slightly cheaper in the more middle class area of the city. In a related project Forsyth and colleagues included in a large scale survey questions about foods consumed in different neighbourhoods by individuals belonging to two age cohorts (40 years and 60 years old) of the West of Scotland Twenty-07 longitudinal study (Forsyth, Anderson and Macintyre 1994). The authors report (amongst other findings) variation between 'neighbourhoods' and more brown or wholemeal bread, high fibre cereals and spreading fats (polyunsaturated fatty acids) (Forysth *et al* 1994). The researchers also found variations by gender (notably with salt intake being higher among males than females) and by age (Forsyth *et al* 1994). But emerging findings from a recent study, using more robust methodology, from the Medical Sociology Unit suggests that the number of food shops is actually greater in the disadvantaged areas (Cummins and Macintyre 1998).

Several large-scale surveys have also noted regional variations in the types of food consumption as well as recording gender differences. Whichelow and her colleagues, reported findings from the Health and Lifestyle Survey (carried out in 1984/85) note for example, that there are significant differences across the 11 regions in relation to the consumption of chips and fried foods, fruit and salad (Whichelow, Erzinclioglu and Cox 1991). Analyses of gender differences reveal that women were more likely than men to eat fruit, salads and fruit juice 'frequently' and to choose 'brown' bread and skimmed milk, and less likely to eat potatoes, pulses, processed meat, eggs, chips and fried foods (Whichelow *et al* 1991). Issue about gender and attitudes to food are discussed later.

A marked North-South gradient in diet quality is well described. In Scotland, Bolton-Smith *et al* (1991a). reported that men and women from manual social classes had a higher total energy intake but lower intake of vitamin C, vitamin E, beta-carotene dietary fibre and ratio of polyunsaturated to saturated fat (compared to non-manual classes). Bolton-Smith (1991b) also reports manual workers consuming more saturated fats from meat products, hard margarines and lower intakes anti-oxidant vitamins because of low intakes of fruit juices, green vegetables, fresh fruit, cereals, soft margarine, vegetables oils, green and root vegetables. In Ireland, Gibney and Lee (1993) reported adequate energy intake in adults living in an area of high social deprivation except for lone mothers who had low iron and vitamin C levels (compared to other women surveyed and Irish RDAs).

In Wales, the Welsh Consumer Council carried out a survey to establish prices and availability of foodstuffs in different types of shops and areas in Wales (Welsh Consumer Council 1990). They surveyed cost and availability of 30 items from a sample of 111 shops (quality was not assessed), and reported that the survey findings confirmed that smaller shops generally charged higher prices than large shops and that the costs of the selected items was 11.2% more expensive than in large shops. Geographical variations in price differences between the north and south Wales were more marked in large shops, with prices tending to be lower in the south. The survey also highlighted the methodological difficulties with such apparently straightforward

comparisons, as some small shops were affiliated with larger chains (which affects pricing), not all items were available for comparison in each shop and pricing variations sometimes depended upon the shop's definition of certain foods (e.g. 'lean' beef) (Welsh Consumer Council 1990).

Therefore 'access' to certain foods is underwritten by the deliberate strategy of the retail market in terms of placing and pricing of foods in selected neighbourhoods. It is interesting to note that according to recent focus group work carried out in different areas of England by Hunt *et al* (1991) that "for many women shopping presented more difficulties in terms of providing the family with a healthy diet than the preparation and cooking of healthy food".

Recent attempts to improve local shopping facilities included community business bulk buying schemes, food co-operative and issuing coupons to residents to subsidise the purchase of healthy foods in local shops (Sooman *et al* 1993). However, none of these ventures have yet been shown to make a major impact on overall food choice In Scotland there are virtually no fruit and vegetables markets, thus the provision of a range of good quality fruit and vegetables and price competition that comes from street markets does not exist although Glasgow boasts the only wholesale market in Scotland due to the demise of market in Edinburgh (Graham Wallace personal communication).

Income and food purchasing

Perhaps the most fundamental consideration in terms of the 'access' literature is disposable household income. The relationship between income and food choice is one that has lead to a great deal of debate in recent years, and until recently, has been hindered by a lack of appropriate tools for assessment. Detailed, weighed prospectively recorded diet surveys are time consuming and known to results in changes in eating habits and under-reporting (Bingham 1987). Retrospective methods and questionnaires lack precision and rely heavily on memory for estimating frequency of consumption and portion weights. Both methods are open to social bias, from the large eater who wishes to appear modest and the poor eater who wishes to be

seen as eating a good diet. Issues relating to dietary survey techniques and low-income groups have recently been extensively reviewed by Dowler and Rushton (1994). Thus, much work on diet and income has tended to focus on discussion of foodstuffs rather than nutrients - an approach that is often considered less rigorous, the National Food Survey does discuss nutrients and income in its annual reports. Research studies that have focused on low income households and 'access' to a healthy diet have found that respondents, in both qualitative and structured studies report cost of food dominating food selection and expenditure (Health Education Aurthority 1989, Dobson, Bearsdworth, Keil and Walker 1994, Dowler and Calvert 1995).

The Health Education Authority (HEA) study found that when choosing food, respondents reported that price was the most important concern followed by ease and speed of preparation and family preferences. The HEA study used both food diaries and interviews to understand food shopping behaviours in their sample of 47 households on low income (HEA 1989). Income rather than taste was reported as the barrier to purchasing certain foods (HEA 1989). Similar methods were used later in the National Children's Home 1991 study of 354 families with children living on a low income claiming state benefits (NCH 1991). Using in-depth interviewing and structured validated tools, it emerged that some foods are more 'essential' than others are from the Loughborough study. Dobson and her colleagues report that foods such as meat, vegetables, fruit, staples and snacks were seen as essential items although salads and fresh fruit were regarded as luxury items in the families (Dobson *et al* 1994).

The mixed method, dual discipline (sociological and nutritional) perspective of the lone parent study of Dowler and Calvert (1995) allowed an investigation of the nutritional outcomes (through a dietary survey) of 200 lone parent households (adult and children) and an examination of the factors influencing food selection in great detail. The researchers found that parents who exclusively used discount food shops (22% of the sample) and their children had worse nutritional outcomes than those who used other shops as well or instead (Dowler and Calvert 1995). No evidence was

found to suggest that discount stores provided low quality foodstuffs or that this contributed to the poor outcomes. Rather, the authors argue that have a lack of variety of food in the diet is linked with nutritional inadequacy (Dowler and Calvert 1995). Long term poverty was just one factor that compromised the variety of the lone parents' diets. Other commitments such as automatic deductions from benefits were related to food selection decisions (Dowler and Calvert 1995).

The body of evidence consistently suggests that price is a strong barrier to selecting certain foods. It could be argued that bulk buying is one strategy to reduce food costs but low income households may not be able to take this opportunity if they budget on a day-to- day basis (Anderson, Lean, Foster and Marshall 1994) or a weekly basis with no resources for building up stores. Additionally, larger and multiple packs require storage facilities including dry stores and freezer space, neither of which may be available in small flats and certainly not in bed and breakfast accommodation or for the homeless. Lack of storage reduces the types of food that may be purchased and so may act as practical barrier to the adoption of healthier eating as suggested earlier by the HEA study findings (HEA 1989). However, there is a lack of comparative work on higher income households who may have storage opportunities and bulk buying power.

Consumer goods, such as cookers and freezers, were developed in line with the food and shopping post-war revolutions. The refrigerator made shopping less demanding because food could last longer. By 1978 more than 90 per cent of households owned refrigerators. Almost half possessed a deep freeze or fridge freezer in 1981. Gradually the supermarkets shifting the responsibility for storing food from the shop to the home that could store food in bulk. In post-war Britain, consumer goods have grown in ownership and types. Where only 6% of British families had an electric cooker in 1936, nearly a third had them by 1961 and nearly a half by 1980. Ownership of microwave ovens, launched in the mid 1970s, accelerated in the 1980s and by 1991 more than half the nation's households owned one (Harrison 1998).

In theory, the cost of a healthy diet, which is largely based on cheap carbohydrate foods such as bread, potatoes, cereals and pasta could be considerably cheaper than the current, typical British diet. However, dietary designs (Ministry of Agriculture, Fisheris and Food 1992), which have used this approach have been generally considered unpractical and have been described by Killeen (1994) as ignoring "meals, snacks, sweets and drinks taken outside the home" and as representing "a rather idealised vision of the realities of food consumption by all groups". Nelson and Peploe (1990) constructed a modest-but-adequate food budget for households with 2 adults and one pre-school child but concluded that this type of diet was out of financial reach of the majority of families living on low incomes in the UK. Similarly, Cade & Booth (1990) demonstrated from 2340 one day food records and supermarket prices that people achieving dietary goals ate more cereals, wholemeal and brown bread and less white bread than others. Their food costs were not significantly greater for one day but, the authors argue over a prolonged period for a family that food costs may mean that meeting dietary goals may be out of reach for certain groups such as the elderly, unemployed and low paid.

Work from Scotland (Anderson and Hunt 1992) also showed that using a multivariate analysis that adults with higher incomes were more likely to be consuming a diet consistent with local health advice (e.g. less whole milk, spreading fats, cheese, chips, manufactured meat products and fat on meat and more foods high in fibre-rich carbohydrate). Healthy eating advice has also tended to promote variety as an important feature of food intake.

Income and Nutrition

As discussed earlier, material deprivation has been found to be related to poor nutritional outcome in 200 lone parents (Dowler and Calvert 1995). Larger scale government funded surveys have documented the impact of income on diet and nutrition. The Dietary and Nutritional Survey of British Adults (Gregory, Foster, Tyler and Wiseman 1990) reports lower energy intakes for both men and women when informants lived in households in receipt of state benefits, and a clear trend towards lower recorded energy intake in lower social class women (but not men). In

the same survey, unemployed men and lower fat as percentage of food energy, but also had lower intakes of vitamins and minerals (although mean intakes met the Recommended Amounts (Department of Health and Social Security 1979). Furthermore, the National Food Survey (Ministry of Agriculture Fisheries and Food 1994a) which provides longitudinal data on UK food consumption has consistently reported higher energy intakes in lower income groups and little difference in nutrient intakes (apart from vitamin C, which is lower in lower income groups). In all income groups nutrient intakes were close to the Reference Nutrient Intake level (apart from energy, magnesium and potassium). People living in lower income groups purchased notably less total fruit, cheese soft drinks and more potatoes, meat products and sugar. Nelson and Naismith (1979) reported that energy intakes in children from low income had low energy intakes and showed evidence of poor growth. Such findings were illustrated in more details in the survey of The Diets of British Schoolchildren (Department of Health 1989). Analysis using social class (which is highly related to income but cannot be considered a proxy measure) reported significantly lower energy intakes in boys aged 11-12 in social class IV and V which was accompanied by of vitamin C and calcium. Heights of boys whose fathers were unemployed or long term sick were significantly shorter than those in social class I and II. Girls from lower social classes also had lower intakes of iron, retinol, thiamin, riboflavin, vitamin C, nicotininc acid and pyridixine. Lower social class children tended to consume more chips, meat products, sugar and sweets and less fruit juice.

Other UK dietary surveys (usually smaller scales) relating income or social demographics characteristics have tended to focus on particular sub-groups of the population whom are vulnerable to dietary deprivation. For example, the effect of income on diet has been explored by Doyle, Campbell, Laurence and Drury (1982) who reported a low energy intake in women from lower socio-economic groups. Women who had low birth weight consumed significantly fewer calories, fat and pyridoxine that those with normal weight babies. Dowler and Calvert (1995) found that those in the poorest households had a limited nutrient base, two or three foods providing the majority of a nutrient. Gibney and Lee (1993) found that women in their Irish sample from a locality with a chronically high unemployment had low

alcohol intake and fibre, and intakes of certain vitamins and minerals were lower than recommended levels. Cost and (lack of) availability was given as the reason for low fruit purchasing (Gibney and Lee 1993). This study also emphasised the additional cost of feeding older children whose energy intakes were increasing.

The 'access' literature suggests that, in general, higher income or more socially advantaged groups have a more nutrient dense diet from a wider food base, which may not be higher in total calories. The impact of low income on the diet and nutrient intakes of other groups such as the disabled, elderly, ethnic minorities, homeless, people following special medical diets (such as diabetes) have rarely been studied in national or wide scale survey work.

Budgeting for the cost of a healthy diet

Official statistics claim that approximately 12% of household expenditure is spent on food (Central Statistics Office 1994) and that it is the third largest single item of expenditure (after transport and communication and housing). However the statisticians acknowledge that the proportion of the budget and the amount spent is known to vary according to income, other competing household costs and household composition. Households with incomes of less than £100 of disposable income per week spend nearly a quarter of their expenditure on food and a further quarter on housing, fuel, light and power. This compares to households with over £400 per week who spend only 15% of expenditure on food. Thus, although the actual amount of money spent on food is lower in low income households it represents a greater proportion of the total (Central Statistics Office 1994). Subject to difficulties of the 'costing' exercises used by the 'shopping basket' approach discussed earlier, it has been estimated that a 'healthy diet' would cost around 42% of income support benefit per week for individuals aged 25 years and over and the cost of the 'less healthy diet' (items not meeting food Health Policy Guidelines) was only around 25% of income support benefit (Mooney 1990).

The composition of households may play a major role on food purchase and only by using equivalence scales (McClements 1977) can comparisons of food expenditure

be made. The National Food Survey (MAFF 1994a) clearly shows an increase in food expenditure with increasing household size. Leather (1992) also demonstrates that to consume "a modest by adequate diet" as devised by the Family Budgeting Unit (1991) would mean that for households on income support, 55% of expenditure would go on food in a household of 2 adults and 59% for a household with two adults and two children (Leather 1992). In addition, the presence of children may have a major effect on food expenditure through the influence of peer pressure, children's advertising, children;' food market and issues surrounding schools dinners. Food also plays an important role in family relationships and the having the resources to provide a 'proper meal' for the family has been described as important in terms of psychological and emotional well being which will be discussed later in greater detail (Charles and Kerr 1988).

Several studies have placed into context the relative 'cost' of a healthy diet across different income groups (Millburn, Clarke and Smith 1987, HEA 1989, Blackburn 1991, Leather 1992, Killeen 1994). Food is one of the few items of regular household expenditure with variable costs. With fixed costs, basic essentials such as housing and fuel there is little scope without an increase in income for increasing the food budget simply to try unfamiliar foodstuffs unless households go into debt. Furthermore, Sheiham (1988) reports that 'people in low income groups will more readily accept healthy changes which also save money'. Milburn *et al* (1987) reported how 440 low income individuals 48% mentioned food in the first two items that they would cut back on when short of money. Leather (1992) suggest that many bad dietary habits associated with poverty are perfectly reasonable responses to the poor. For example, the purchase of manufactured foods are in fact a cheap option because they require little kitchen equipment, use less fuel to prepare have a predictable, familiar taste and have little waste. It has been argued that low income families "shop more efficiently in money and nutrient terms than higher income families" citing the National Food Survey (MAFF 1989) as showing that low income families already buy nearly every type of food more cheaply, than high income families and that low income families spend 25% more of every nutrient, per £1 spent on food with the exception of vitamin C (Blackburn 1991). Such findings lend support to the view expressed by Hanes and

MacDonald (1988) that for those on income support a healthy diet could only be achieved with 'extreme austerity'. Further evidence suggests that when unexpected expenses occur food is one of the expenditures most readily cut (Health Education Authority 1989). It has also been suggested that, when money runs out, people on low incomes frequently eat less total food, cut down on frequency of consumption of certain foods (notably fresh fruit) skip meals (Allen 1989) or eat poorer quality foods (Killeen 1994).

The qualitative methods used by some researchers have provided a wealth of data concerning the intricate budgeting strategies of low income households e.g. 'ringfencing' (Dobson *et al* 1994). Respondents on state benefits in Dobson *et al* (1994)'s study reported spending money quickly after receipt of benefits on weekly or fortnightly food shopping to avoid it being 'frittered away' so the authors concluded that food expenditure was open to variation (Dobson *et al* 1994). However, the lone parents study suggested that food expenditure was a lower priority than accommodation and utility bills (Dowler and Calvert 1995). As discussed earlier, the dietary consequences of this was inadequacy of nutrient intake, a poor food variety and less nutritionally sound dietary patterns (Dowler and Calvert 1995). However, the NCH study reported the opposite, that parents would not pay bills and risk getting into debt not to go short on food (NCH 1991). This lack of congruence between the three findings may be partly explained by differences in sample characteristics and aims of research studies.

Income and Dietary innovation

Why is adopting healthier eating practices more difficult for some? One of the most widely recognised and used theories of behaviour change is the Health Belief model. This model describes how attitudes guide health behaviour and is based in the idea that specific health beliefs are relevant to taking recommended health action. The beliefs considered most important are an individual's perception of risk, perceived barriers to change and perceived benefits of change. In families of lower income, the possibility that the children might not like, and therefore would not eat 'new' foods is a constraining factor in adopting healthier eating practices (HEA 1989, Dobson *et al*

1994). Dowler and Calvert report that those lone parents who did not experiment and who are more tied to their children's tastes, ended up with restricted diets (Dowler and Calvert 1995). Convenience foods (which will be discussed in more detail later) were reported by the women in the HEA study as popular with children and easier to budget for, but confirming the findings of Dowler and Calvert (1995), this dietary strategy contributed to a monotonous diet with limited variety (HEA 1989).

Food Preparation and the Division of Labour

The earlier discussion of food shopping and the division of labour presented the evidence that women carry the majority of the burden unaided. The story is a similar one for the topic of food preparation (Murcott 1983, Backett 1990) although Murcott argues that while managing food is predominately a female activity, eating patterns within the family are more complex in nature (Murcott 1998).

Using data from a large scale dataset in Canada of married men and women, Douthitt (1989) examined time allocation to home tasks. The author found that analysed by employment, employed married women with no children spend the highest proportion of all groups on food preparation in the home (31%) with the smallest portion of time spent by women with children under 5 years (18%). A similar trend was found with women not employed, with childless women spending 30% of time on food preparation compared to 20% of time by those with young children (Douthitt 1989) Men with an employed wife and children under 5 spent the greatest proportion of time in food preparation (32%), followed by men with no children (13%) and wife employed); men with young children and a wife not in the labour market spent the smallest proportion of their time in food preparation (9% of their time) (Douthitt 1989). Another time allocation quantification exercise (again carried out in North America) concluded that women spend considerably more time than men on food-related task (Blair and Lichter 1991).

These North American studies are some of the very few studies that have considered men's direct involvement with food preparation and cooking. British studies in this area have been smaller scale Charles and Kerr 1988, Backett 1990, Warde and

Hetherington 1994). In Murcott's study in South Wales, men helped out and lent a hand or sometimes cooked 'things on toast' but women remained in charge of the day-to-day purchasing and preparation of food (Murcott 1982 p 691) and Charles and Kerr note that "Most men in our sample only cooked as a standby or if they were particularly interested in food" (Charles and Kerr 1988 p 45) or men were involved with high profile cooking associated with entertaining (Backett 1990, Warde and Hetherington 1994). Furthermore Hetherington and Warde who noted that if the meal involved buying a takeaway or alcohol then the male partners were more likely to take responsibility (Warde and Hetherington 1994). Combined with the evidence presented in the earlier section on food shopping and division of labour, these studies consistently suggest that women bear the main responsibility for purchasing and preparing food.

Recent trends in preparing food or 'cooking'

Preparing food holds connotations of home cooking although Social Trends data suggests that home cooking, from raw ingredients may be decreasing as the purchasing of convenience foods rose by 10% in the decade to 1993 and is still rising (Central Statistics Office 1995). As discussed earlier, evidence that low income mothers of young children appear to rely heavily on convenience foods such as burgers, fish fingers, sausages and pizza rather than cooking from raw ingredients (HEA 1989) implies that the generally higher fat, higher salted convenience foods form an important proportion of the diet. There is a substantial gap in our knowledge about availability, affordability and attitudes to convenience foods and their nutritional content.

In contrast, the thesis that the nutritional composition of home cooked meals are superior has been largely untested by researchers even though there are growing indications of concern in this area for example, over half (53%) of a North Glaswegian population aged 18 to 64 years reported adding salt generally to food before tasting/ or after tasting (Eley, Lean, Anderson, Morrison and Bolton-Smith unpublished). Two studies have been located by Reid and Adamson (1998) which assessed the nutritional value of home cooked foods versus ready to eat meals, did not

support the assumption that home cooking is better (Anderson unpublished, cited in Scottish Office 1993, Stordy 1995). The impact of income on home cooking overlaps with the previously discussed studies within the 'income and food shopping' section.

Food activists have underlined changes in the national curriculum in secondary schools in England and Wales as corroding the fabric of home cooking. From an unpublished study of skills of 7-15 year olds, it was found that more could programme a video recorder – 61% of the sample (size not reported) could carry out this task compared to 54% who could bake a cake; 38% could cook a jacket potato in the oven 9 (reported in Stitt *et al* 1995). However, about half the young people helped in the kitchen once a week or more and over fifty per cent knew how to slice, peel and grill (National Food Alliance, and reported in Stitt, Jepson and Paulson-Box 1995). The lack of a coherent programme of research to the study of home cooking leaves this topic ripe for further investigations of more substance.

Distribution of food within the family

It has been argued that cooking and eating within the family is about gender and power relations (Murcott 1982). Because of its pivotal place in the division of labour, food is an area of control: control over family finances and control over distribution to the individual family members. The relationship between expenditure and food has already been discussed so this section will focus on inequalities in distribution of food within the family.

The methodologies of the large scale 'official' surveys such as Family Expenditure Survey and the Survey of the Household Food consumption and Expenditure mean that intra-household distribution of food cannot be determined. In these annual quantitative surveys, individual food consumption is calculated from household data, on the assumption that the food in the weekly shopping basket is equally divided among the family. As in other areas of family life, such as assumption is not always valid. Instead, the distribution of food within the home is governed by a host of factors of which income is just one. Understanding of distribution of food within the family has largely relied on the methods and design of sociologists with three studies

using rigorous methods specifically highlighted for their findings (NCH 1991, Dobson *et al* 1994, Dowler and Calvert 1995).

Food has been shown to play an important role in newly married life (Murcott 1982, Kemmer, Anderson and Marshall 1998) and in family relations (Murcott 1982) Early evidence suggests that some adults use eating to punish and reward their children and some children, in turn offer and refuse their co-operation at meal times over food served. In the family, particular significance is attached to the 'proper meal' as studies confirmed that mothers have clear ideas about what their children, and their partners, should be eating (Murcott 1982). When income is a constraining factor on food expenditure and therefore food selected for preparation and cooking, some researchers have argued that the majority of the scarce resources are spent on men and the children in the household (Murcott 1983, Charles and Kerr 1988, Dobson *et al* 1994). Consequentially, women may eat less overall and /or less 'high status' foods such as meat (Fiddes 1995). Dobson *et al* (1994) and Dowler and Calvert (1995) both report strategies within the families of their studies of some members of going without food so that other family members could eat more. Data from the NCH survey confirms the above findings and adds more depth (NCH 1991) In this study 20% of parents reported that they had 'gone' hungry' in the last month because of lack of money and 44% had gone short of food in the last year to ensure that others in the family had enough to eat (NCH 1991). One in 10 children under five had gone without food in the last month because of lack of money and nearly one in four had gone without food during the last month because they did not like the food on offer (NCH 1991).

Eating Out

While control over food within the home can be exerted, eating out, defined in the NFS as 'the consumption of food and drink eaten outside the home which is not obtained from the household's stocks (MAFF 1995 p 39) is less easy to police unless totally eliminated from diet. 'Eating out' can be undertaken in a range of circumstances and venues, including eating out at a restaurant as a social occasion, buying take-away foods, eating at a café or at a workplace canteen. Since the 1960s

British public houses have been moving away from low quality, basic food and distinctions between public house and restaurant started to blur around the edges as drinking and eating merged in the 1980s onwards (Harrison 1998). Payne and Payne, in an economic review of the catering market, identify public houses as the largest sector in the eating out market (Payne and Payne 1993). Burger bars, pizza houses and fish and chips shops account for over 25% of the eating out market with the first two categories enjoying considerable growth since the early 1980s (Payne and Payne 1993). NFS figures indicate that in the categories 'eaten out' and 'takeaway food' McDonalds is the market leader (in terms of annual revenue) although fish and chip shops and Chinese food also yield strong takeaway sales (MAFF 1995). Take-away foods are not modern inventions but have their origins in Victorian working class Britain, for instance the fish and chips of the textile towns of Northern England. The 1990 MAFF study reported that more men than women consume food outside the home, with 94% of men and 90% of women deriving some food energy out of the home during the 7 day study period (men deriving a greater proportion of their energy by eating out) (Gregory *et al* 1990). Younger people aged 15-24 years are more likely to eat out at burger bars or pizza houses than other age groups (Payne and Payne 1993).

Some health educationalists have commented on the high energy-density, high fat, low in fibre, vitamins and minerals of popular 'eating out' foods such as burgers and pizzas (Lobstein 1988, Rees 1992, Anderson *et al* 1995). This has been confirmed by data from the National Food Survey which identify the workplace as most dietary compromising venue with the highest percentage of fat contribution to total energy of the food provided (MAFF 1996) with an average of 48% fat; schools came second, with 42.8% and restaurants, pubs and takeaways 40.3%. All values are higher than Department of Health recommendations. The NCH study notes that 40% of the women in their low income study, said that eating take away food was 'too costly' (NCH 1991) but there has been little scientific work on exclusion of low income households from the popular activity of eating out. As this aspect of food choice has become increasingly popular, it is likely that substantive research projects will follow

Warde and Martens (1998) original investigations and include the topic of 'eating out' routinely in food research.

Work and Household eating Patterns

Changing trends in women, work and employment discussed in depth in Chapter One are likely to have an impact on household eating patterns. British food researchers have apparently ignored the topic of women, work and household eating patterns. In a sample of UK households where 81% of women were in employment, Warde and Hetherington (1994) described that take away meals were purchased several times a week by 5% of households, a weekly occurrence for 29% and monthly by 24% of households (Warde and Hetherington 1994). But the study's design fails to compare these findings to other groups so the evidence is limited.

North American studies, as in the time allocation of domestic tasks literature, are generally more robust in this area and have been conducted using quantitative methods from the social sciences and nutrition. Kim using a nationwide Canadian survey data looked at the effect of the wife's working status (nonworking/working including part-time) on two sets of variables involving consumption frequency of 34 convenience foods and frequency of meal purchasing at 4 types of restaurant (Kim 1989). Although there were significant patterns of use between the two groups in relation to the convenience foods neither group was an overall heavier consumer of convenience foods. However, working wives showed significantly higher use than those in paid employment of meal purchasing at all 4 types of restaurant and especially with 2 types, namely fast foods and take-away restaurants (Kim 1989).

Johnson and her colleagues studied the effects of maternal employment on the quality of diets of their young children (aged 2-5) (Johnson, Smiciklas-Wright and Crouter 1992) using dietary assessment methodology. Using parental recall of four non-consecutive days meals, the researchers analysed the adequacy of the diets and concluded that there was no detrimental effect on the children's diets by working mothers, whether in full or part-time work (Johnson *et al* 1992). But this evidence does not stand up to close scrutiny by the authors who report that the sampling

strategy is limited and there is no comparison group for the children and the analysis in terms of employment status was rather basic.

The 'access' literature covers a wide host of factors relating to the role that income (and related variables) plays in healthier eating and nutritional adequacy. There has been a disproportionate amount of research attention directed to availability of foods and 'costing' exercises characteristic of the shopping basket surveys in exploring the relationship between income and diet. This has been carried out at the expense of understanding the processes of food selection on a limited disposable income. Much of the existing literature was carried out over ten years ago and may be presenting and outdated picture of income and diet in Britain. **There is a research need for a modern survey of barriers to the adoption and maintenance of healthy eating in a locality such as Glasgow to determine the current state of play in this topic area.**

Two studies carried out in the early-mid 1990s have contributed significantly to the present understanding of the relationship between income and diet, strategies for selecting food and nutritional adequacy (Dobson *et al* 1994, Dowler and Calvert 1995). These studies have provided detailed descriptions of barriers to nutrition in sub groups of the population, for example, mothers living on a low income (Dobson *et al* 1994) and lone parents (Dowler and Calvert 1995) **However, no research to data has considered the effect of an income change on dietary choice in UK households.**

The previous sections of this chapter have reviewed the evidence on 'access' to healthier diets . 'Access' has been studied largely in terms of difficulties experienced by population sub-groups. **However, there is a lack of literature that studied a representative sample and far less is reported about eating in the higher incomes.**

The 'Attitudes' literature

The link between access and culture or 'knowledge, beliefs and attitudes' is recognised in 'Eating for Health: a diet action plan for Scotland' (Scottish Office 1996). The affordability of different diet choices is related to 'access' resources (income and related structural variables) on one hand and by 'attitudes' towards the different foods on the other. The next section offers a review of previous studies, which have considered 'attitudes' or 'culture' in their analyses. It should be born in mind that just as reliable measure of household income are not readily available, so adequate and consistent operalisations of 'culture' are lacking in the literature due to underdeveloped discussion of findings. Therefore much of the evidence is descriptive in essence without elaborate analysis.

Open-air fruit and vegetables markets, commonplace in some European countries, do not feature on a grand scale in Scotland. Combining this observation with another that the climate is frequently cold and wet, may offer an explanation why common Scottish dishes do not include fruit (other than berries), vegetables (other than root) and salads. Dietary studies have compared regional diets across the UK (Whichelow *et al* 1991) and the Scottish diet versus the English (Schofield, Wheeler and Stewart 1991). So how can the cultural aspects of food selection or attitudes towards healthier eating be best understood? Recent highly sophisticated analysis by Fine and his colleagues has made a significant contribution to our understanding of 'food norms' i.e. the systematic patterns of consumption, by socio-economic variables.

Food Norms

Fine's methods, which he reports are unusual for economics and in the context of food, are based on previous work on consumer durables. Using the National Food Survey data for 1979, 1984, 1986 and 1989 (used for the aggregation), Fine and colleagues ranked a selection of food by popularity defined as whether each food had been purchased or not and called the (absolute) frequency of purchase. Their next step in defining food norms is the measure how much the sample violates or conforms to the initial ranking. The third step was to partition the sample by some socio-economic characteristic such as age, social class, income or household composition to

examine how socio-economic variables lead to variations around the norm. Finally two-way interactions for example income and social class, may be examined on the norm. A wide range of socio-economic variables was used to generate the food norms through sub-sampling. These included region, social class, income, household composition, with or without both men and women and similarly for children of various ages, age of head of household (retired or not), form of housing tenure and ownership of freezer or not. Results are presented in a table or 'dramatrix' (the authors' term) and change over time could be examined by comparing the dramatrices for the four years (Fine, Heasman and Wright 1995, Fine Heasman and Wright 1998).

Table 2.2 Aggregate dramatrix for social class (Fine *et al* 1995)

	Class				
	A	B	C	D	E
Milk	0	0	0	0	-1
Potatoes	-3	-4	-6	-4	-6
Biscuits	6	6	4	0	1
White bread	-17	-6	3	5	6
Eggs	-2	-1	-1	-1	-1
Brown bread	11	7	-7	-9	-14
Cereal	2	4	5	5	4
Skimmed milk	13	9	-1	-3	-5
Sugar	-22	-16	-6	1	4
Margarine	-13	-10	-5	-1	3
Crisps	1	2	13	9	8
Chicken	-5	-8	-1	0	2
Yoghurt	17	9	2	-1	-2
Juice	21	14	0	0	-9
Butter	-2	-3	-3	-4	-5
Spreads	-3	-1	1	2	3
Ice cream	0	0	0	-4	-1
Chips	1	1	-1	0	7
Burgers*	-7	-4	3	4	7
Ready meals	4	1	2	1	3

* Combined with other frozen convenient food in 1979
where A = social class I, B = social class II, C = social class IIInm/IIIm, D = social class IV and E = social class V.

Bearing in mind that **Table 2.2** from Fine *et al* (1995) is aggregated over the four years, there are clear stronger rankings or skews towards higher classes for brown bread, skimmed milks, yoghurt and fruit juices and towards lower classes for white bread, sugar, margarine and burgers (Fine *et al* 1995). Fine and colleagues suggest

that this is clear evidence of the food norms by social class although there are foods for which there is not consistent pattern of purchase behaviours by class. They cite chicken as an example as it is purchased weekly by about one third of the members of each of a number of household subsets of varying socio-economic characteristics The purchasing patterns of other foods are best explained by inverted V patterns, for example, the relationship between crisps and social class. Fine and colleagues suggest that this is due to the influence of other socio-economic variables with which social class is associated such as presence of children and age.

Table 2.3 Aggregate dramatrix for income percentiles (Fine *et al* 1995)

	Percentile					
	1	2	3	4	5	6
Milk	0	0	0	0	-1	-2
Potatoes	2	1	0	-2	-6	-3
Biscuits	-3	-3	-2	2	7	7
White bread	2	1	3	1	2	-6
Eggs	-1	0	-1	0	1	1
Brown bread	1	1	-3	-5	-7	4
Cereal	-5	-3	2	3	7	4
Skimmed milk	-3	-3	-5	-3	2	6
Sugar	2	4	2	-5	-6	-13
Margarine	-5	-3	0	-1	-8	-13
Crisps	-5	-2	1	10	12	7
Chicken	2	2	0	-3	-3	-3
Yoghurt	-2	-2	-1	2	5	4
Juice	-5	-7	0	0	4	14
Butter	9	2	-2	-4	-8	-3
Spreads	11	6	-2	1	2	-1
Ice cream	-5	1	-2	0	0	-1
Chips	2	-1	1	0	0	0
Burgers*	2	1	5	4	-1	-3*
Ready meals	-1	-1	2	1	1	2

* Combined with other frozen convenient food in 1979
where 1 = lowest percentile, 2 = second percentile, 3 = third percentile, 4 = fourth percentile, 5 = fifth percentile and 6 = highest percentile

Further, as social class is highly associated with income, it could be hypothesised that it may be acting as a proxy for it. Fine and colleagues extended their analyses to test this. The dramatrix (**Table 2.3** from Fine *et al* (1995)) shows food purchasing aggregated over the four NFS test years by income expressed as percentiles. It was suggested that food norms did not vary enormously over income percentiles although

for some foods, lower income is associated with higher frequency of purchase of certain foods such as white bread. The impact of income over social class was tested and Fine and colleagues concluded that class takes the leading role over income. 'In short, the association of patterns of food purchases with social class is well established for a variety of foods even when account is taken of household composition and income. Indeed, for the foods considered here, class has a stronger effect than income. However, income does itself emerge as being more important than previously apparent, once other socio-economic influences, especially the presence of children and age, are taken into account" (Fine *et al* 1995 p 227).

The approach of Ben Fine and colleagues can be criticised on ignoring the issue of average quantities of foods that are being purchasing in favour of existence of food type in the shopping trolley or not but it may be the case the those 'on the margins' of society – those on low income, with children, with children, the unemployed, the adequacy of their food purchasing may be diluted if analysis was restricted to average quantities consumed.

Professional advice promoting dietary change

Many scientists and nutritionists have always assumed that, as they are clearly the experts they can set dietary guidelines, such as the Food, Nutrition and Prevention of Cancer report (World Cancer Research Fund 1997). The value of guidelines in assessing the population's risk of disease, should not be understated. However, they are often translated into health messages to the general public carry the weight of medical prescription. 'Experts' believe they have the duty to advise and educate the public about diet and that their recommendations will be obediently followed. It is for this reason the linguistics of nutrition research includes the use of 'achievers/non-achievers' and 'compliance' with guidelines.

Despite over a decade of intensive and increasingly co-ordinated health messages, many researchers urge for better public education in food and nutrition. But assuming that people do have control over their eating habits, they will not necessarily do what they are told or perceive a reason to 'comply' with dietary

targets. Alternatively, baked beans-and-chips, sugary-tea-and-sticky-bun consumers may continue in their habits, as access to food is not directly under their control. Public health nutrition needs to address both of these issues in interpreting findings and designing research. Sociological studies of family eating patterns have found relatively little reported about the impact of professional advice on dietary change. Calnan noted evidence from his small interview study that there were 'hints of scepticism' about food messages, the hints being stronger from working class women (Calnan 1990). In this study, not only did women have problems differentiating what constituted good advice but also they were constrained by limited resources and family preferences (Calnan 1990). This finding was also support by the sociological work of McKie, Wood and Gregory (1993).

Attitudes to dietary change

Since the 1930s governments have argued that a major reason for poor dietary intake has been ignorance as to what constitutes a healthy diet or a stubborn refusal to change existing beliefs about diet and that educating the population about dietary health will result in changes in dietary habits. Classical health education approaches have focused on attempts to increase awareness of the importance of a healthy diet, awareness of healthy eating messages, knowledge of what is in food and how to put healthy eating into practice.

Importance of a healthy diet

One common theme in the 'attitudes' literature is that the experts don't agree on what is a healthy diet constitutes, that dietary advice changes over time and that advice is often promoted by organisations with vested interests. Studies have found that while most people are aware of some healthy eating messages, there does appear confusion over certain messages. However, being well informed does not mean that people will act according to one particular set of beliefs in promoting health and preventing disease. Information may be altered, disregarded or may even be used to justify existing behaviour rather than stimulate behavioural change (Parraga, 1990) In the last ten years of intensive health education about diet and nutrition there has been little evident impact on nutrient intakes (MAFF, 1995).

So how important is dietary change towards healthier eating practices to the general public? Using data from the Health and Lifestyle Survey with a national sample of 9003 men and women within the UK, with 3749 women between the ages of 18 and 59 Blaxter and colleagues reported that when both sexes were asked about why people may be healthier today, women placed more importance on food and diet and on standard of living, and men on medicine and exercise (Blaxter 1990). The US National Health Interview Survey gathered a small amount of data on the links between disease and diet. The data indicated that 35.3% of the men and women said that they had changed their diet within the past five years, with more reporting eating vegetables, low-fat meats and fruit (Cotunga, Subar, Heimendinger and Kahle (1992). Of the remaining 64.6% of respondents who said that they had not changed their diets, the most frequently cited reason was that they enjoyed the foods that they were eating (Cotunga *et al* 1992). A large percentage of this groups (69.3%) said that they thought their diet was already 'healthful' (a response which tended to increase with age yet decrease with increasing income and educational level). Forty eight per cent of non-'changers' reported that there were so many recommendations that it was difficult to know which ones to follow (Cotunga *et al* 1992).

Low income women in an English study reported that the 'reduce fat increase fibre' message was plausible with some women reporting trying to reduce the amount of fat in their diet and try to try grilling rather than frying food (HEA 1989). But the relationship between material deprivation and diet was a powerful force over food selection and the authors report that this caused the conflict between the professional advice on diet and women's own priorities, summarising the findings by noting 'the less the money, the lower the morale and the shorter the perspective on health' (HEA 1989 p 13).

US and UK studies that conducted in-depth interviews with middle class women (Mayall 1986, Devine and Olson 1992, Backett 1992). All found that diet was often rated highly as important factors in sustaining good health. Mayall reported that in the 135 mothers she interviewed, was a steady drop in the number of mentions about food in connection with prevention and promotion from classes I to classes IV/V

(Mayall 1986) although Mayall was concerned about the quality of her data i.e. that some form of social desirability bias may be occurring. Backett noted possible bias in the findings from her two year qualitative study with repeat interviews with a sample of middle class families in Edinburgh investigating the relationship between health knowledge and behaviour. She reports that there was a pressure for respondents to report biomedically determined knowledge about 'healthy lifestyles', with other kinds of health knowledge being expressed or given greater legitimacy in later interviews (Backett 1992).

Although there may be some evidence for an overkill on health messages as there appears to be some apathy about the individual need for dietary change. In the Scottish Opinion Survey, those who ate less than four portions of fruits and vegetables per day said they did not want to change their diet. Qualitative data suggest that this may be because of the association between 'health' and slimming and lack of knowledge about the benefits of dietary change (Scottish Opinion Survey 1992).

Nutrition knowledge

Dietary messages about decreasing total dietary fat and increasing fibre-rich carbohydrate have been widely advocated since the publication of the NACNE report in 1983. Numerous studies (Lang, Andrews, Bedale and Hannon 1984, Calnan 1988, Charles & Kerr 1988) have shown that there is a general awareness of healthy eating messages and these do not vary markedly by social class or income. The NCH study concluded from questionnaires and interviews with low-income families that 'there was no evidence to suggest that parents are ignorant about what constitutes a healthy diet'; (NCH 1991, p3) although as already discussed income and long-term poverty are significantly related to the final decisions about food purchasing (NCH 1991, Dowler and Calvert 1995).

However, Rudat (1991) argues that although there is a broad awareness of the concepts of healthy eating the public lack detailed knowledge on how to achieve this Several Scottish studies (Schofield, Wheeler and Stewart 1988) have noted that

confusion exists among many women about the respective roles of fibre, fats and carbohydrates. Likewise, a national survey of 1709 members of the general public in the UK reported that while 95% were aware of the message to eat more fibre, 93% to eat less sugar, 93% less fat, 87% less salt and 60% less fat, in contrast from a list of food items, only 25% could identify starch sources, 14% saturated fat sources and 2% polyunsaturated fat sources (Rudat 1993).

Studies to assess nutritional knowledge have been done on selected groups as well as on representative samples of the general population. In a study of pregnant women by Anderson, Campbell and Shepherd (1993a) using a nutritional knowledge questionnaire, results showed a wide range of nutritional knowledge scores in the sample studied. Difference in total score was found in younger age groups. It has been suggested that those with a formal education (i.e. that matches with the investigator's background) tend to give "the right answers" (Backett, 1990). A number of studies have shown that the reasons for adopting healthy habits are "health reason" or weight control. In the Scottish Heart Health Survey, subjects completed a questionnaire which included a section on health knowledge. The proportion of people with medically diagnosed coronary heart disease (CHD) were compared with those who had symptoms of ischaemia but were undiagnosed, and those who were asymptomatic and apparently healthy with regard to CHD. The diagnosed groups appeared to be better informed with regard to the value of making nutritional changes and a greater proportion reported trying to reduce fat intake and lose weight than the control and undiagnosed groups. This indicates that these people had a concrete reason for making dietary change in order to improve their health (Bolton-Smith 1991).

With regard to dietary fibre, the Health and Lifestyle Survey (Whichelow *et al* 1991) found that many respondents , including a considerable percentage of the highly educated were noticeably ignorant about the fibre content of fish, meat, potatoes and white bread, although the majority of people, irrespective of education knew that digestive biscuits and Wheetabix were high fibre products, possibly a credit to advertising. Knowledge about dietary fibre was found to be related to age and gender

with the middle-aged and women gaining more favourable scores of nutrition knowledge. In further analysis, no association between fibre knowledge and breakfast cereal consumption was found (Whichelow *et al* 1991) but prevalence of "brown" (as opposed to white) bread consumption increased with increasing knowledge. In summary, nutritional knowledge often does not transfer into actual eating behaviour. Some research suggests that individuals actually believe that they are eating a healthy diet when in reality they need to make dietary changes.

Putting knowledge about healthier diets into practice

The health campaign for increased fruits and vegetables consumption seemed to have been successfully received into personal knowledge but not put into practice. When Scottish Opinion Survey respondents were asked what they personally believed were the advantages of eating fruits and vegetables, 82% mentioned health, diet or appearance. In an assessment of people's perceptions of their fruit and vegetable intake 69% felt they were eating the right amount of vegetables and 29% felt too little, 55% reported eating the right amount of fruit and 40% too little. Among these low intakes (i.e. less than two portions per day, 55% still thought they were eating the right amount of vegetables, 24% thought they were eating the right amount of fruit and 60% claimed they did not want to change their current diet (Anderson *et al* 1994). On the other hand, income remains a pervasive contributor to food selection choices as illustrated in a survey carried out by the National Children's House (1991) The authors reported that fruit and vegetables were items people on supplementary benefits would buy if given an extra £10 to spend on food (NCH 1991).

Furthermore, the beneficial role of starchy carbohydrates in the modern healthy diet has not been so widely acknowledged by the public. Evidence points to a public belief that starchy foods are fattening and research has shown wrong answers or low scores for nutritional knowledge concerning starchy carbohydrates (Anderson and Hunt 1992). A high proportion of respondents in British Social Attitudes Survey gave weight control as a common reason for eating less bread, while almost no-one gave this as a reason for eating more bread.

In a similar vain, a study which examined attitudes and beliefs regarding low fat diets found that the majority of people were familiar with current guidelines concerning reduction of fat intake and accepted the supposed healthy beliefs of adopting lower fat diets. Regardless of their actual fat intake, most individuals believed they were consuming a healthy diet , and many appeared to misjudge their relative fat intake believing it to be lower that it was. Respondents were divided into tertiles for percentage energy from fat, allowing classification into low, medium and high fat intake groups and no consistent difference emerged in the attitudes and beliefs of respondents (Shepherd & Stockley, 1985).

A review of the published literature suggests that many people are familiar with general healthy eating messages but specific practical details may not be well known, but there is little evidence that there are differences in dietary knowledge in different income or social class groups. There is also little evidence that the provision of more dietary information without corresponding changes in personal resources and food availability would change dietary behaviour. The reason why knowledge and beliefs do not easily translate themselves into behaviour and barriers to dietary change have been theorised by a number of models which are summarised further below.

Changing trends in cultural eating styles

'Snacking' has received a limited but growing amount of research attention in the past five years. Adolescent and young adults have been the primary focus (Cox, Blaxter, Buckle, Fenner, Golding, Gore, Huppert, Nickson *et al* 1987, Story 1989, Anderson, Macintyre and West 1993b) in the UK and US. The large scale Health and Lifestyle Survey found a far higher proportion of British adults in the 18-29 age groups consumed one or two snacks a day than the older age group (Cox *et al* 1987). While nutrition educationalists would advocate that it snacking is not unprudent per se, despite American data suggests that snacking food choices are often high in fat and or sugar (Story 1989). What is eaten as a snack is related to culture and knowledge. In Anderson's nutritional assessment for the West of Scotland Twenty-07 study the adolescent sample (aged 15, men and women) reported 'grazing' with 5.5 eating occasions per day (2.7 main meals, 2.8 snacks) (Anderson *et al* 1993b)

The adolescent meals included at least once daily chips (15%) crisps (43%) soft drinks (52%) and/or sweets and chocolates (42%) (Anderson *et al* 1993). Food choice research needs to address the issue of 'snacking' wherever possible. This section has attempted to review the area of knowledge and culture. Before pulling together all the threads of the literature review by presenting a summary of the theories used to understand diet choices, the place of food, diet and nutrition in the 'lay perspective' of health and illness will be discussed.

The Lay Perspective on Health and Illness

All societies have complex belief systems about how the properties of various foodstuffs relate to the physiological and psychological health of those who consume them (Fieldhouse, 1986). In Europe, the dominant discourse has been biomedical, and particularly during the past decade, this discourse has increasingly centred on certain 'risky' foodstuffs to health. Furthermore, public attention has been socially engineered towards official reports on 'good diet' and the evangelised to individuals to change their diet to a more prudent one (NACNE, 1983, SHHD, 1993). In the case of some diseases, for instance cancers, the evidence is not yet robust enough to define the precise relationship between diet and some diseases. Critics has also indicated that some of the dietary advice may be inappropriate for certain groups in the population because of its financial implications (Lang *et al* 1984), its sexist assumptions (Charles and Kerr 1988) and its lack of appreciation that eating is a cultural based social experience (Fieldhouse, 1986).

Although the biomedical discourse dominates discussion of food, eating and health, social scientific studies point to a lay epidemiology of health and illness (Davison, 1991). Furthermore, studies of the lay perspective on health have demonstrated that importance of seeing how aspects of everyday living provide the framework for understanding health-relevant attitudes and behaviours. The biomedical discourse does have its influence on the 'lay epidemiology' but there is a significant lack of fit between the two. This can be illustrated as follows, if certain everyday and individually controllable behaviours such as having a diet lacking in fruits and vegetables, are identified as harmful by both lay and professionals and given that

good health is a valued concept, why is it that many people persist in choosing nutritionally deficient foods for themselves and their families?

Indeed, the majority of observations and surveys in the UK, indicate that most people are well aware of epidemiologically identified health risks (Blaxter, 1990). But it is apparent, that there is no automatic long-term translation of knowledge of behavioural risks into modifications of personal lifestyles. Studies have shown that, regardless of respondents' understanding of probability or long term consequences of health-damaging behaviours, there was a strong tendency to pay attention to the short-term rather than long-term consequences (Backett *et al*,1994). From the lay perspective, if a person looked all right, felt all right, was not suffering any immediate effects from being overweight, and then there was less experienced pressure to change any personal health-relevant behaviour such as diet. From the lay perspective, evidence shows that putting "healthy eating" messages into practice means to avoid excess (Blaxter, 1990, Backett, Davison and Mullen 1994) and to aim for moderation and balancing out the 'good' and the 'bad' (Mullen, 1993). The lay perspective suggests how socio-cultural processes interact with health knowledge and attitudes to shape their translation into potential behaviour. The next section will conclude this chapter with a discussion of the breadth of theories that have been applied to widen the understanding of diet choice.

A Unified Theory?

This review of the literature has exposed the lack of an unified theoretical framework which is to be expected as many disciplines have been involved in the study of diet and income. Overall, the studies into food choice have used a plethora of theoretical models. Some studies may combine two or more models or apply some key concepts from different theories.

In this thesis, different meanings have been assigned to the term' dietary change'. In the first instance, descriptive may involve dietary assessment per se or dietary assessment compared to national dietary guidelines or dietary change towards the targets. Secondly, dietary change may refer to changes in diet i.e. explanations for

certain dietary changes in some population sub-groups developing at different speeds and in different directions to other population sub-groups are discussed . Finally, the term dietary change may refer to the prospective design of healthy eating interventions that aim at facilitating dietary change.

To draw conclusions from across all the sections of the literature review, there is a need for research that addresses income in a comprehensive way taking account of income dynamics, further research is needed to gain an understanding of the impact of a change in household income on diet and nutrition. Previous research has suggested that income has a significant role in diet and nutrition in families. Although much of this research is small scale in nature and could be considered as outdated (the majority of studies were carried out in the 1980's) and particular to a region (Dublin, London, York etc.).

The conduct of a cross-sectional survey of attitudes and beliefs towards healthy eating in parents across five income groups, in the Glasgow population would provide valuable baseline data on the modern Scottish diet and test run the attitudinal measures prior to undertaking the main research. The availability of an dietary survey of a representative Glaswegian adults was used for post-hoc hypothesis testing to complement the findings of the main Income Change Study. A novel survey method for further research was also reviewed.

The objective of the research conducted and presented in this thesis, was to increase the understanding of the impact of an income change (either a rise or a fall) on dietary choice across a range of income groups to inform national policy. As this research was the first of its kind carried in the UK, there was no precedent best practice methods of enquiry set. Due to practical constraints on the programme of research carried out for this thesis, the studies were all carried out in the urban setting of Glasgow. A small proportion of volunteers were recruited for the Income Change Study from Reading but they did not strikingly differ from the Glaswegians.

This research thesis straddles across many disciplines including nutrition and medicine, social science (and its many branches), social psychology, economics and social policy. As such, one theoretical perspective does not guide the design of the main study although selective tools have developed in one field over another. Such work was possible through the multidisciplinary culture within with this research was carried out. The methods chapter will drawn out the threads of each discipline's lead in different aspects of the design of the three studies.

Chapter Three– Methodologies of the studies

Aims and objectives of this thesis

Increasing the scientific understanding of income's role in influencing the foods that we eat is the main aim of this thesis. Previous research studies have failed to explain fully the relationship between income and diet. In 1994, when I began this research training endeavour, the science base about attitudes and behaviour relating to food choice was still expanding. For example, evidence of associations between food consumption and food preferences could be used for behavioural change at the individual and population level.

Parents of young children; attitudes to healthy eating **September 1994**
Income Change Study **March 1995 - January 1996**
Secondary analysis of Dietary Survey of Glasgow Adults aged 18-65 years old **April – August 1996**

Table 3.1: Summary of studies presented in the thesis

This thesis sought information about the associations between different measures of income and nutrition indicators in parents of young children in Glasgow. In the mid 1990s, very little was known about what happened to households when one of its members involuntarily changed their income. At that time, only a few committed research leaders were carrying out studies into the current profile of diet and income in the UK, building upon the findings of the 1980s. Addressing the gap in the literature of the impact of an income change (a rise or a fall) on food choice was one of the main research questions of this thesis. To the best of my knowledge, the longitudinal Income Change study was the first of its kind carried out in the UK. In recognition of

the importance of the study findings, the Ministry of Agriculture, Fisheries and Food announced in 1998 that they wished to commission a similar larger scale research project to inform future nutrition policy. Finally, an opportunistic collaboration within the Food Choice Group of the Department of Human Nutrition allowed an in-depth examination of income, dietary variety and nutrient intakes in a random sample of people living in the city of Glasgow. **Table 3.1** provides a timeline of the studies contributing to this thesis.

Quantitative and Qualitative Methods: In competition or complementary?

Quantitative research uses deduction whilst qualitative research relies on induction style. 'Deductive methods use categories and units of analysis that have been observed and accurately defined by the researchers involved, and can so be used as the basic elements of the research process. Induction, on the other hand, aims to use flexible data collection techniques and interpretation to allow the units and categories of analysis to flow *from* the data *to* the researcher; rather than the other way round' (Davison 1995 p 19). The simplistic binary labelling of research methods as 'quantitative' or 'qualitative' is akin to the proliferation of the concepts of 'good' or 'bad' foods. Davison (1995) has elegantly argued that a social research methods spectrum exists. He suggests that the different styles are "complementary not in competition" (Davison 1995, p 18).

Quantitative ⟶		⟶	⟶	⟶	Qualitative
Bio-metric measurements and food constituent weights	Postal survey questionnaires with boxes to tick	Structured observation (researcher notes data on chart, no interaction with subject)	Face-to-face survey with closed questions and space for extra comments	Face-to-face survey, semi-structured format, dialogue on list of topics encouraged	Unstructured conversations, interactions, observations noted down by researcher

Figure 3.1 Some points on the methods spectrum (Source: Davison 1995 p 19)

In crude terms, qualitative methodologies gain insights into the 'process' or the meaning and value that an individual places on phenomena and behaviour and the social and cultural contexts in which things and actions exist. While quantitative

methods determine information on the 'structure' or rather the sizes, quantities, distributions and prevalence of phenomena and behaviour at particular moments in time. But the ability of the two extremes of the quantitative-qualitative spectrum (shown in **Figure 3.1**) to produce findings about different angles of a research topic should not be underestimated.

Quantitative studies

Summary documents of nutrition surveillance in the UK such as the Scottish Diet (Scottish Home and Health Department 1993), The Nutrition of Elderly People (Department of Health 1992a) and The Health of the Nation (Department of Health 1992b) review evidence from large scale quantitative data collection exercises such as the Dietary and Nutritional Survey of British Adults (Gregory *et al* 1990) and the Scottish Heart Health Survey/MONICA (Bolton-Smith *et al* 1991a). The Scottish Health Survey (SHS) 1995 sponsored by the Scottish Office serves as an example of the value of these large surveys. The Scottish Office allows open access to the raw SHS data on CD-Rom with full survey documentation. Scientifically rigorous measurements were made and notes made on the dataset where inaccuracies may have occurred.

National surveys like the SHS, using quantitative methods have been designed at different times to meet different needs. A range of investigators and institutions has also carried them out. Consequently surveys have been developed separately with different goals. When reviewing the evidence, this lack of cohesion, with differences arising in concepts, definitions in design and in fieldwork practices need to be kept in mind.

The relationship between socio-economic status and nutrition has been identified in findings from the National Food Survey, the Dietary and Nutritional Survey of British Adults and the Scottish Heart Health/MONICA Study and is therefore worth examining in more detail. These large-scale surveys have different methodologies and possible sources of error and bias that will be highlighted in turn.

The National Food Survey

The annual National Food Survey of 7000 British households shows that, compared with the highest income group A, low income groups D and E2 consume more milk (but less semi-skimmed milk), meat and meat products (of which more is higher fat meat products), fats, sugars and preserves, potatoes and cereals (MAFF 1994a). They consume fewer fresh vegetables, fruit and higher fibre products such as brown and whole-wheat bread. As the quantity and type of food consumed is a determinant of nutrient intake, it is likely that nutrient intakes will vary by SES groups. Thus, the intake of nutrients as a percentage of the reference nutrient intake (the level that 97.5 % of the population will not develop a classic deficiency) is lower in groups D and E2 for all nutrients, and markedly so for calcium, iron, magnesium, folate (and other B vitamins), and especially vitamin C (181% for group A v 118% for D and E2). Although some of these values are above 100% of the reference nutrient intake, this indicator does not relate to recent knowledge on the protective role of nutrients.

Data arising from the National Food Survey over the past 15 years have been examined (James *et al* 1997). The authors report that food consumption and energy intakes have fallen and argue that this reflected an increasing sedentary lifestyle that has been compensated by a more nutrient dense diet. The authors determined that for each food item between 1980 and 1995, nutrient intakes have been worse for groups D and E2 with the exception of vitamin C intake. The differences between groups A and D and E2 are greater now than 15 years ago, whether intake was expressed in ounces and grams or in terms of energy density (amount per 1000 kcal/4184kJ).

As its major strength, the annual National Food Survey in the United Kingdom has over 50 years of continuous data collection and therefore provides longitudinal data against which to measure changes. One drawback is the Survey's data are based mainly on food purchases. This methodological feature fails to take account of intra-household distribution although it does make some allowance for wastage. Eating foods away from home has recently been added to annual survey data collection.

Dietary and Nutritional Survey of British Adults

In the Dietary and Nutritional Survey of British Adults (Gregory *et al* 1990), the informants were an accurate reflection of regional distribution and household composition of general population. There was some evidence that people aged 16-24 were under-represented but reweighting was not carried out as this difference was considered by the authors to be relatively small. Dietary and lifestyle data was collected by questionnaire and seven day weighed inventory. The Survey investigators operated double checks to reduce errors in weighed intake data. To ensure high quality data, seven day weighed diaries required a detailed description of food (e.g. brand, flavour,) and the weight of foods served and left uneaten. Evidence suggests that the major source of error is that study volunteers find that the weighing and recording process itself is a stimulus to change eating habits and/or the amount of information given towards the end of the seven days diminishes (Anderson 1995).

The Dietary and Nutritional Survey of British adults does not provide information on quantities of key foods consumed by socio-economic characteristics. One major strength of the Survey of British Adults lies in the application of principal components analysis which had never previously been used to identify eating patterns in UK. The researchers did not use income but social class as an indicator of socio-economic status. Five types of diet were contextualised: health conscious diet; a traditional meat and vegetables diet; traditional puddings and cakes diet; a diet with a high consumption of wines and spirits and a variety of non-traditional foods; and fast foods and snack foods based diet. The study reported that men and women in higher social classes were more likely to follow a health conscious diet or a diet with a high composition of wine and beer and non-traditional foods than the manual classes.

Due to the large proportion of students and people looking after the home, the social class of head of household was used as an economic indicator. Results showed significant differences in nutrient intakes by social class. For men, there were systematic differences in energy intakes through social class gradient. Among women in the sample, there was a clearer trend with lower recorded energy intake among the

lower social classes, (the average intake for those in Social classes I and II was 1740 kcal compared to 1580 kcal for those in social classes IV and V).

Nutrient values expressed per 1000kcal rather than absolute intakes of nutrients should be relied on, due to the variation in energy intakes by social class. The higher social classes consumed higher intakes of sugar and fibre per 1000kcal than lower social classes. In men, those in the higher social classes had significantly higher intakes recorded for potassium, magnesium, calcium, phosphorous and iron per 1000 kcal compared to the manual classes. In women, those in the higher social classes had significantly higher intakes per 1000kcal for iron, potassium, magnesium, phosphorous, copper, calcium and iodine. Where there were difference in vitamin intakes by social class in men and women it was not a linear trend. The clearest trend across all social class groups was for vitamin C. Men in social classes I and II had an average daily intake of 96.8 mg compared to an intake of 53.8 mg for men in social classes IV and V. Women in social classes I and II had an average daily intake of 96 2mg compared to an intake of 55.8 mg for women in social classes IV and V. Women in lower social classes were more likely to follow a fast food diet highlighted by the principal components analysis.

Surveys of the Scottish Diet

Scotland was one of four broad regions covered by the Dietary and Nutritional Survey of British Adults but only contributed 9% to the whole sample population. Results showed that men in Scotland were more likely to eat a 'fast foods and snacks diet' from the principal components analysis. Informants in Scotland were markedly less likely than informants living elsewhere to have eaten lamb, oily fish, skimmed milk, carrots, leafy green vegetables and polyunsaturated margarine. Compared to informants living in Central region and the South East/London, the Scots were less likely than others to have eaten salad vegetables. The data showed that informants living in Scotland were more likely than others to have consumed semi-skimmed milk and non-diet soft drinks and more likely than those in Central and South East region of UK to have eaten fried white fish.

Using different methodologies, other studies have found similar findings. In the Scottish Heart Health Study/MONICA, an in-depth food frequency questionnaire was used within a series of 'lifestyle' questions. Food frequency questionnaires will not usually provide accurate information on specific nutrient intakes, but the SHHS/MONICA food frequency questionnaire has been shown to give a reliable estimate. This study found that people in the lower manual classes were consuming more saturated fats from meat products, hard margarines and lower intakes of antioxidant vitamins because of low intakes of fruit juices, green vegetables, fresh fruit, cereals, soft margarine, vegetable oils, green and root vegetables (Bolton-Smith *et al* 1991).

Qualitative research

One the main objectives of qualitative studies is to provide depth to the understanding of a phenomena from 'rich' data collected from a small number of volunteers. This is in contrast to the breadth of surveys of a large sampling fraction of the general population. In the research area of income and diet, qualitative techniques are at their most valuable when explaining the findings of broader larger scale studies. They also examine the micro level of the intra-household dynamics of resource decision making and allocation.

As previously discussed in Chapter Two, food is consistently described as a flexible budget item in low income households where economies are readily made (Lang *et al* 1984, Graham 1984, Dobson *et al* 1994, Dowler & Calvert 1995). Qualitative work by these key researchers and others have 'unpacked' the complex and subtle coping responses.

Methods adopted most frequently by qualitative researchers in income and diet include semi-structured interviews (with or without questionnaires) and focus groups sessions, both with and without tape recording. In-depth interviewing, characteristic of the qualitative style, can reveal the underlying mechanisms of sensitive phenomena. The evidence determining that, when cut-backs in the food budget are made, adults

(usually women and especially lone mothers), go without food to enable the children to have what they perceive as a better diet (Health Education Authority 1989, Gibney and Lee 1993) are good examples of the success of the methodology.

The choice of methods and measurement tools for the two original studies in this thesis were mainly pragmatic. Qualitative methods were used in pre-pilot work and questionnaire design, testing and for in-depth interviews in the Income Change Study. Fieldnotes were made and tapes transcribed verbatim and analysed using qualitative analysis techniques to capture emerging themes. Overall, the approach is largely qualitative with nominal and ordinal data collection using questionnaires.

Dietary and attitudinal data was gathered from the parents of the young children using an adapted (i.e. shortened) version of a validated research tool. Underlying the search for association was the Theory of Planned Behaviour (TPB) (Ajzen & Fishbein 1980). This theory is widely accepted by social psychologists that work in multidisciplinary teams with nutritionists (Conner, Povey, Sparks, James and Shepherd 1998). Usually studies using this type of TPB questionnaire offer a participation fee (Lloyd, Paisley and Mela 1993, Shepherd, Paisley, Eley, Sparks, Anderson & Lean 1997) as it is recognised that the questionnaires tend to be long and repetitive.

Defining key concepts

Defining income

Income is a concept that varies in each substantive investigation. Some researchers use income to classify persons as households to assist analysis of research topics. This point is made clear when considering Government Surveys. For example, the Survey of English Housing uses a single question relating to income compared to the numerous questions which comprise gross household income in the Family Expenditure Survey and the Family Resource Survey. An ideal income variable would define income as net or gross for a defined period relevant to the respondent, with banding which balances a requirement for broad categories with sufficient detail to

allow for broad categories with sufficient detail to allow for the variation produced by household size.

The Government Statistical Service reported that "It has been stated in the Market Research Society Submission to the OPCS Working Group on Content for the 2001 Census that gross income has been found easier to obtain than net income...Social Survey Division is testing banded income questions for the 2001 Census. Following this research, it is anticipated that a specific harmonised variable to provide classification of households by income will be published" (Government Statistical Service 1995 p 27). In this thesis, household income (after tax and NI deductions) was collected using bands that were used in the National Food Survey (MAFF 1994a). Where possible, this estimate of household income was supplemented with questions about benefits and other money coming into the household. Information about the number of adults in the household and the number of children of specified ages in household was collected so the McClements scales of equivalence could be used to make comparisons between households of different sizes (McClements 1977).

Defining household

The term 'household' used in this thesis took the definition used for the 1981 and 1991 Censuses of the Population i.e. the household response unit. The basic definition is 'one person or a group of people who have the accommodation as their only or main residence AND (for a group) either share at least one meal a day OR share the living accommodation, that is, a living room or sitting room' (Central Statistics Office 1995). This definition contrasts with that used in the National Food Survey which currently bases their household response unit definition on the domestic consumption unit.

Why and how best to measure food?

Diet is one 'risk factor' in explaining health outcomes (Scottish Office 1998, Bartley, Blane and Davey-Smith 1998). Researchers can ask people either qualitative questions about the types of foods people eat e.g. white or wholemeal bread, and/or quantitative questions about the frequency of food consumption (daily, weekly or

monthly). Whilst it may seem simple to gather information on foods consumed by direct questioning, the formal measurement of diet for nutritional research is fraught with biases and errors.

The main sources of error include incorrect recording of food eaten, incorrect weight recorded (and/or frequency), bias in recording "good foods" or "bad foods", day-to-day variability, change in diet from usual, coding errors and food tables. In most studies, measuring food and nutrient intake requires quantitative methods. Diet can be measured either retrospectively or prospectively.

Retrospective methods

Retrospective dietary assessment methods include tools like the diet inventory, 24 hour recall, diet history and the food frequency questionnaire. The most basic form of dietary assessment is the diet inventory approach. Focusing solely on food habits, this tool provides no information on nutrient intake and is frequently used in lifestyle questionnaires. The dietary inventory method offers only very limited data on food intake and must be carefully interpreted for nutritional implications. Dietitians are often required to carry out a simple, quick and cheap 24 hour recall of all food and drink consumed as type of food, drinks eaten with portion weights. This research tool is unable to collect data on day to day variation in nutrient intake that challenges its reliability. Another limitation is the subjects' subjective description of small, medium or large portion weights. Food photographs may be of value in assessing portions.

An alternative to the 24 hour recall is the diet history approach. This involves a time consuming face to face interview. Direct questioning determines the usual food intakes that are crosschecked with a food frequency list. Then a three day recall audit is carried out. Often the academic researchers of food will favour a self complete measurement tool such as a food frequency questionnaire or a diet inventory. Both methods are relatively quick for the subject with data entry and processing time being reduced for the researcher.

The food frequency questionnaire (FFQ) queries the frequency and amount of usual consumption of anywhere from tens to hundreds food items. Portion sizes are conceptualised as household measures such as tablespoons or cups etc. A careful explanation must be given to the subject to reduce errors in these descriptions. As a retrospective tool, the FFQ relies heavily on memory. A FFQ may ask subjects to recall food intake over the previous month, year or even in childhood. The instrument is mainly used to rank subjects into thirds of the distribution for one particular food or nutrient (e.g. low, medium or high intakes). FFQs would not usually provide accurate information on specific nutrient intake in individuals and have not generally been validated for this purpose.

In this thesis, both the cross-sectional surveys of the parents and the longitudinal Income Change Study used a validated FFQ (Paisley, Lloyd, Brown and Mela 1996) which was shortened in collaboration with Dr Paisley for this purpose. The decision to use the FFQ was pragmatic based on time constraints for the questionnaire completion (Glasgow Parents Study) and on interviewing time (Income Change Study). The use of a prospective methodology that did not have the disadvantages of the FFQ's reliance on memory could have produced a more comprehensive dietary assessment but it is likely that recruitment would have taken longer to achieve existing figures or volunteer numbers low.

Prospective methods

There are two main prospective methods that are commonly used if nutrient intake is the main interest- weighed food inventory and estimated food inventory. Weighed food and drink diaries can vary from four days, seven days, fourteen days to a month. The requirements made of participants cannot be overemphasised and every effort needs to be taken to make this process as unobtrusive as possible to limit method effects. With estimated inventory, food is unweighed but portion sizes estimated with reference to food photos, models or by replicating descriptions of portions and weighing. Again subjects need training on recording and it is essential that a trained individual check diaries and estimates portion weight. In both methods, foods will be

coded using a computer package incorporating an electronic database of the food tables.

The Dietary Survey of Glasgow Adults (Chapter eight) used the seven day weighed inventory approach for data collection. This survey was designed with the validation of the bar-code nutrient analysis system Foodmeter (UK) 2 against COMP-EAT as its main objective. As a dietitian carried out fieldwork, the seven day weighed food and drink diary is the cornerstone of modern community dietetics so it was the preferred method for comparison of the two assessment methods.

Statistical considerations for research design

Statistical analyses must be understood in the wider context of the scientific investigation. The research question, study design, sampling techniques and data collection methods determine which statistical procedures are appropriate and how and when these procedures are applied to the data. This section addresses the issues of potential error and bias that may arise in reporting original research.

Measurement theories

The importance of defining concepts and choosing appropriate indicators has been stressed earlier. The validity and reliability of an indicator will depend on its degree of accuracy linked to the concept. An indicator links a concept, for instance dietary variety, with observable facts (number of food items consumed per week). The adequacy of this link depends on the underlying measurement theory. The measurement theory for dietary variety is the proposition that diets that are nutritionally inadequate are often monotonous while a diet close to one recommended for a healthier life is more diverse in food choice.

Measurement theories need to be tested to ensure confidence in indicators. Gilbert reports that the use of an incorrect measurement theory could lead to 'the wrong conclusions when inducing theories from observations' and 'one may falsify correct

theories, or fail to falsify incorrect theories, because the indicators are not measuring the concepts properly' (Gilbert 1993, p28-29).

Levels of measurement

There are four levels of measurement that gives information about the data. Nominal levels of measurement enable responses to be categorised to a named category. For example in the Income Change Study, when I asked respondents to state their employment status, I ticked against a phrase or category that best describes them such as looking after the home and family, looking for part-time work, off sick etc. This level of measurement is built on the assumption that each data is mutually exclusive. For some respondents this may not hold true, for instance they may be 'unemployed' and 'looking after the home and family' at the same time.

Ordinal levels of measurement enable responses to be ranked. Visual analogue scales are the most common method. In this thesis I used the Hospital Anxiety and Depression (HAD) scale (Zigmond & Snaith 1981) and the seven point Likert scales used in food preferences and attitudinal data collection in the Income Change Study. These tools are examples of visual analogue scales where responses are marked along a scale. One important issue is that the interval between the points may not be equal. For instance, using a seven point scale to assess self perception of healthfulness of current diet (-3 = extremely unhealthy, -2 = very unhealthy, -1 slightly unhealthy, 0 = neither unhealthy or healthy, 1 = slightly healthy, 2 = very healthy and 3 = extremely healthy), the interval between a score of 1 and 2 may not be the same interval as 2 and 3. As such, it is possible that individuals will rate healthfulness differently.

Interval and ratio levels of measurement assume that the intervals between the points on the scale are equal. In this thesis, height and weight are good examples of this.

Measurement error

All measurements have a range of error attached to them and this can be minimised by increasing precision to reduce random error, including sampling error. Increasing

sample size will increase power. This would allow small differences to be detected despite errors in measurement. Systematic errors can be minimised by increasing internal and external validity. Internal validity refers to inferences to actual subjects in the study. Selection bias, information bias and confounding can affect internal validity. External validity refers to subjects outside the study.

Sampling methods

The questions asked to test the hypothesis raised and the distribution and limits of the variable of interest influence a scientist's choice of method. In practice, often scientists will often use opportunistic samples i.e. subjects who are easily available and willing to participate. It should be recognised that such recruitment may affect the research outcomes. Heterogeneous samples are more typical of pragmatic studies that are conducted under 'normal' conditions. This is driven by the need to make decisions about the study population and generalise this to the rest of the general population. More homogeneous samples usually indicate explanatory studies that are driven by a need to understand the process of the variables under study. Such studies are conducted with tighter inclusion/exclusion criteria to increase scientific control of the investigation. The lower the variability between the subjects is, the better chance we have of detecting a difference if it exists. Although it is of value to restrict subject recruitment to a particular set of characteristics for control, it may lead to difficulties: limiting the applicability of the study and the generalisability of the findings to the rest of the population. Interpretation of the results should keep the study's hypotheses in mind and extrapolation of the results can only be made to the population subgroup only.

Sampling

If all the subjects of interest can be studied, there is no need to sample. Instead the entire population of interest can be evaluated in a census. Most populations are too large and too widely dispersed for a census to be performed so they must be sampled. Random sampling from the population means that each participant has an equal probability of being included in the study. Because most statistical techniques depend

on randomly selected samples, how a population is sampled is critical to the quality of the study. Some common sampling techniques include random selection, subjects who met the inclusion criteria during a given time interval, convenience, self-selection, matching or pairing and stratification.

Random sampling can eliminate biases such as volunteer bias. There are several methods for sampling including the simple random sampling from a table of random sampling numbers (Fisher & Yates 1974) which will be representative provided it is large enough.

Convenience and self-selection sampling may suffer from selection bias. In a convenience sample, subjects are recruited at the investigator's discretion and in a self-selection sample, participants volunteer in response to calls for volunteers at the investigator's discretion.

In a matched or paired sample design, participants are chosen to "match" other participants on the basis of similar characteristics (usually demographic variables) in the attempt to reduce variability between groups. In the advanced statistical analysis of the Glasgow Parents Study (Chapter Four), a stringent five variable matched pairs case control research design was used. Case-control analysis has usually been restricted to use in epidemiology. **Figure 3.2** presents the estimation of an odds ratio and its confidence interval from a matched pairs case-control study. The use of such a statistical technique applied to nutrition research may be viewed as unorthodox in its substitution of disease as an outcome with a dietary outcome. Its use in this thesis is justified on the grounds that a greater control is achieved under which to test the hypotheses.

Figure 3.2 Estimation of an odds ratio and its confidence interval from a matched pairs case-control study

Tabular (2 x 2) presentation

		Control	
	Total	Variable under study present	Variable under study not present	
Case	Variable under study present	*a*	*b*	*a* + *b*
	Variable under study not present	*c*	*d*	*c* + *d*
Total		*a* + *c*	*a* + *d*	

Estimation of odds ratio and confidence interval

The odds ratio (OR) can be estimated as OR = *b* / *c*.

A confidence interval can be constructed from the following formula for the standard error of $\log_e$OR:

s.e.($\log_e$OR) = sqrt (1 / *b* + 1 / *c*)

Assuming approximate Normality for the sampling distribution of $\log_e$OR, a 95% confidence interval for $\log_e$OR is

$\log_e$OR - 1.96 x s.e.($\log_e$OR) to $\log_e$OR + 1.96 x s.e.($\log_e$OR)

The corresponding limits for the confidence interval for OR itself are

$(e^{\log_e OR - 1.96 \times s.e.(\log_e OR)}, e^{\log_e OR + 1.96 \times s.e.(\log_e OR)})$

The study is designed as a retrospective, matched pairs case control as follows: one member of the matched pair is employed with x income and the other member of the pair is unemployed with a comparable reported annual household income but has experienced living at a higher income previously. If the same influences apply, the influence of other interacting variables can be controlled for by the matching. Matching attempts to make the cases comparable with controls on key characteristics. I decided that one-to-one pair matching would give the highest degree of control available. The homogeneity of the parents' socio-demographic data allowed this form of matching possible. In the Glasgow Parents Study, one-to-one pair matching was used with cases and controls identical for current household income, age, partnership status, gender and number of children living in household. It is unreasonable to expect that all of the volunteers of the original parents' study fulfilling the 'case' criteria would match with the 'controls' on the five variables. Indeed, 37 people were 'lost' or rather excluded from the analysis.

Stratified sampling is where a population is divided into sections on the basis of one or more characteristics thought to affect the outcome. These subsections are then sampled. Identifiable categories such as age, sex, race, geographic area, demographic and lifestyle factors are used to ensure that the sample represents these aspects within the general population. This process is sometimes referred to as over-sampling because some subsections are sampled more heavily than others to obtain the desired number of participants. This was considered a possibility in the design of the Glasgow parents study. Stratification, if not dealt with in the design, can be dealt with in the statistical analysis by adding the stratification factors as one of the explanatory variables. But as this destroys the initial randomness of the sample, this approach was not taken in this thesis.

Irrespective of the design, participation in a research study relies on an individual's consent. A serious hazard to drawing inferences from samples is that a substantial proportion of the representative sample of the population originally selected may fail to respond. Quite apart from the waste of fieldwork resources this entails, the

'deadwood' of non-contacts (dead, moved, on holiday, fitting exclusion criteria) and non-consenting persons may differ from available consenting persons. Where this is so, non-response can seriously bias population estimates at the level of both particular variables and of the strength of relationships between variables.

The literature contains many instances of demonstrated or inferred non-response bias of this kind. Non-responders have often been shown to differ from responders in terms of a number of socio-demographic and economic variables that are likely to be linked to lifestyles, attitudes etc. (Lievesley 1983). The pattern of non-response bias may be complex, because the characteristics of those who cannot be contacted can differ markedly from the characteristics of those who are contacted, but refuse to participate (Wilcox 1977). Non-response per se is not problematic but the recognition and identification of non-response bias is imperative in scientific research. This is further discussed in more depth later in this chapter.

Sample size

In some studies, especially retrospective, sample size is determined by how many participants within a certain inclusion criteria were encountered in a given time and how many participants were available. In other studies, the researcher can set the number of participants needed. In this case, a good sample will be a large enough to provide reliable conclusions but not so excessive that unnecessary numbers of participants undergo the study which would be unethical and a waste of resources by collecting more data than necessary.

Ideally, sample size should be chosen with the aid of a statistical power calculation. In general, statistical power indicates the ability of a statistical test to detect a difference given only if one truly exists. If no statistically significant difference is found, it may be because there is no true difference or it may be because not enough data were collected to determine whether there was a difference, i.e. the sample size was too small.

To obtain a minimum sample size for a study, the statistical power must be set, and the number calculated for determining the difference that the study aims to detect or exclude. This calculation requires some estimate of the limits of the variable of interest, either through experience or pilot tests. The sample size therefore depends on the standard error of the variable to be estimated including biological variability, measurement and random errors (Kahn & Sempos 1989). In human studies, the size of the sample recruited must allow for the potential rates of response and drop out. In practice, original research often addresses topics where information necessary for formal power estimation is not available and a reasonable assumption has to be made. In the Dietary Survey of Glasgow adults, n=160 was chosen as the desired recruitment rate rather than deriving a desired number from a nomegram. It is important to present confidence intervals for primary analyses where no formal a priori power calculation has been made.

Statistical power equals 1 - beta where beta is the probability of committing a type II error. A type II error is wrongly concluding that there is no difference between the groups or no differences between treatments in experimental research. The alpha level is set by the researcher as the threshold value, below which, statistical significance will be declared. The alpha level is the probability of committing a type I error. A type I error is wrongly concluding that a difference exists between the groups.

Controls

During the process of designing the Income Change Study, the issue of whether controls were needed or not arose. Controls are required to eliminate the influence of as many confounding factors as possible and crucial within an experimental intervention trial. The community-based Income Change Study was recruiting in an ad-hoc manner as access to a sampling frame was impossible, therefore formal 'controls' were not recruited or used in the analysis. Instead the research was designed for groups comparisons to be made as Income Increase Group *v.* Income Decrease Group and Time 1 *v.* Time 2.

Response rates

Surveys place a vital role in public health nutrition. Large numbers of the population must be surveyed if the results are to be considered representative of the overall general population. Limited funding resources, which bring restrictive time scales, have led to a greater reliance on postal survey tools. Compared to interviews, postal survey questionnaires are less expensive, more convenient and allow honest disclosure.

But the general public has seen a dramatic rise in calls for their views from researchers (in the high street, by telephone or by mail) and it is becoming more difficult to encourage people to participate in research. Cash and other financial incentives have been recently shown to have some impact on the return of postal questionnaires while cosmetic factors surrounding questionnaire presentation maintain their importance in social survey methods. Response rates are a particular problem in surveys of the general population of a city. There is a certain amount of 'deadwood' that needs to be cleared before a response rate can be ascertained. Inadequacies of the sampling frame contribute to some loss of potential respondents as such lists are invariably out of date when you access them. Depending on selection criteria for the study, deadwood includes retired persons, the deceased, moved out of scope, extended absence from work (holiday or sickness), questionnaire fails to reach person due to mail astray en route from researcher (estimated at 5% of despatch).

High response rates to surveys help to maintain the representativeness of the sample but there is no safe level of response rate below 100%. However small the non-response, a possible bias as a result of it must be investigated and reported.

There is concern about response rates from surveys but a low response rate does not lead to automatic bias and a high response rate does not guarantee a representative sample (Andy Ward, personal communication). The assumption that quality of data varies by point of data collection and that non-responders have significantly different characteristics to responders needs to be tested and routinely presented in published studies. This is of great concern due to the pressure placed on researchers to achieve

arbitrarily set response rates (e.g. over 70 per cent), as a criterion for acceptance for publication in professional journals.

Time and resources are limited for the general public and survey researchers alike. Many factors are likely to influence an individual's participation in a survey. The literature suggests a number of cosmetic factors that influence response rates. The packaging of a mail survey can influence response rate. Perception of an overlong or unstructured questionnaire is likely to lead to a lower response. The orientation of the cover letter and a promise to share the results of the study with the respondents may influence participation.

Low response rate can introduce bias into survey and therefore it is important to assess the characteristics of non-responders with care. Few published studies report comparisons between responders and non-responders and even less compared data collected from initial despatches and reminders for quality control. A low response rate need not affect the validity of the data collected but it is still necessary to test for non-response effects and make corrections to the original data in order to maximise validity.

In the Glasgow parents study the return rate of the self complete questionnaire was low but unfortunately it was not possible to test the differences between responders and non-responders. This was mainly due to the exclusion of the researcher from the process of recruitment to study and questionnaire completion. The uptake in the Dietary Survey of Glasgow Adults was also low (<50%) but this was not felt to be problematic as it was comparable to previous dietary surveys and the achieved sample was fairly representative of the Glasgow population.

Payment of respondents

Although there is evidence to show that paying respondents in structured surveys increases response rates (Kemsley 1969, Herberlein and Baumgartner 1978), such conduct in the UK is controversial and not often used (Margaret Reid, personal

communication). Herberlein and Baumgartner (1978) suggest that the most important factors in generating high return rates in mailed surveys are providing pre-paid envelopes and offering monetary incentives. When a survey places a relatively heavy burden on the participant, a cash inducement can improve response. The 1951 and 1968 National Food Surveys offer no participation fee and achieved response rates of 35 and 55 per cent respectively. Kemsley (1969) found that a response rate of 71 per cent was obtained for the UK Family Expenditure Survey when payments were made to the respondents. The data collection process was intensive as a all family members aged over 16 were required to keep a diary of personal expenditure for a fortnight and had to answer a battery of questionnaires.

Some researchers are often keen to employ fees for participation to reduce the risk that non-responders will differ significantly from responders. Others argue that against paying respondents saying that it introduces contamination and bias. One case study of Jamaican working women suggests that payments can reduce some kinds of bias (Thompson 1996). Thompson reports that "in valuing the time that the helpers were willing to contribute to the research by compensating them for their contribution, the researcher gained access to their knowledge and experience as part of the consultative process. While it is possible that the payments led to the participants providing what they believed to be appropriate opinions, this must be weighed against two advantages"

"First payments helped to avoid the bias which might have resulted from the omission of those who declined to participate because they put a greater value on their time, energy and views. Second, one must be mindful that work conducted in a particular way alerts the researched about the investigator's values. It leaves residues about how participants are valued by those in control of the study. This can create its own form of bias, perhaps skewing the results in favour of those women who might place less value upon their own time and skills and therefore be less aware of their exploitation as workers" (Thompson 1996, p 4).

In the 'parents of young children' survey, it would have been possible to recruit through schools or community groups. This would have given more control over the postcode sectors sampled and face to face contact but due to time constraints, this was not feasible. It was acknowledged that some form of personal contact was more desirable than a postal structured questionnaire and one alternative route to parents of young children was routine visits to health visitors. This was negotiated through the Chief Nursing Managers who did not wish the researcher to be involved in direct recruitment by either being present at the consultation or approaching parents during waiting time. After meetings with the four area (North, East, South and West) nursing managers in the City of Glasgow, they agreed to ask the health visitors for their participation in the research. The nursing managers controlled distribution thereafter and due to the design, there was little control over the extent of health visitors' participation or for follow-up of non-responders. The Glasgow parents study reported in this thesis formed the pilot to a larger survey in England and Scotland that used a market research company for door-step recruitment (with a £3 participation fee offered). I was interested in devising a systematic random recruitment method that could promote completion through a health related endorsement without using financial incentive.

Market research methods were of little help for recruitment to the Income Change Study. One market research company was offered the contract to locate income changers (and not even promise the individual's consent to take part) within our selection criteria and found three people in six months. It became obvious within one month into the contract that the selection criteria for the study were making recruitment slow. The study inclusion criteria had been devised based on the literature to increase control over variables. To ensure that the study would be substantive, recruitment methods needed to be as creative and diverse as possible.

A wide dissemination of recruitment information was employed. This included features and advertisements in newspapers, posters in public places, advertisements in newsletters, approaches to local large employers, mail shots to areas known to be

prone to transitions in employment status and 'snowballing'. In spite of using a wide range of sources to contact those experiencing a change in income, a higher proportion of respondents had experienced further or higher education than the general population. Once potential volunteers responded to the publicity, the setting up of interviews was not without limitations. Many people, who did not fit study criteria but who had experienced a change in income a year or more ago wished to take part in the study to "tell their story". Respondents who had experienced a rise in income were often enthusiastic to talk about their change in lifestyle but were not available to be interviewed within the time frame criteria. Respondents who had undergone an income decrease were more likely to have reservations about the research. Some were concerned that giving information to an University researcher may affect benefits and housing.

The practical issues of how to ask about expenditure and changes to diet that may be felt (by the respondent and/or the investigator) to be 'negative' or 'bad' practices shaped the format of data collection into a preliminary self complete questionnaire and a semi-structured interview schedule. The study attempted to balance issues of respondent burden, comfortableness with income questions and survey quality. More detailed questions were included only where they would not significantly add to the interview length. There was no intention to probe for detail that was not volunteered.

A participation fee of £10 BOOTS voucher for the first interview and £20 BOOTS voucher for the second interview after six months were offered. Travel expenses were also paid in full. The BOOTS brand was chosen over other options (for example a food retailer) to allow a wide choice of items to be purchased in a range of locales in the Greater Glasgow area. Some respondents would not accept the vouchers at the time of payment. To save embarrassment, these were posted out to them with a handwritten thank you note.

Respondents were told that I was interested in lifestyle. In the interviews, every attempt was made to reduce any distance between myself and the respondent. My

clothes would be smart casual to appear comfortable and an ID badge displayed. In this way, I hoped to convey competency, bona fide research but non threatening. Tape recording may be quite daunting. As part of the study protocol, I always ensured that if the respondents agreed to the interview being taped that they felt free to say that they wanted the tape turning off. Assurances were made and kept that I would be the only one that played back the tape recordings.

Unlocking the details of the changes that some had experienced after the income change was involved. Some of the follow up interviews were challenging for respondent and myself alike. In some situations, life circumstances had deteriorated substantially in six months.

This study was an awakening experience. The interviewing process heightened my awareness of certain issues. Establishing rapport and being accepted by the respondents were important to me. My own national identity, defined by many (wrongly) on the basis of my accent was an aspect that I had not warranted so strong in some. At the time of our first interview, one lady told me that I would have to remain in the garden rather than enter the house. 'I have never had a sassonack (the English) in my house ever'. Six months later, which was now in winter, I was allowed through the front door as I was deemed 'nae too bad'. Another instance, a young mother proudly showed me her tattoo on her shoulder saying that the money she had saved with the vouchers had allowed her to have the rose drawn.

Personal motivation of each of the respondents in the questionnaire survey, the interview study and the weighed intake community survey may affect quality of data. But it is likely that all the respondents offered their time and details about their life as an altruistic gesture to nutrition research because they attached some importance to this.

Data management and statistical analysis

In all the studies, data was dual entered and checked thoroughly by the researcher and another colleague. Data were managed and analysed using the Statistical Package for the Social Sciences for Windows 5.8 (SPSS for Windows 1994). Statistical significance is taken as greater or equal to the $p < 0.05$ level although it was recognised that this was a weak association. Stronger association between variables were shown if significance was above $p < 0.01$ or $p < 0.001$ level.

Choosing a statistical text

In general, data from the studies are reported as means and standard deviations and tested by non-parametric tests or as percentages tested by Chi-Square tests where appropriate. In the Glasgow parents study, comparison of group means were made by analysis of variance (ANOVA). As assumptions were made in the analyses of variance, the normality of the distribution of the dietary data was checked. As the distributions were significantly skewed to the right, the intakes were logarithmically transformed. A geometric mean (=antilog of mean of transformed values) were used in the tables instead of an arithmetic mean and analysis of variance were performed on the transformed value.

In the Income Change Study, differences in socio-demographic details of the Income Increase Group and the Income Decrease Group were tested by Chi-square or Mann-Whitney test where appropriate. Comparisons of the pre-income change and the post income change expenditures on food and of the post-income change and follow-up expenditures on food within each income change group were tested by Wilcoxon matched pairs test. Differences between percentage of money spent on food and reported change in meal styles and food types between income change groups were assessed by Mann-Whitney test. Within the study groups, differences in food intake, food preferences and attitudes between the first and second interview were tested by non-parametric Wilcoxon tests. Spearman correlations were used on two occasions: to test for association between psychological health, changes in food choice and food expenditure and to search for associations between rate of smoking, seasonality,

reported food intakes and changes in body weight. To test predictors of Expectation at Both T1 and T2, a step wise linear regression was performed with Expectation as the dependent variable, the predictor variables were entered into analysis as follows: Step 1 Attitude, Subjective Norm, Step 2, perceived control and perceived difficulty, Step 3 Perceived need followed by Step 4 two factors indicating groups membership, income change group and city of residence.

One way ANOVA was used to test the difference in frequency of food consumption by gender and age within Income Change groups. Analysis of variance (ANOVA) were carried out to test the main effects and two-way interactions of income change group (independent variable) and quintiles of income expressed as a proportion of the national average income (independent variable) on frequency of food consumption (dependant variable). The assumptions of using analysis of variance were respected i.e where dietary data were not normally distributed, the data were logarithmically transformed. In contrast in the Dietary Survey of Glasgow Adults, differences in mean food and nutrient intakes were tested by Kruskal-Wallis ANOVA. Such a statistical procedure makes no assumption about the normality of the distribution of the dependent variable and as such is a non- parametric test. The choice of statistical tests used in the studies of the following chapters were determined from the Decision Chart published by Greene & D'Oliveira (1982) outlined in **Figure 3.3**).

Figure 3.3 DECISION CHART (Greene & D'Oliveira 1989)

Where Q: Question asked of date; A: Answer and T: Statistical test required

START

Q: Categories? - T: Chi Square

Q: Correlations? - T: Parametric (Pearson) or Nonparametric (Spearman)

Q: Differences? - Q: One variable or two or more variables?

Q: If one variable - Q: How many experimental conditions?

A: Two or A: Three or more

A: Two – Q: Same or different subjects in each condition?

A: Same – T: Parametric (t-test related) or nonparametric (Wilcoxon)

A: Different – T: Parametric (t test unrelated) or nonparametric (Mann Whitney)

A: Three or more – Q: Same or different subjects in each condition?

A: Same – T: Parametric (1 way ANOVA related) or nonparametric (Friedman, Page's L Trend)

A . Different – T: Parametric (1 way ANOVA unrelated) or nonparametric (Kruskal Wallis, Jonckheere Trend)

Q. If two or more variables – Q: Same or different subjects in each condition?

A: Same – T: 2 way ANOVA (related)

A: Different – T: 2 way ANOVA (unrelated)

Chapter Four – Associations between income and healthy eating practices in mothers of young children in Glasgow

Introduction

Several studies have suggested that several nutrition outcome indicators which contribute to cardiovascular disease, some cancers and obesity may be associated with income (NCH 1991, Dobson *et al* 1994, Dowler & Calvert 1995). All the aforementioned studies of diet and income suggest that poor diet was directly attributable to low income. To date, there has been a lack of harmonisation between official surveys and published independent studies in their measurement of the concept income. This observation suggested the hypothesis of the present study: to test if different measures of income lead to different variation in nutrition outcome indicators. If so, this might have implications for subsequent findings and nutrition policy. To the best of my knowledge, this is the first study of parents with young children that has attempted to carry out such analysis. The major objectives of this study was to assess associations between healthy eating practices and income across five income groups with a range of income measures (e.g. household income, personal income and partner's income). At the time of the design of the present study, published surveys which had addressed income and diet in Scotland such as the Twenty 07- Survey at the Medical Research Council Medical Sociology Unit had been collect up to five years previously. In Glasgow during the period 1990-1995, there had been many high profile public health promotion campaigns such as the 'Good Hearted Glasgow' campaign of 1991. The current associations between income and healthy eating practices were unknown. The study sought to address the following research questions:

1. How equivalent are different self-report measures of household income?
2. How is income associated with nutrition outcome indicators?
3 Do different measures of income lead to different nutrition outcome indicators?
4 How do different measures of income contribute to predicting different expectations of eating a healthy diet?

Methods

This chapter relies on data collected from mothers who presented their young child for immunisation to their local health visitor, across all four area sectors of Glasgow. Each health visitor were instructed to give their 10 questionnaires to the first 10 parents they had contact with the following week. A pilot study of 10 parents recruited from a local church based group was carried out to check for clarity and time for questionnaire self-completion. Two main areas were modified following the pilot study. The word 'you' was highlighted for emphasis, to personalise responses, whenever it appeared in the wording of a question. Secondly, sections of text were periodically inserted into the flow of the questionnaire in response to criticism of respondent fatigue with the repetitive nature of the questions. It was envisaged that this would increase motivation to complete questionnaire. The final survey questionnaire is presented in **Appendix 1**. The questionnaire took approximately thirty minutes to self-complete and was posted back to the Department of Human Nutrition using a FREEPOST envelope by either the respondent or the health visitor. Thirty six per cent of 400 questionnaires given to the managers of the four sectors of Glasgow were returned to the Department of Human Nutrition. Variables used in the present analysis are outlined below.

Basic socio-demographic information: Information was collected on gender, age, weight, height, educational attainment, size of household, partnership status, number and age of children, job title of main earner, car ownership and housing tenure.

Income: **Table 4.1** indicates the questions about income used in the survey. For Questions 10—18, the expected responses were absolute values for earnings per month, income support, partner's earnings, other money coming into household other benefits, housing benefit. In addition, information about gross household income was requested in terms of five income groups (£/per year after tax), used in the National Food Survey (MAFF 1994) (**Table 4.1**). Information on the number of adults and children living in the household with whom all bills, including food was shared, together with information on current household income were collected in order to

calculate equivalised income. That is, a measure of income per person was obtained, enabling comparisons between different sized households using the McClements equivalence scales (McClements 1977) **(Appendix 2). Table 4.2** describes the variables derived from the raw questions with calculations. Each of the derived variables was spilt into quintiles for the comparative analysis.

Food intake (a food frequency list): Assessment of usual personal food intake was by means of a 33-item food frequency list modified from a validated tool (Paisley *et al* 1996). Frequency of consumption of unquantified servings of foods was measured by estimating the number of times each food was consumed per week or per month. The food list included the main sources of fat in the diet (MAFF 1994a), fruit and vegetables, breakfast cereals, bread, pasta, and alcohol. Foods which have been shown to differ by income group (MAFF 1994a) such as type of bread and milk used, crisps and chips, fresh and frozen vegetables and fruit juice were also included on the food frequency list.

Food variety: The total number of different food items reported on the food frequency questionnaire by each individual was summed to create an indicator of food variety. It was not expected to give a comprehensive assessment.

Fat and carbohydrate intake indices: Scores were calculated from a modified version of the Health Education Board for Scotland healthy eating quiz (HEBS 1996) **(Appendix 3)**. This coding scheme was applied post-hoc to the dietary data collected using the food frequency list.

Barriers to healthy eating questions: These were assessed by a set of eleven questions: 'Do you agree or disagree that it is difficult for you to eat healthily when...' i) cooking for friends or other guests; ii) eating out at a friends' houses; iii) eating out (other); iv) eating takeaway food; v) eating snacks; vi) cooking meals for your partner and yourself; vii) cooking meals for you children and yourself; viii) your partner and children want food that you find hard to resist; ix) you are bored; x) you feel depressed

and xi) you feel stressed. Responses were on a seven point scale of strongly agree, moderately agree, slightly agree, neither agree or disagree, slightly disagree, moderately disagree, strongly disagree.

Food expenditure: This was estimated by three questions: a) 'Approximately how much money do you spend on food in a typical week (including food eaten away from home)?'; b) 'Approximately how much do you spend on food in the supermarkets?'; and c) 'Approximately how much do you spend on food in your local shops?'. Expenditure was equivalised using the McClements scales (McClements 1977).

Measurement of Attitudes towards a healthy diet: This section comprised 29 questions based on the components of The Theory of Planned Behaviour (TPB) (Ajzen and Fishbein 1980) The Fishbein and Ajzen model is a structured attitude model developed in social psychology which has been recently applied to a range of food choice problems (Anderson 1991, Paisley 1994). Within this model, the person's intention to perform a behaviour (healthy eating in this case) is determined by two components i) the individual's own attitude (i.e. whether the person subjectively rates healthy eating as good, beneficial etc.) and ii) perceived social pressure to behave in this way (the subjective norm). In turn the attitudinal component is predicted by behaviour and outcome evaluations (Ajzen 1988).

Attitudes to Healthy Eating (AH) were evaluated by two cognitive attitudes items, two affective attitude items and one item on the difficulty of making changes for eating a healthier diet. Affective attitudes items were "Do you think that for you eating a healthy diet is.." ("extremely unpleasant" to "extremely pleasant") and "Do you think that for you eating a healthy diet is... ("extremely unenjoyable" to "extremely enjoyable"). Cognitive attitude items were "Do you think that for you eating a healthy diet is.." ("extremely harmful" to "extremely beneficial") and "Do you think that for you eating a healthy diet is.." ("extremely foolish" to "extremely wise"). To measure *Perceived Difficulty* participants were asked "Do you think that for you eating a healthy diet is ... ?" ("extremely difficult" = -3 to "extremely easy" = 3). *Subjective*

Norm (SN) was assessed by the responses to the question 'Most people who are important to me think that I should eat a healthy diet' (rated as 'agree strongly' = -3 to 'disagree strongly' = 3). *Perceived need* (PN) to eat a healthier diet, is a component that previous work has highlighted as important, was measured by the question: 'To what extent do you feel that you need to eat a healthier diet?' (rated as 'extremely great extent' to 'not at all') (Paisley 1994). *Perceived behavioural control* (PC) was measured by the question 'How much control do you have over whether you eat a healthy diet?' (rated as no control at all to total control). *Expectation* (E) was measured by the question "How likely is it that in the next week you will eat a healthy diet?' (rated as 'extremely unlikely' to 'extremely likely').

Results

Representativeness of the mothers

Compared to the Scottish sample of the 1991 Census (General Register Office for Scotland 1993a), the Glasgow mothers in the present study were ideally matched. The exact same proportion (45%) of the study group and the general population had an one child family (45%). The sample were fairly representative of lone parents. Over one in ten of the mothers in the present study were lone parents (12.6%) which was lower than the national average (16%) in Scotland. However, owner-occupiers were hugely over-represented in the present study (84% compared to 52% in the general population (**Table 4.3**).

Income

Table 4.4 shows the distribution of the sample across the pre-defined income groups (unequivalised). When this variable and the other derived income variables were compared, all correlated strongly ($p<0.001$) which is not unexpected as they are all measuring aspects of the same concept. It was noteworthy that personal and partner's (where relevant) incomes were highly associated (**Table 4.5**). The classification of each individual across the six income variables is described in **Table 4.6** and equivalence is shown in **Table 4.7.** The majority (93%) of the individuals were

classified by the two income variables within one of the categories (very low, low, medium, high and very high) while the reminder (7%) were extreme outliers.

Healthy eating practices

Differences in frequency of food consumptions between the income measures were unspectucular. Higher household income quintiles were associated with lower intakes of white bread (p=0.0418), biscuits (p=0.0009) and higher intakes of high fibre breakfast cereals (p=0.0319), chicken (p=0.04), rice (p=0.0282) and pasta (p=0.045). Being classified in the higher quintiles of personal income was associated with reported higher intakes of brown bread (p=0.0069), pasta (0.0495) semi-skimmed milk (p 0.01) and lower intakes of biscuits (0.0489). However, higher variety of reported foods from the frequency list was consistently strongly related to the mid to higher income quintiles, regardless of the measure used (**Table 4.8**). There was some indication that an inverted V shape relationship between variety and income might be apparent. Fat scores were not found to be related to income although carbohydrate scores were positively associated with household income (p=0.0032) and personal income (p=0.0154). Eating out and cooking for others were increasingly reported as barriers by lower incomes. Reporting a lower personal income was related to more reporting of 'eating out at friends home' and 'cooking for partner' as barriers (p–0.0161, p=0.0244). In a similar way, partner's income was related to 'eating out at a friends home and eating out of boredom (p=0.0148, 0.0284) and a higher household income was related to 'cooking for children' being reported by a lower proportion as a barrier to healthy eating (p=0.0328). All these relationships were statistically weak and it is possible that they are spurious findings. The data suggested that income-food expenditure relationship was a positive linear gradient. This was true for household income and personal income but partner's income was not found to be significantly associated with food expenditure (**Table 4.9**). Car ownership was lower in the lowest quintiles of household and personal income (57.1%) compared to total ownership in the highest quintile (p<0.001). Partner's income did not significantly relate to car ownership. Regression analysis showed that cognitive attitudes were the most important predictor of expectations of eating a healthy diet. The model that

included personal income rather than a measure of household or partner's income explained most strongly the variance in expectation (**Table 4.10** shows results).

Discussion

There was very little difference in the impact of different household income measures on nutrition outcome indicators although in most cases partner's income was not a significant predictor although highly correlated with the other income measures. A variety-income relationship was robust, irrespective of income measure used. The differences between the mean variety scores by quintiles suggested that there be a threshold effect of income on variety that needs further investigation. In contrast, the data of the present study suggested that the income-food expenditure relationship was linear.

No differences were found for indicators of fat intake when estimated using a modified version of the Health Education Board for Scotland healthy eating quiz (HEBS 1995). The indicator of carbohydrate intake was inversely related to household income. Higher levels of consumption of starchy foods such as pasta, rice and breakfast cereals were associated with household income. The observation that socio-economic differences were not observed in the indicator of fat intake was unexpected. Earlier studies in the UK (Bolton-Smith *et al* 1991a, Smith and Baghurst 1992, Lloyd *et al* 1993) have reported them. There can be some methodological reasons for the socio-economic differences in fat intake not being observed. Possible sources of error include the following: conversion of the food frequency data into the HEBS modified healthy eating quiz and selection bias. The conversion of dietary data into the fat intake index (question A1-6 on the quiz) was one phase, where existing differences in intake of high fat foods can be levelled off. One question A2 was modified from the original classification. The modified question remained a qualitative question and it is unlikely to have contributed to the unexpected results. In recent years, the uptake of skimmed and semi-skimmed milk and of low fat spread instead of butter and margarine has increased. In the present survey, 68.5% of parents reported usually consuming skimmed or semi-skimmed milk and 40% reported using reduced fat spread.

Therefore it may be argued that beneficial dietary change may be in progress for fat consumption. It is therefore likely that the quantitative questions concerning intake of high fat foods are open to error. Questions concerning the intake of chips and meat products fail to account for differences in fat intake derived from fat used in cooking.

In this study, selection bias could have operated on two levels. Primarily due to the recruitment methods of approaching parents who were presenting a child for immunisation. There are class differences in immunisation with parents from a higher class position more likely to immunise their children (Smith and Jacobson 1988). **Table 4.3** clearly indicates that there was indeed a high proportion of advantaged parents in the group using housing tenure as a proxy measure for class position.

Secondly, the return rate from the subjects approached by the health visitor was 36% that could have caused selection bias. Those who participated in the study may be different to those who failed to return questionnaire. Possible reasons for failure to return questionnaire may include lack of time, lack of interest in food and nutrition and or poor literacy to complete questions. Due to the nature of the recruitment for the study, the investigator was not involved in the data collection process. While it is known that questionnaires were returned from all the four sector of Greater Glasgow, it can not be guaranteed that all health visitors were motivated to distribute their allocated questionnaires systematically or even at all. This type of selection bias which may have contributed to a greater similarity between the subjects in the survey. Consequently part of the income differences in food and macronutrient intake may have remained unobserved. If the reasons for not participating in the survey varied according to socio-economic status, the main results of the present study could have been influenced by the selection bias. However, income differences were found for reported variety of food. These results can be regarded as reliable and the observed differences are likely to be more apparent in the whole population.

Conclusion

The results of the present study suggest that a robust relationship is apparent between variety of food consumed and indicators of income. Different subtle calculations of measures of income have little notable impact on results and it was assumed that these measures could be used interchangeably in future studies as equivalence was good.

If you are currently unemployed, please answer questions 10 and 11. If you are currently employed, please go to question 12.

10 How much unemployment benefit do you receive £_____/fortnight
11 How much did you earn in your previous job after paying tax and National Insurance (now please go to question 13) £_____/month
12 How much do you earn per month after paying tax and National Insurance £___/month
13 How much income support do you receive £___/fortnight
14 If you are currently living with your partner, how much do they earn per month after paying tax and National Insurance £___month
15 How much money do you get from other people who live with you which is used for food, bills, rent etc. £____/week
16 How much money do you get from other people that you know, who do not live with you, which is used for food, bills, rent etc. £____/week
17 How much family credit, child benefit, one parent benefit or other benefit do you get £____fortnight
18 How much housing benefit plus council tax benefit do you get £____/fortnight

19 How much money does your household (this includes yourself and any other adult with whom you live and share all the bills) get per year from employment, benefits, other people and other sources, after paying tax and National Insurance (please tick appropriate box)?

- ☐ Less than £5,499
- ☐ Between £5,500 and £9,900
- ☐ Between £9,901 and £15,000
- ☐ Between £15,001 and £21,900
- ☐ Greater than £21,901

Table 4.1 Income questions used in the study

Income variable 1 (HI)

Definition: Gross household income per annum in five predefined bands
Coding: 1 = Less than £5,499, 2 = Between £5,500 and £9,900
3 = Between £9,901 and £15,000, 4 = Between £15,001 and £21,900 and
5 = Greater than £21,901

Income variable 2 (EHI)

Definition: Equivalised gross household income from five predefined bands
Procedure: Equivalised income required information on the number of adults and children living in the household with whom all bills, including food was shared. The McClements equivalence scales (McClements 1977) were used to calculate an equivalence score for each respondent's household composition. This would enable comparisons between different sized households. The midpoints of each category band were divided by this score to give an equivalised gross household income from predefined bands.

Income variable 3 (AHI)

Definition: Gross household income per annum as an absolute sum
Procedure: The sum of (question 10 x 26) + (question 12 x 12) + (question 13 x 26) + (question 14 x 12) + (question 15 x 52) + (question 16 x 52) + (question 17 x 26) + (question 18 x 26).

Income variable 4 (EAHI)

Definition: Equivalised gross household income per annum as an absolute sum
Procedure: Divide income variable 3 by McClements equivalence score calculated for each respondent based on their household composition.

Income variable 5 (PPI)

Definition: Personal gross income per annum
Procedure: The sum of (question 10 x 26) + (question 12 x 12) + (question 13 x 26) + (question 17 x 26) + (question 18 x 26).

Income variable 6 (PI)

Definition: Partner's gross income per annum (if living with a partner)
Procedure: Multiply question 14 response by 12.

Table 4.2 Derived variables from income questions

	Sample		1991 Census Scotland (GROS 1993a)
	n	%	%
Age			
18-29 years	22	17.2	18.1
30-44 years	90	70.3	21.4
45 and over	16	12.5	19.5
Living with partner	111	87.4	-
Lone parent	16	12.6	16.0
Tenure of household			
Owner occupied	107	83.6	52
Private/public landlord	21	16.4	46
Other inc. bed and breakfast	0	0	2
Number of children in family			
1	58	45.3	45.0
2	48	37.5	-
3	20	15.6	-
more than 3	2	1.6	-
Education			
No qualifications	20	14.0	-
Bas c qualifications at age of 16	22	15.4	-
Bas c qua ifications at age of 17/18	14	9.8	-
Technical/professional	44	30.8	-
Degree	43	30.1	-

Table 4.3: Basic characteristics of the mothers in the study group

	Sample		Definition
	n	%	
Household income bands			
1	17	13.4	< £5,499
2	12	9.4	£5,500-£9,900
3	28	22.0	£9,901-£15,000
4	38	29.9	£15,001-£21,900
5	32	25.2	>£21,901
Missing	1		

Table 4.4: Descriptives about basic household income variable

	HI	EHI	AHI	EAHI	PPI
EHI	0.8088				
AHI	0.7076	0.5585			
EAHI	0.6738	0.70708	0.8643		
PPI	0.7027	0.5715	0.9771	0.8625	
PI	0.6144	0.4308	0.8913	0.7373	0.8946

HI = Basic household income per annum (bands only)
EHI = Equivalised gross household income per annum (bands only)
AHI = Gross household income per annum (bands + additional questions)
EAHI = Equivalised gross household income per annum (bands + additional questions)
PPI = Personal gross income per annum
PI Partner's (if living together) gross income per annum

Table 4.5: Spearman correlation matrix between income variables (Significance p<0.001)

ID No	HI	EHI	AHI	EAHI	PPI	PI
1	Very high	Very high	Very high	Very high	Very high	High
2	Medium	Very low	Low	Very low	Low	Very low
3	High	High	Very high	Very high	Very high	Medium
4	High	High	High	High	High	Low
5	High	Medium	Very high	High	Very high	Very high
6	Very high	Medium	Very high	High	Very high	Very high
7	High	Medium	High	Medium	Very high	Very high
8	Medium	Medium	Very low	Low	Low	Very low
9	High	Medium	Very high	Very high	High	High
10	Medium	Very low	Very low	Very low	Very low	-
11	Very low	Very low	Very high	Very high	Very high	Very high
12	Very low	Very low	Low	Medium	Low	Low
13	Low	Low	Low	Medium	Low	Low
14	High	Medium	High	Medium	High	High
15	Medium	Low	Low	Low	Low	Low
16	Very high	Very high	High	High	High	High
17	High	Low	Very high	High	High	High
18	Medium	Low	Low	Low	Low	Very low
19	Medium	Very low	Medium	Low	Medium	Medium
20	Very high	High	Medium	Medium	Medium	-
21	High	Medium	Medium	Medium	High	High
23	Medium	Very low	Low	Very low	Low	Low
24	Very low	Very low	-	-	-	-
26	Very high	Medium	Very high	Medium	Very high	Very high
28	Very low	Very low	Medium	High	Medium	Medium
29	-	-	-	-	-	-
31	Very high	Very high	Medium	High	Medium	Medium
32	High	High	High		High	High
33	Very high	High	-	-	-	-
34	High	Medium	Medium	Medium	Medium	High
36	Medium	Medium	Medium	High	Medium	Medium
37	Medium	Medium	Medium	Medium	Medium	High
38	High	Medium	Low	Low	Low	Very low
39	Very high	Medium	Very high	Very high	Very high	Very high
40	Very low	Low	-	-	-	-
41	High	High	High	High	High	High
42	Very high	High	-	-	-	-
43	High	Medium	Medium	Medium	Medium	High
44	Very high	High	High	Medium	High	Low

ID No	HI	EHI	AHI	EAHI	PPI	PI
45	Medium	Low	Low	Low	Low	Low
46	Low	Very low	Very low	Very low	Very low	-
47	Medium	Very low	Medium	Low	Medium	Medium
48	Very high	High	High	High	High	High
49	Very high	High	Low	Low	Very low	
50	Very high	Very high	High	Very high	High	Medium
51	Very high	Very high	High	High	High	High
52	Very high	High	Medium	Medium	Medium	High
53	Very high	Very high	Very high	Very high	Very high	Very high
54	Medium	Low	-	-	-	-
55	High	Medium	Medium	Low	Medium	Low
56	High	High	High	High	High	High
58	Low	Low	Very low	Very low	Very low	Very low
59	High	Very high	Low	High	Low	Very low
60	High	Medium	High	Medium	High	High
61	Medium	Very low	Low	Low	Low	Low
62	Medium	Low	Very low	Very low	Very low	N/A
63	Very low	Very low	Very low	Very low	Very low	N/A
65	Low	Very low	Very low	Very low	Very low	N/A
67	Very low	Very low	Very low	Very low	Very low	N/A
68	Low	Very low	-	-	-	Very low
69	High	High	High	High	High	Low
70	High	Medium	Medium	Low	Medium	Low
71	High	High	High	High	High	Medium
72	High	Low	Low	Very low	Very low	-
73	Low	Low	Very low	Very low	Very low	-
74	High	Low	Medium	Low	Medium	Medium
75	High	Very high	High	Very high	High	Medium
76	Medium	Medium	Low	High	Low	Low
77	Very low	Low	Very low	Very low	Very low	-
78	Very low	Very low	Low	Very low	Low	Very low
79	Medium	Medium	High	High	Low	Low
80	Low	Medium	Very low	Medium	Low	Very low
81	Medium	Low	Medium	Low	Medium	Low
82	Very high	Very high	Very high	Very high	Very high	High
83	Very high	High	Very high	Very high	Very high	Very high
84	Medium	Medium	Medium	Medium	Medium	Low
85	High	High	Low	Medium	Medium	Very low
87	Medium	Low	Medium	Low	Medium	Very low

ID No	HI	EHI	AHI	EAHI	PPI	PI
88	Very low	Low	-	-	-	-
89	Low	Very low	Very low	Very low	Very low	-
90	Low	Very low	-	-	-	Very low
91	Low	Very low	Very low	Low	Low	Very low
92	Very high	High	Very high	Very high	Very high	High
93	Very high	Very high	Very high	Very high	Very high	High
94	Very high	High	Medium	Medium	Medium	Medium
95	Medium	Low	Very low	Very low	Very low	N/A
96	High	High	Low	Low	Low	Low
97	High	High	Very high	Very high	High	High
99	High	High	Low	Medium	Low	Very low
100	High	High	Low	High	Low	-
101	High	High	High	High	High	High
102	Very low	Low	Very low	Very low	Very low	-
103	High	High	High	Very high	High	Very high
104	Very low	Very low	Very low	Very low	Very low	-
105	Very low	Low	-	-	-	-
106	Very high	High	-	-	-	-
107	High	Medium	High	Medium	High	Low
108	Low	Very low	Very low	Very low	Very low	Very low
109	Medium	Low	Medium	Low	Medium	Low
110	Very high	High	Very high	High	Very high	Medium
111	Very low	Very low	-	-	-	-
112	Medium	Very low	Very low	Very low	Very low	-
113	Very high	High	Very high	Very high	Very high	High
114	Very low	Low	-	-	-	-
115	Very low	Very low	Very low	Very low	Very low	-
116	High	Medium	Medium	Medium	Medium	Medium
117	High	High	Low	Low	Low	-
118	High	High	Very high	High	Very high	High
119	Medium	Medium	Low	Low	Low	-
120	Medium	Low	Medium	Low	Medium	Medium
121	Very high	Very high	Very high	Very high	Very high	Very high
122	High	High	High	High	Very high	Very high
123	Very high	High	Very high	High	Very high	High
124	Low	Very low	Low	Low	Low	Low
125	Medium	Low	High	Medium	High	Medium
126	Very high	Very high	Very high	Very high	Very high	High
127	High	High	-	-	-	-

ID No	HI	EHI	AHI	EAHI	PPI	PI
128	High	High	Medium	High	Medium	Medium
132	Medium	Low	Medium	Medium	Medium	Medium
133	Very high	Very high	High	Very high	High	Low
134	High	Medium	Low	Low	Low	Very low
135	Medium	Medium	Very low	Low	Very low	Very low
136	High	Low	High	Medium	High	High
137	High	High	Medium	Medium	Medium	Medium
140	Medium	Low	Low	Low	Low	Low
141	High	High	High	High	High	High
142	Very low	Very low	Very low	Very low	Very low	-

HI = Basic household income per annum (bands only)
EHI = Equivalised gross household income per annum (bands only)
AHI = Gross household income per annum (bands + additional questions)
EAHI = Equivalised gross household income per annum (bands + additional questions)
PPI = Personal gross income per annum
PI – Partner's (if living together) gross income per annum
Quintile 1 = very low, 2 = low, 3 = medium, 4 = high and 5 = very high

Table 4.6: Classification of income variables (as quintiles)

EAHI	EHI (% of cases in same category)	
Very low	14/21	66.7%
Low	9/24	38%
Medium	12/24	50%
High	14/26 (13 missing)	54%
Very high	9/18	50%

EHI = Equivalised gross household income per annum (bands only)
EAHI = Equivalised gross household income per annum (bands + additional questions)

Table 4.7: Equivalence between the two measures of household income (adjusted using McClements method 1977).

	Mean (standard deviation) food variety across income quintiles					
	Lowest quintile	2	3	4	Highest quintile	P value
EHI	20.0 (4.0)	22.8 (5.1)	22.2 (4.9)	24.1 (4.7)	22.2 (4.2)	0.0004
AHI	18.8 (5.0)	24.4 (3.7)	23.5 (4.3)	23.4 (4.9)	22.8 (4.5)	0.022
EAHI	19.5 (4.7)	22.9 (4.7)	24.3 (4.4)	24.8 (4.7)	21.3 (4.0)	0.0006
PPI	19.2 (4.6)	22.3 (5.1)	23.9 (4.0)	23.4 (3.7)	23.1 (5.1)	0.0005
PI	21.9 (5.7)	23.3 (4.1)	23.9 (4.0)	23.9 (3.1)	22.0 (5.7)	0.005

EHI = Equivalised gross household income per annum (bands only)
AHI = Gross household income per annum (bands + additional questions)
EAHI = Equivalised gross household income per annum (bands + additional questions)
PPI = Personal gross income per annum
PI Partner's (if living together) gross income per annum
Quintile 1 = very low, 2 = low, 3 = medium, 4 = high and 5 = very high

Table 4.8: Differences in reported food variety by different income variables in quintiles.

	Mean (standard deviation) food expenditure across income quintiles					
	Lowest quintile	2	3	4	Highest quintile	P value
Total food costs						
EAHI	47.42 (16.65)	44.77 (20.49)	57.64 (21.92)	52.85 (19.82)	87.99 (38.45)	0.0001
PPI	51.72 (20.19)	53.92 (36.08)	53.00 (11.82)	57.36 (37.66)	75.28 (24.81)	0.034
Food costs at supermarkets						
EAHI	32.55 (9.52)	35.04 (11.31)	43.48 (17.66)	44.93 (16.48)	62.01 (23.11)	0.0001
PPI	35.89 (14.97)	45.16 (20.87)	37.63 (9.58)	44.23 (21.74)	55.69 (20.16)	0.002

EAHI = Equivalised gross household income per annum (bands + additional questions)
PPI = Personal gross income per annum
Quintile 1 = very low, 2 = low, 3 = medium, 4 = high and 5 = very high

Table 4.9: Differences in reported food expenditure by household and personal income.

	Final Beta	Sig	Final Beta	Sig
Affective Attitude	0.17	0.32	0.07	0.67
Cognitive attitude	0.33	0.024	0.48	0.004
Subjective Norm	0.07	0.61	-0.14	0.92
Perceived Control	0.30	0.045	0.07	0.69
Perceived Difficulty	0.14	0.34	0.24	0.18
Perceived Need	-0.14	0.39	-0.23	0.14
Past change	-0.28	0.039	-0.23	0.11
Income	Not entered		EAHI:-0.06	0.67
Multiple R	0.65		0.72	
R Square	0.42		0.52	
F	3.75		4.01	
Sig F	0.0038		0.0024	
	Final Beta	Sig	Final Beta	Sig
Affective Attitude	0.03	0.86	0.06	0.81
Cognitive attitude	0.44	0.05	0.30	0.15
Subjective Norm	-0.04	0.77	-0.13	0.56
Perceived Control	0.04	0.79	-0.05	0.83
Perceived Difficulty	0.27	0.12	0.32	0.16
Perceived Need	-0.24	0.13	-0.20	0.38
Past change	-0.22	0.13	-0.16	0.35
Income	PPI:-0.07	0.61	PI:-0.02	0.88
Multiple R	0.72		0.67	
R Square	0.52		0.45	
F	4.04		2.20	
Sig F	0.0024		0.07	

EAHI = Equivalised gross household income per annum (bands + additional questions)
PPI = Personal gross income per annum
PI Partner's (if living together) gross income per annum

Table 4.10. Results from multiple linear regression of attitude variables on expectation of eating a healthier diet

Chapter Five - A case control study of unemployment and its implications for the adoption and maintenance of healthy eating

Introduction

The physical and psychological strain of unemployment has been described in depth in a volume of British Medical Journal publications (Smith 1987). Although, it has often been the psychosocial effects of unemployment, rather than the dietary consequences which have been specifically documented. Identified effects of unemployment include demoralisation (Eisenberg and Lazarfield 1934), low self esteem (Warr and Jackson 1983), social isolation (McKenna and Payne 1985), cognitive difficulties (Fryer and Warr 1984), low levels of activity (Kilpatrick and Trew 1985), anxiety (Jackson, Stafford, Banks and Warr 1983) and depression (Feather 1982).

Shortage of money is repeatedly reported in psychological studies by unemployed respondents as their greatest source of concern (Warr 1987). Activities involving expense are known to decline with unemployment (Warr and Payne 1983) and buying healthy foods may be one such item that is reduced (National Children's Home 1991). As there is considerable individual variation in the impact of unemployment according to a wide range of moderating variables (Warr 1987) it is not unexpected that previous research of studies have suggested that families suffer material deprivation some do not seem to suffer the psycho-social consequences associated with unemployment (Fryer and Payne 1984). Furthermore, due to the nature of unemployment, there may be a time lag between job loss and changes in expenditure. While unemployment does not cause physical deterioration in all people, it is commonly assumed that well being suffers in the experience of unemployment.

For most unemployed people, or rather people living in relative deprivation, life circumstances include curtailed activities and daily inconveniences. Unemployment may affect diet in one of three ways (Roos, Quandt & DeWalt 1991). It may be detrimental, causing financial problems and/or changes in social contacts and daily routines, for example causing anxiety about wasting unfamiliar foods. It may result in

the unemployed having more time for purchasing and preparing food and thus, have a better opportunity to improve the quality of their diet by looking for bargains. Finally, the unemployed may try to maintain their former lifestyle and follow a diet similar to the one they had before they lost their job (Prättälä *et al* 1997). Empirical findings on the impact of unemployment on food behaviour are inconclusive: from the health point of view, unemployment seems to be associated with both positive and negative traits in diet (Roos *et al* 1991, Kontula and Koskela 1993).

The adjustment to living on a lower family income is likely to place a great burden on domestic life and health maintenance may be overlooked in the plan to make ends meet. Diet is one fundamental aspect of health maintenance. In the UK many more males than females are officially registered as unemployed. The focus of the majority of unemployment research since the 1930s has been almost exclusively on males. The vast majority of samples in this research are composed of white lower socio-economic/occupational status men (Warr, Jackson and Banks 1988).

It can be problematic defining women who are "unemployed" in terms of actively seeking work. Unemployment can be masked by categories such as "looking after the home and family" . A minority of studies have concentrated upon unemployed female heads of households (Warr and Parry 1982), on women who do not define themselves as unemployed or actively seeking paid jobs but how would like them if offered (Callender 1987) or upon "wives of unemployed men and the mothers of such men's children" (Kelvin and Jarett 1985). However, these studies are remarkable for their scarcity as well as their content. In the present study the parents defined themselves as 'unemployed' when they were asked to state a previous job title. If 'looking after the family', 'housewife' etc. was written, these people were not included in the present analysis.

Many studies on unemployment and health have collected interview data and food diaries from a social science perspective without the use of a control group commonly used in applied nutrition research (Dobson *et al* 1994) and the heterogeneity of the

social composition of 'the unemployed' had made it impossible to make generalisable findings (Prättälä *et al* 1997). Very few studies can establish causality even with a control group but one can establish associations. The present study was a post-hoc extension to the parents and young children's study. The present study was original in two respects. Firstly, much unemployment research has focused chiefly on the male as an individual subject whose implications have been investigated in isolation. This study redresses that as the focus will be mainly on women and in particular women and men who are responsible for the upbringing of children. Secondly, the use of the case-control approach to a study of relative deprivation and diet in the Greater Glasgow area is unique. Such an approach allows for a statistically rigorous search for associations. The study aimed to test for associations between employment status and 'healthy' eating practices.

Matching of cases and controls

The stringent five variables matched pairs case control research design has been discussed in Chapter Three. Matching attempts to make the cases comparable with controls on key characteristics. It was decided that one-to-one pair matching would give the highest degree of control available. The homogeneity of the parents' socio-demographic data allowed this form of matching possible. In this research, one-to-one pair matching was used with cases and controls identical in current household income, age, partnership status, gender and number of children living in household (shown in **Table 5.1**).

Results

The matched pairs in this sample were predominantly women living with a partner. The parents were living on average or low incomes and most had a small family of one or two children **(Table 5.2).** Compared to their matched employed parents, unemployed parents were less likely to know about national dietary guidelines to maintain current levels of polyunsaturated fat and to increase fibre in diets. **(Table 5.3).** But these differences in reported knowledge did not lead to consistent variation in food intake by employment status. The data from this study suggested that the

adoption of healthy eating practices were superficially related to employment status in some cases (fresh fruit, white bread and breakfast cereals) and stronger in the case of fresh vegetables (**Table 5.4**). The low adoption of these healthy eating practices by the whole study group, regardless of "status" may account for this. When asked about 'barriers to healthy eating' (my terms), the associations between employment status and 'barriers' were more evident (**Table 5.5**). The data suggested that there were three main barriers for those describing themselves as unemployed: cooking for children and yourself, cooking for partner and yourself and cooking for friends.

Discussion

The fundamental basis of the research design of the present study was the 'matching' of parents for, among other factors, household income. From the results of the present study, it did appear that unemployed parents have a poorer theoretical knowledge of the national recommendations concerning polyunsaturated fat and dietary fibre. With the research design controlling for income, very few dietary differences were found. Consumption of tea and breakfast cereal other than high fibre varieties were superficially associated with employment status ($p=0.03$, $p=0.04$ respectively).

Competing hypotheses for the relationship between unemployment and food habits arise from different research perspectives. From a a qualitative study of 48 case studies of families in receipt of Income Support in England, it was reported that economic deprivation imposes a common discipline of poverty on people's every day life including their diet. The authors conclude that such families have no choice other than to adopt cheaper imitations of conventional eating patterns (Dobson *et al* 1994). Differences in food habits by employment status have been found to be small and inconsistent. In a cross-sectional survey of 3644 25-64 year old Finns, the authors propose that dietary factors are more strongly explained by educational level rather than with employment status (Prättälä *et al* 1997). All these studies including the present study can be criticised for the omission of data concerning length of unemployment. The simplistic broad groupings of 'the employed' and 'the

unemployed' of this study and the present study may fail to capture the influence of unemployment on dietary change. It can be tentatively suggested that being unemployed constrains healthy eating, controlling for income.

Unemployment has been studied as a predominantly male experience (McGhee and Fryer 1989). Such a characterisation of unemployment may induce possible gender bias in the explanation affective responses to unemployment such as boredom. There have been uncorroborated anecdotal explanations of unhealthy lifestyles adapted by the unemployed as being due to boredom but the present study found no evidence to support this. Little research has focused on female responses to healthier eating during unemployment. In the present study, it was assumed that females tend to have different primary responsibility than men, during such a context. Based on previous research studies of women, work and families (Graham 1984), women were assumed to be responsible for budget planning, dealing with the challenges of day to day living in relative deprivation and all round coping. This assumption may help to explain why the perceived barriers to the adoption of healthy eating "cooking for children and yourself" and "cooking for partner and yourself" are strongly associated with employment status. During a period of deprivation, compared to previous socio-economic situation, the context of family meals may be where negotiation for dietary changes is more difficult. Often the majority of resources are spent on men and children in the household (Murcott 1983, Charles and Kerr 1988, Dobson *et al* 1994). Partners and children may demand the familiarity of favourite foods rather than radical changes which creates the risk of unaffordable waste and possible arguments over food. This has been shown in studies of low income families (Health Education Authority 1989).

In the present study, selection bias could have operated in two ways. At the primary recruitment phase, the health visitors may have been biased in their selection of parents to allocate the survey questionnaire to. The health visitors selected parents who were unemployed, employed and looking after the home and family. It was unknown to the recruiters that unemployment status was of particular interest. Therefore, it is unlikely

that the health visitors showed bias in their selection of parents relevant to this study. Secondly, investigator selection bias could pose a problem. Aware of this problem, each the matching variable details of each subject were printed on 143 cards with an identification number. Selection into matched pairs by the investigator occurred systematically and without reference to any data other than cards. No matching was altered once the pairs were selected and analyses began. This process aimed to deal with the problem of inadvertent underrepresentation or misrepresentation occurring due to the selection process for both cases and controls. The respondents in this study were selected by health visitors in Glasgow only. The findings of the present study are limited by the locality and setting of the recruitment. There may be some value in the attempt to disentangle the synthesised effects of employment and income on healthy eating in terms of perceived barriers to adoption of a healthy diet.

Conclusion

The data suggests that unemployed parents perceived (as indicated by reported barriers) 'social' eating as an obstacle to eating a healthy diet when compared to employed parents on an equivalent income. With increased flexibility of the labour market affecting all social classes, it may be assumed that unemployment is less stigmatised by 'poverty'. However, this study shows the influence of unemployment per se: it is the "status" of the respondent (the case) that appears to have an influence on the adoption and maintenance of healthier eating rather than household income. This study is limited by its methodology as it did not map individuals over time in employment and unemployment so these findings may be mentioned as presenting a story only at a given time in a group of people sampled in a quasi-systematic manner.

Table 5.1: Description of the matched pairs used in the study

1	Em.	54	F	partner in home	less than £5,499	1 child
	Unem	51	F	partner in home	less than £5,499	1 child
2	Em.	62	F	partner in home	less than £5,499	1 child
	Unem	63	F	partner in home	less than £5,499	1 child
3	Em.	28	M	partner in home	£5,500 - £9,900	1 child
	Unem	22	M	partner in home	£5,500 - £9,900	1 child
4	Em.	38	F	partner in home	£5,500 - £9,900	2 children
	Unem	31	F	partner in home	£5,500 - £9,900	2 children
5	Em.	36	F	partner in home	£9,901 - £15,000	2 children
	Unem	35	F	partner in home	£9,901 - £15,000	2 children
6	Em.	25	F	partner in home	£5,500 - £9,900	1 child
	Unem	23	F	partner in home	£5,500 - £9,900	1 child
7	Em.	35	F	partner in home	£5,500 - £9,900	2 children
	Unem	29	F	partner in home	£5,500 - £9,900	2 children
8	Em.	35	F	lone adult	£5,500 - £9,900	2 children
	Unem	29	F	lone adult	£5,500 - £9,900	2 children
9	Em.	46	F	partner in home	£9,901 - £15,000	1 child
	Unem	45	F	partner in home	£9,901 - £15,000	1 child
10	Em.	33	F	partner in home	£9,901 - £15,000	2 children
	Unem	32	F	partner in home	£9,901 - £15,000	2 children
11	Em.	40	F	partner in home	£9,901 - £15,000	2 children
	Unem	39	F	partner in home	£9,901 - £15,000	2 children
12	Em.	39	F	partner in home	£9,901 - £15,000	2 children
	Unem	33	F	partner in home	£9,901 - £15,000	2 children
13	Em.	31	F	partner in home	£5,500 - £9,900	2 children
	Unem	31	F	partner in home	£5,500 - £9,900	2 children
14	Em.	44	F	partner in home	£9,901 - £15,000	3 children
	Unem	37	F	partner in home	£9,901 - £15,000	3 children
15	Em.	40	F	partner in home	£9,901 - £15,000	2 children
	Unem	41	F	partner in home	£9,901 - £15,000	2 children

16	Em.	40	F	partner in home	£9,901 - £15,000	2 children
	Unem	40	F	partner in home	£9,901 - £15,000	2 children
17	Em.	41	F	partner in home	£15,001- £21,900	3 children
	Unem	36	F	partner in home	£15,001- £21,900	3 children
18	Em.	32	F	partner in home	£9,901 - £15,000	1 child
	Unem	31	F	partner in home	£9,901 - £15,000	1 child
19	Em.	36	F	partner in home	£15,001- £21,900	2 children
	Unem	37	F	partner in home	£15,001- £21,900	2 children
20	Em.	32	M	partner in home	less than £5,499	2 children
	Unem	35	M	partner in home	less than £5,499	2 children
21	Em.	41	F	partner in home	£15,001- £21,900	3 children
	Unem	42	F	partner in home	£15,001- £21,900	3 children
22	Em.	36	F	partner in home	£15,001- £21,900	1 child
	Unem	35	F	partner in home	£15,001- £21,900	1 child
23	Em.	32	F	partner in home	£15,001- £21,900	2 children
	Unem	33	F	partner in home	£15,001- £21,900	2 children
24	Em.	33	F	partner in home	£15,001- £21,900	1 child
	Unem	27	F	partner in home	£15,001- £21,900	1 child
25	Em.	29	F	partner in home	£15,001- £21,900	2 children
	Unem	31	F	partner in home	£15,001- £21,900	2 children
26	Em.	42	F	partner in home	£15,001- £21,900	2 children
	Unem	45	F	partner in home	£15,001- £21,900	2 children
27	Em.	39	F	partner in home	£9,901 - £15,000	1 child
	Unem	36	F	partner in home	£9,901 - £15,000	1 child
28	Em.	32	F	partner in home	less than £5,499	1 child
	Unem	32	F	partner in home	less than £5,499	1 child
29	Em.	28	M	partner in home	£5,500 - £9,900	1 child
	Unem	29	M	partner in home	£5,500 - £9,900	1 child
30	Em.	30	F	partner in home	£15,001- £21,900	1 child
	Unem	29	F	partner in home	£15,001- £21,900	1 child
31	Em.	35	F	partner in home	£15,001- £21,900	1 child
	Unem	37	F	partner in home	£15,001- £21,900	1 child

32	Em.	33	F	partner in home	£15,001- £21,900	2 children
	Unem	33	F	partner in home	£15,001- £21,900	2 children
33	Em.	42	F	partner in home	£15,001- £21,900	3 children
	Unem	42	F	partner in home	£15,001- £21,900	3 children
34	Em.	43	F	partner in home	£15,001- £21,900	1 child
	Unem	42	F	partner in home	£15,001- £21,900	1 child
35	Em.	37	F	partner in home	>£21,901	3 children
	Unem	37	F	partner in home	>£21,901	3 children
36	Em.	35	F	partner in home	>£21,901	2 children
	Unem	34	F	partner in home	>£21,901	2 children
37	Em.	26	F	partner in home	>£21,901	2 children
	Unem	29	F	partner in home	>£21,901	2 children
38	Em.	31	F	partner in home	£9,901 - £15,000	1 child
	Unem	35	F	partner in home	£9,901 - £15,000	1 child
39	Em.	38	F	partner in home	>£21,901	2 children
	Unem	33	F	partner in home	>£21,901	2 children
40	Em.	37	M	partner in home	>£21,901	1 child
	Unem	37	M	partner in home	>£21,901	1 child
41	Em.	37	F	partner in home	£15,001- £21,900	3 children
	Unem	35	F	partner in home	£15,001- £21,900	4 children
42	Em.	28	F	partner in home	>£21,901	1 child
	Unem	31	F	partner in home	>£21,901	1 child
43	Em.	44	F	partner in home	>£21,901	1 child
	Unem	45	F	partner in home	>£21,901	1 child
44	Em.	34	F	partner in home	>£21,901	3 children
	Unem	34	F	partner in home	>£21,901	3 children
45	Em.	31	F	partner in home	£15,001- £21,900	3 children
	Unem	33	F	partner in home	£15,001- £21,900	3 children
46	Em.	32	F	partner in home	£15,001- £21,900	1 child
	Unem	37	F	partner in home	£15,001- £21,900	1 child
47	Em.	40	F	partner in home	£5,500 - £9,900	2 children
	Unem	33	F	partner in home	£5,500 - £9,900	2 children

48	Em.	39	F	partner in home	>£21,901	1 child
	Unem	38	F	partner in home	>£21,901	1 child
49	Em.	52	F	partner in home	£5,500 - £9,900	1 child
	Unem	57	F	partner in home	£5,500 - £9,900	1 child
50	Em.	25	F	lone adult	less than £5,499	1 child
	Unem	33	F	lone adult	less than £5,499	1 child
51	Em.	45	F	partner in home	£9,901 - £15,000	3 children
	Unem	30	F	partner in home	£9,901 - £15,000	3 children
52	Em.	28	F	lone adult	less than £5,499	2 children
	Unem	27	F	lone adult	less than £5,499	2 children
53	Em.	34	F	lone adult	less than £5,499	1 child
	Unem	34	F	lone adult	less than £5,499	1 child

	n pairs
Sex: Male	4
Female	49
Partnership Status: Living with partner	49
Lone parent	4
Household income: under £5,499	7
£5,500-£9,900	9
£9,901-£15,000	12
£15,001-£21,900	16
£21,901 and over	9
Number of children: 1	23
2	21
3 or more	9
Total n pairs*	53

Table 5.2 Basic characteristics of the matched pairs

	Answered incorrectly by both members of pair	Answered incorrectly by case only	Answered incorrectly by control only	Answered correctly by both members of pair	Odds ratio	95% CI
Increasing poly-unsaturated fat in diet	13	15	7	18	2.1	1.8, 2.6,
Increasing fibre in diet	0	4	2	47	2	0.4, 11
Increasing starchy carbohydrates in diet	20	14	11	8	1.3	0.6, 2.8,

Table 5.3: To show matched pairs case control analysis to calculate odds ratio for dietary recommendations questions where unemployed parents are cases and employed parents are controls

	Eating less by both members of pair	Eating less by case only	Eating less by control only	Consumption met by both members of pair	Odds ratio	95% CI
Fresh vegetables (240g/day)[2]	3	18	9	23	2	0.9, 4.5
Fresh fruit (160g/day)[2]	2	10	6	35	1.7	0.6, 4.6
White bread (84g/day)[1]	16	15	12	10	1.3	0.6, 2.7,
Breakfast cereal (34g/day)[1]	19	13	10	11	1.3	0.6, 3.0,
All bread (153.7g/day)[1]	16	12	12	13	1	
Wholemeal bread (69.7g/day)[1]	8	17	17	11	1	
Fruits and vegetables (400g/day)[1]	47	3	3	0	1	
Rice (50g/day)[3]	0	6	6	41	1	
Pasta (65g/day)[3]	1	5	5	42	1	
Potatoes (191g/day)[1]	53	0	0	0	0	

[1] Recommendations for the Scottish Diet (Scottish Office, 1996)

[2] Fruits and vegetables target (WHO, 1990) based on two portions of fruit and four portions of vegetables per day. The World Health Organisation does not recommend eating fresh fruits and vegetables only.

[3] Rice and pasta daily consumption based on two average servings per week

Table 5.4: To show matched pairs case control analysis to calculate odds ratio for daily food intake targets where unemployed parents are cases and employed parents are controls

	Reported barrier by both members of pair	Reported barrier by case only	Reported barrier by control only	Not reported as barrier by both members of pair	Odds ratio	95% CI
Cooking for children	10	17	2	24	8.5	2.0, 3.7
Cooking for partner	3	15	4	31	3.8	1.3, 11.2
Cooking for friends	10	17	7	19	2.4	0.8, 7.3
Eating out	11	15	10	17	1.5	0.7, 3.4
Eating out of boredom	27	1	1	4	1	

Table 5.5: To show matched pairs case control analysis to calculate odds ratio for barriers towards healthy eating where unemployed parents are cases and employed parents are controls

Chapter Six – The effects of a change in income on food choice

Introduction

The relationship between income change and food choice in the UK general population has not been extensively studied in the past. One study of income change and food consumption (not food choice as defined below) by Ritson & Hutchins involved elegant statistical analysis of the National Food Survey data to investigate 'elastic' (food consumption rises as income rises) and 'inferior' goods (food consumption falls as income rises) (Ritson & Hutchins 1991). The authors reported that elastic foods include cheese, canned salmon, shellfish, beef, pork, chicken, salad vegetables, salad oils, frozen vegetables, fresh fruit, chocolate biscuits, brown and wholemeal bread, rice, coffee and ice cream. Canned meat, milk puddings and vegetables, sausages, herrings, margarine, lard, potatoes, dried pulses, tea, white bread and oatmeal products were found to be inferior foods within the representative sample of UK general population (Ritson and Hutchins 1991).

This chapter presents findings from the Income Change Study, funded by the Ministry of Agriculture, Fisheries and Food between 1994 and 1996. As the study is the first known investigation of the effects of income change on food choice, a broad approach was adopted. The study did not restrict itself to any one income band, social class, food group or macronutrient. Food choice was defined as the selection of foods made by individuals from the range of options available to them. Food choice within this framework includes attitudes to different types of food and patterns of purchasing as well as to frequency of food consumption.

This chapter will examine the effects of a change in income on food choice by comparing measures of food intake, expenditure and attitudes towards eating a healthier diet taken at the time of the income change and at six months later.

Aims and objectives of the study

The major objectives of this study were to assess the impact of a change in income on food choice and to identify the individual differences that might lead some people to change their food choice in healthy or unhealthy ways when they have undergone this socio-economic transition.

The first prospective study of the impact of income change on food choice was expected to break new ground and pose as many questions as it would answer. However, it is important to put the broad nature of this study in perspective, and not to exaggerate the study findings and their implications for the relationships between food, nutrition and health. Food choice is only one of the many aspects of life that would be affected by an income change. It was hypothesised that the impact of income change on food choice may be limited or extended by other factors such as social and tangible support, and possibly restricted to vulnerable individuals.

The relationship between changes in food choice and income change is complex, since at least three different hypothesised patterns of response may occur:

1. Changes in income and in food choice are separate so no particular association between the direction of income change (a rise or a fall) and the magnitudes of change in food choice required for statistical significance will be found.
2. Changes in food choice are stimulated by the reason for the income change (i.e starting a new job or job loss). If this is the case, changes in food choice occur not as direct consequence of the income change but indirectly as a result of entering or leaving a workplace. Some isolated individuals may experience little difference between work and home environments and this could possibly lead to no evident alteration in food choice.
3. Changes in food choice may only take place among people who are disturbed by the income change. The changes in food choice may serve as a comfort and distraction from daily hassles. Consequently, the more that people change their food choices, the more adapted and less upset they will become. A positive correlation between poor

psychological health and changes to food choice can be predicted under these circumstances.

The possibility that all three of these patterns might be relevant in different cases greatly complicates the following investigation.

Methods

Rationale

Assessment of the effect of income change on food choice can be approached in a number of ways. One possibility was to carry out a dietary survey in which exposure to a new workplace (business start-up) or job loss from a business closure was controlled by the fixed timing of the change of income. This type of study would allow measurements to be taken before the change in income had occurred (e.g at home after accepting job offer or at the workplace prior to closure). Setting up the study using this approach could have provided greater surveillance but would have required a longer lead in time for gaining access to volunteers. It would have been difficult to replicate such methods in Glasgow and Reading or in the future by other researchers. Although this approach has been used by researchers examining adaptation to a job loss and subsequent health outcomes (Iversen, Sabroe and Mogens 1989, Westin, Schlesselman & Korper 1989).

A second option was to ask people whether their food choice was affected by the change in income. This would require a semi-structured questionnaire about changes to food type, meal types, quantity, quality and variety of food. This approach could incorporate more in-depth interviewing where appropriate. This strategy is reliant on people being aware of the links between the income change (as distinct from the other simultaneous changes in life circumstances) and changes in food choice, and this may not always be the case.

A third method is to assess the impact of income change on food choice using objective tools with established validity and reliability to measure indicators of food

choice at two or more time points. This approach would have the advantage of being quicker, easier to replicate. For pragmatic reasons, the present study of income change and food choice used a combination of the second and third approach outlined above. A semi-structured questionnaire and interview schedule was designed with the opportunity for in-depth interviewing through prompts and probes. As I was experienced in qualitative interviewing this was restricted to the Glasgow sample only.

Volunteers

Adults resident in Glasgow and Reading areas were recruited through advertisements and features in local newspapers, cards and posters in employment agencies, job centres and large employers, and market research recruitment. The use of the predefined volunteer selection criteria, shown in **Table 6.1** attempted to minimise confounding variables. Volunteers had the opportunity to make contact either through a FREEPOST address or by telephone. The aim was to recruit at least 100 individuals in each income change group for the baseline interview with the recruitment lead in programme running up to a maximum of six months. The design of the study allows that only one member of the household had experienced the income change.

No upper or lower limit was set on actual household income at time of recruitment. All volunteers gave their written consent for the study to be conducted. The protocol was approved by the Greater Glasgow Community/Primary Care Local Research Ethics Committee and Institute of Food Research Reading, Ethics Committee. Respondents were interviewed on two occasions after the income change, the first interview within 8 weeks of the income change (time 1), the second at six months (time 2) (see **Figure 6.1**).

Data Collection

The methods of recruitment, selection criteria, piloting and research protocol were identical in Glasgow and Reading. All questionnaires were piloted for phrasing, comprehension and face validity. On recruitment to the study, volunteers were posted

a questionnaire (**Appendix 4**). Requested information included background socio-demographic information, income change circumstances, pre-income change measures of expenditure. Volunteers were asked to complete this questionnaire before the interview appointment.

The questionnaire was checked for completion and collected by a trained interviewer who then proceeded to administer a structured interview questionnaire (**Appendix 5**) requesting information on the frequency of consumption of key foods (a food frequency list), post-income change expenditure, recent changes in consumption of meal styles, recent changes in consumption of food types and recent changes in food selection. All recent changes were compared to a period of income stability six months previously. The interviews, lasting between one and three hours, took place in volunteers' own homes or in the offices of the research institution.

The interviewing methods described for the primary interview were repeated at time 2 with a semi-structured questionnaire measuring current (prospective) measures of income, changes to meal styles, changes to food types, habitual food intake (using a food frequency list), food preference scales and measures of attitudes to healthy eating (using the Theory of Planned Behaviour model) (Ajzen & Fishbein 1980). The questionnaire was similar in content to the tools presented in **Appendix 4** and **Appendix 5**.

Volunteers were given a £10 BOOTS gift voucher at the end of their primary interview and £20 BOOTS gift voucher at the end of the follow-up interview, plus any travel expenses incurred.

Measures

The following section details the questions used for data collection and derived variables for data analysis.

Household Income and equivalisation: Household income was defined as total household income comprising the sum of: personal earnings after tax, partner's

earnings, money from others in, and external to, the household; unemployment benefit, income support, family credit; child benefit and other state benefits. The present study used the equivalisation scales of McClements (McClements 1977) to allow comparisons of households of different compositions (number of adults and number of children). An overall equivalence value is calculated for each household by summing appropriate values for each household member. Equivalised household income is calculated by dividing household income by the overall equivalence value.

The McClements method (McClements 1977), used by the Department of Social Security (DSS), the Central Statistical Office (CSO) and the Institute of Fiscal Studies (IFS), is not ideal but it uses the best approximation. It is based on the assumption that a household of 5 adults will need a higher income than a single person living alone to enjoy a comparable standard of living. It would be clearly better to study the allocation of income within the household at much greater depth.

The household income reported at time 1 (up to eight weeks post-change) was also represented as proportion of the national average weekly income for 1995 (£298.43 Source: Central Statistics Office 1996).

Food Expenditure: Self-reported expenditure on food (grocery bill, takeaways, food consumed in cafés, restaurants and food bought for entertaining at home) was assessed as the amount currently spent per week and equivalised (McClements 1977). Information was also collected on reported post change expenditure and at follow-up.

Food Consumption: Habitual food intake of the volunteers was measured by a 33 item food frequency inventory based on a validated food frequency questionnaire which has been previously described in detail (chapter 4).

Changes in meal styles: To examine changes in consumption of meal styles between the two interviews, volunteers were asked a series of questions phrased 'do you feel that your increase/decrease in household income has altered how often you eat....?'

for the following eight meal styles (i) "home made foods and meals", (ii) "pre-cooked foods and meals", (iii) "luxury foods and meals", (iv) "healthy foods and meals", (v) "junk or fast meals", (vi) " in cafés or restaurants", (vii) "take-away foods and meals" and (viii) "cooking or baking for pleasure". No definitions of these foods or meal types were provided. For each of these questions the first response was a yes/no response indicating if any changes had occurred, followed by an open response asking for descriptions of those changes.

The second set of questions attempted to elicit the perceived extent of change by asking volunteers to rate the extent of change on a seven category scale ranging from 'extremely increased' to 'extremely decreased' to the following question "Overall have you increased or decreased your consumption of / the amount of / the number of times .. .? for the same eight meal styles.

Changes in food type: Changes in food type were assessed from responses to a series of questions phrased 'do you feel that your increase/decrease in household income has altered the .....' for the following six food types (i) "quantity of food you eat", (ii) "quality of food you eat", (iii) "the variety of foods and meals you eat" (iv) "the amount of fresh foods you eat" (v) "the amount of frozen foods you eat" and (vi) "the amount of canned or dried foods you eat". For each of these questions the first response was a yes/no response indicating if any changes had occurred, followed by an open response asking for descriptions of those changes.

A second set of questions was asked in the format of "Overall have you increased or decreased your consumption of / the amount of / the number of times ....? for the same six food types. Responses were gathered on a 7 category scale ranging from 'extremely increased' to 'extremely decreased'.

Measurement of Food Preferences: Current food preferences were assessed by a series of 31 questions (e.g. Do you currently like whole milk...?) with a corresponding scale rated from extremely dislike to extremely like. Food preferences were assessed

for **milk**, (whole milk; skimmed/semi-skimmed milk) **bread**, (brown/wholemeal; white) **spreading fats**, (butter; margarine; reduced-fat spreads;) **fruit**, (apples; other fresh fruit; fruit juice), **meat products**, (sausages; beefburgers; meat pies;) **meat**, (lean cuts of red meat; other cuts of red meat; chicken/turkey; bacon) **fish**, (fresh/frozen/tinned) **cheese**, (cheddar, speciality cheese) **vegetables**, (fresh vegetables, frozen vegetables; potatoes; chips) **rice**, **pasta** and **"snack foods"** (plain biscuits; chocolate biscuits; cakes; chocolate; crisps. This type of questionnaire has been used extensively in social psychology (Conner, Povey, Sparks, James & Shepherd 1998).

Psychological health: The Hospital Anxiety and Depression Scale (HAD) was used as an indicator of psychological health. The HAD scale has been found to be a reliable instrument for detecting states and severity of anxiety and depression in the setting of an outpatient clinic (Zigmond & Snaith 1983) and has been used in other contexts examining psychological response (Green, Platt, Eley & Green 1996).

Stability of food choice: The number of food choices, up to a maximum of 37 items, reported to have been modified by the respondents due to the income change were summed. All the items were not mutually exclusive. Defining food choice in its broadest sense, the items were 1) timing of meals, 2) frequency of meals, 3) length of preparation and cooking time for meals, 4) timing of snacks, 5) frequency of snacking 6) type of snacks 7) amount of cooking, 8) breakfast cereals, 9) bread, 10) spreading fats, 11) red meat, 12) poultry, 13) fish, 14) eggs, 15) cheese, 16) potatoes, 17) milk, 18) vegetables, 19) fruit, 20) puddings, 21) snack foods, 22) drinks, 23) home made meals, 24) cook for pleasure, 25) pre-cooked meals, 26) luxury meals, 27) portioned meals, 28) healthy meals, 29) fast food meals, 30) quantity of food, 31) quality of food, 32) variety of food, 33) fresh food, 34) frozen food, 35) canned food, 36) eating out at cafes and restaurants and 37) take-aways. Changes in food choices were summed for time 1 and at time 2.

Measurement of Attitudes towards a healthy diet: This section comprised 29 questions based on the components of The Theory of Planned Behaviour (TPB) (Ajzen & Fishbein 1980) The Fishbein and Ajzen model is a structured attitude model developed in social psychology which has been recently applied to a range of food choice problems (Anderson 1991, Paisley 1994). Within this model, the person's intention to perform a behaviour (healthy eating in this case) is determined by two components i) the individual's own attitude (i.e. whether the person subjectively rates healthy eating as good, beneficial etc.) and ii) perceived social pressure to behave in this way (the subjective norm). In turn the attitudinal component is predicted by behaviour and outcome evaluations (Ajzen 1988).

Attitudes to Healthy Eating (AH) were evaluated by two cognitive attitude items, two affective attitude items and one item on the difficulty of making changes for eating a healthier diet. Affective attitudes items were "Do you think that for you eating a healthy diet is.." ("extremely unpleasant" to "extremely pleasant") and "Do you think that for you eating a healthy diet is... ("extremely unenjoyable" to "extremely enjoyable"). Cognitive attitude items were "Do you think that for you eating a healthy diet is.." ("extremely harmful" to "extremely beneficial") and "Do you think that for you eating a healthy diet is.." ("extremely foolish" to "extremely wise"). Correlation between affective attitude and cognitive attitude at Time 1 was 0.44, $p < 0.000$ and at time 2 = 0.36, $p < 0.001$.

To measure *Perceived Difficulty* participants were asked "Do you think that for you eating a healthy diet is ... ?" ("extremely difficult" = -3 to "extremely easy" = 3).

Subjective Norm (SN) was assessed by the responses to the question 'Most people who are important to me think that I should eat a healthy diet' (rated as 'agree strongly' = -3 to 'disagree strongly' = 3).

Perceived need (PN) to eat a healthier diet, is a component that previous work has highlighted as important, was measured by the question: 'To what extent do you feel that you need to eat a healthier diet?' (rated as 'extremely great extent' to 'not at all') (Paisley 1994)

Perceived behavioural control (PC) was measured by the question 'How much control do you have over whether you eat a healthy diet?' (rated as no control at all to total control).

Expectation (E) was measured by the question "How likely is it that in the next week you will eat a healthy diet?' (rated as 'extremely unlikely' to 'extremely likely')

Belief evaluations were assessed by a series of *Behavioural Beliefs* (BB) statements as follows: (i) 'eating a healthy diet is good for my health'; ii) eating a healthy diet is good for my heart'; (iii) 'eating a healthy diet means that meals take a long time to prepare and cook'; (iv) 'eating a healthy diet means that meals do not taste very good'; (v) 'eating a healthy diet is expensive; (vi) 'eating a healthy diet means that you do not get very good value for money'; (vii) eating a healthy diet means that you do not enjoy you food very much'; (viii) 'eating a healthy diet means that you family does not enjoy their food very much'; (ix) 'eating a healthy diet means not eating some foods that you like'; and (x) 'eating a healthy diet means not being able to eat quick convenience foods, that would be'. These items were rated "agree strongly " to disagree strongly". The scores were multiplied by the values for corresponding Outcome Evaluations (OE) items labelled "extremely good" to extremely bad" and then averaged to give mean scores.

Body Weight: Body weight (clothed without shoes) was measured using portable digital scales (Salter digital scales model 711) to the nearest 0.1 kg. Height was measured using a stadiometer. Body Mass Index was calculated as weight (in kilograms) divided by the square of height (in metres).

Rate of smoking: This was assessed by a self-report question concerning number of cigarettes smoked, on average, per day.

Seasonality: The months of the year that the initial and the follow-up interview were carried out were decimalised to create two seasonality variables for the time 1 interview (January to July 1995) and for the time 2 interview (August 1995 to January 1996). The months of the year were transformed to three decimal places as follows:

January = 0.083, February = 0.167, March = 0.25, April = 0.333, May = 0.417, June = 0.5, July = 0.583, August = 0.667, September = 0.75, October = 0.833, November = 0.917 and December = 1.

Results

Characteristics of the Income change groups

Socio-demographic characteristics of the Income Increase Group and the Income Decrease Group are shown in **Table 6.2**. There were no significant differences between the Income Increase Group and the Income Decrease Group in age, gender, area of residence, type of income change, housing tenure and Body Mass Index (BMI). The most common reason for either the increase or decrease in household income was a direct change in employment of the respondent (76 per cent of the Income Increase Group and 77 per cent of the Income Decrease Group), or by another member of the household (24 per cent of the income increase group and 23 per cent of the Income Decrease Group). There had been no changes in housing tenure or car ownership between pre-change and current time points.

Representativeness of the sample

Compared to the General Household Survey of the same year of data collection (Office for National Statistics Social Survey Division 1997), a higher proportion of the volunteers had attained qualifications overall. The volunteers were more likely to have commercial or higher education qualifications than the general population aged 16-69 years old in 1995 (**Table 6.3**). There were no significant differences between volunteers in the Income Decrease Group and the Income Increase Group in their educational attainment.

The degree of rise and fall in usual household income is described in **Table 6.4**. Compared to the general population (Central Statistics Office 1996). In the lowest decile, a higher proportion of the volunteers experienced an income rise of 4 or more deciles. Volunteers' incomes in the fourth decile were more likely to fall 2-3 deciles

than be 'stable'. In the fifth decile grouping, there was a higher percentage of volunteers whose income rose 2-3 deciles compared to the UK adults in general.

Characteristics of the Follow-up sample

Fifty three adults (32 in Glasgow and 21 in Reading) from the Income Increase Group and ninety seven adults (61 in Glasgow and 36 in Reading) from the Income Decrease Group participated in both interviews. Primary interviews were carried out with 72 adults (46 in Glasgow and 26 in Reading) who had recently experienced an increase in household income and one hundred and seventeen adults (75 in Glasgow and 42 in Reading) who had experienced a decrease in household income participated in the study. This represents a non-contact rate of 26% in the Income Increase Group and 17% in the Income Decrease Group.

Background demographics characteristics of the Income Increase Group and Income Decrease Group follow-up study are shown in **Table 6.5**. The sample comprised both males and females, with a mean age in their 30's, well educated, mostly house-owner occupiers with partner and many had children. The Income Increase Group and the Income Decrease Group were similar in respect of household composition, housing tenure and car ownership. Between the two time points there were no differences in housing tenure, or car ownership. Results are presented as reported acute changes to food habits (changes in meal styles, changes in food types, food consumption), food preferences and attitudes towards eating a healthy diet.

Income and Expenditure

Table 6.6 outlines post-change and follow-up equivalised average income and expenditure on food. In the Income Increase Group there were significant increase in the average amount of money spent on "eating out at cafés" (from £7.74 to £17.01 per week, $p<0.01$). In the Income Decrease Group there were significant differences in between the two time points on eating out at cafés, restaurants and cooking for pleasure.

Changes in meal styles

At follow-up compared to the primary interview **Table 6.7** indicates reported changes in meal styles at follow-up by the Income Decrease group including eating less at cafes and restaurants, eating fewer takeaways and eating fewer luxury meals compared to the Income Increase group who reported increased eating out. The Income Decrease group reported eating less pre-cooked meals and eating more homemade meals while the Income Increase Group reported eating more pre-cooked meals and little change to homemade meals consumption.

Table 6.8 shows the measured extent of the dietary change. Significant variations in dietary change were evident between the two income change groups. The Income Change group (Decrease vs. Increase) were found to be significantly different in the extent of reported dietary change in cafes and restaurants, luxury meals, eating takeaways meals, pre-cooked meals and home made meals.

Changes in food types over 6 months after change in income

Table 6.9 shows that at time 2 compared to time 1, changes in food types were evident in the Income Decrease Group: reported reduction in 'variety' of foods and reported reduction in 'quality' of foods compared to the Income Increase group who reported improvements. Interpretation of this data should be cautious as subjects were allowed to define 'quality', and 'variety' in their own terms. **Table 6.10** shows the measured extent of dietary change. Significant differences between the income change group were evident for reported variety.

Changes in Weekly Food Intake

The mean weekly consumption of specific foods at both time points are presented in **Table 6.11**. Between the two interviews the Income Decrease Group reported significant decreases in fish, rice, pasta, frozen vegetables and salad. No significant increases in consumption were reported. The Income Increase group reported significant increases in porridge and sausages/burgers and decreases in salad.

Correlations between month of interview and reported food intakes found few significant associations. For Time 1 (January – July), interviews nearer to the summer were related to lower reported consumption of rice ($r = -0.21$, $p = 0.012$) and higher reported consumption of chocolate ($r = 0.28$, $p = 0.001$), crisps ($r = 0.17$, $p = 0.041$) and beer ($r = 0.17$, $p = 0.044$). For Time 2 (August – January) interviews held nearer to winter time were related to lower reported consumptions of salad vegetables ($r = -0.27$, $p = 0.001$).

Changes in Food Preferences

Current food preferences at Time 1 and Time 2 are reported in **Table 6.12**. The greatest significant change in food preferences was measured in the Income Increase Group for meat pies, a move from like to dislike. The subjects in the Income Increase Group had also significantly increased their preference for white bread and rice. In contrast, comparing food preferences at Time 1 and Time 2, the subjects in the Income Decrease Group had decreased their preference for beefburgers while increasing their preferences for fresh vegetables.

Links between food consumption and food preferences

Correlational analyses between liking and consumption (measured using the food frequency list) were undertaken to examine the relationship between these two variables. Thus a significant positive correlation suggests that the more a food is liked the more it is eaten. A negative correlation suggests that people do not always eat what they really like. There were few correlations between food intake and food preferences (**Table 6.13**), which suggest that factors other than liking may be more relevant to food consumption, i.e. availability and finance.

Stability of food choice, food expenditure and psychological health

For the Income Increase Group, at Time 1 there was a significant negative correlation between the number of food choices made and psychological health i.e. the better psychologically the person was feeling the more changes to food choice that were

made. There were no statistically significant relationships between food expenditure, stability of food choice and psychological health (**Table 6.14**).

For the Income Decrease Group at Time 1 there was a significant positive correlation between the number of food choices modified i.e. the poorer the person in psychological health the more likely to change food. At Time 2, it was found that the Income Decrease Group had a significant positive correlation between number of food choices modified and psychological health i.e. the poorer the person in psychological health, the more likely to change food choices. There was also significant negative correlation between number of food choices changed and food expenditure i.e. the more money spent on food, the poorer the psychological health of the person.

Attitudes

Table 6.15 shows the ratings of "expectations of eating a healthy diet". These were similar in both income change groups, and did not change between the two interviews. However, both income change groups reported an increase in perceived need to eat a healthy diet. Additionally between interviews, in the Income Decrease Group, perceived social pressure to eat a healthy diet had decreased. Perceived control over eating a healthy diet had also increased. There were no other changes in the Income Increase Group.

Expectation

To test predictors of Expectation at Both T1 and T2, a step wise linear regression was performed with Expectation as the dependent variable, the predictor variables were entered into analysis as follows: Step 1 Attitude, Subjective Norm, Step 2, perceived control and perceived difficulty, Step 3 Perceived need followed by Step 4 two factors indicating groups membership, income change group and city of residence. Further regression analysis showed that perceived difficulties were the most important predictor of expectations of eating a healthy diet. At Time 2, perceived difficulty of eating a healthier diet was the most important predictor of expectation of eating a healthier diet. Thus, lower perceived difficulties, higher perceived control, higher

perceived need and a higher attitude score were predictors of a high expectation of eating a healthy diet (**Table 6.16** shows results).

Body weight

For the women in the Income Decrease Group, mean body weight significantly increased from 64.8 kg (SD:17.0) to 67.2 kg (SD:17.8) ($p<0.05$) while there was no significant increase for men. This change in body weight was matched in the income increase group, where women had a significant fall (from 67.2kg + or - 14.0) to 64.6 kg (+ or - 12.9) $p<0.05$) in body weight over the six month period. At time 2, 47% of the Income Decrease Group and 43% of the Income Increase Group were classified as either 'overweight' having a BMI of 25 or above (Bray 1978). There were no significant associations between seasonality and body weight for the group overall or by gender/income change group divisions. Rate of cigarette smoking and changes in rate of smoking were not found to be associated with body weight and its changes.

Discussion

Income is central in determining food choice when compared to other factors. Income directly affects access and availability of a healthy diet (Leather 1996) and indirectly affects the relationship between food and health (LIPT 1996). The Low Income Project Team for the Nutrition Task Force state that in low households *'There is a constant struggle to retain mainstream eating habits (whether of not these are desirable in terms of health), and to avoid embarrassment in front of children, partners and friends. Feelings of failure are associated with an inability to buy food for healthier diets, or to mark birthdays and celebrations with food. Socializing with friends may be limited because invitations to shared meals cannot be returned (Graham 1986, Dowler and Calvert 1995). Because the food budget often acts as a reserve when demands for other items or bills must be met (Lang, Andrews, Bedale and Hannon 1984, McLellan 1985, Graham 1986, Hobbiss 1993), dietary quality may be compromised"* (LIPT 1996, p 4-5).

In the present original study, three food-related responses to an income change were hypothesised, namely income change would affect food choice directly, that the reason for the income change would influence food choice indirectly or that people more psychologically upset by the income change would be more susceptible to changes in food choice as food was used as a comfort or distraction.

The study presented in this chapter provides evidence that food choice may be affected by income change. Basic foods such as fish, rice, pasta, and frozen vegetables were significantly reduced by the Income Decrease Group. These results are of concern given that these four food items are all currently advocated in national and local health promotion campaigns. These data may support the view that less healthy eating in the low income groups may be a consequence of undesirable dietary change when a household income decreases involuntarily. Also a decrease in income was associated with a decrease in foods eaten away from home, a decrease in pre-cooked meals used at home and an increase in home-made meals. There was a reported decrease in the quality and variety of foods. This has considerable nutritional implications. It has been have shown that decreased variety is associated with decreased quality in terms of nutrient intake (Kant *et al* 1993).

An increase in income was associated with an increase in foods eaten away from home. Some of the changes represent a limitation of time for food preparation and greater reliance on pre-prepared meals. The Income Increase Group reported perceived increases in control over food consumption. Research in women has shown that as number of meals eaten away from home increases, the total saturated fat content of diet increases and the amount of calcium, vitamin C, folate and fibre decreases (Guenther 1986, Haines, Hungerford, Popkin & Guilkey 1992). The Income Increase Group reported increasing in pre-cooked meals at home and increases in quality and variety of foods although absolute measures of food variety are not available from the current study. The data indicates that people are very aware of this alteration in food selection. Increases in food variety in the Income Increase Group may be one way in which food expenditure has been concentrated.

The results stimulate as many questions as they answer. One of the most pressing is why these changes in food choice take place. In considering this issue, several possible reasons can be put forward. One interpretation is that the changes to food choice are made due to cost of food alone. Another is that there is not a direct link between income change and food choice but both depend on a third unmeasured factor. For example, an income change is a period of life stress and this may account for the food choice change and with a higher paid job there may be less time to prepare food etc.

The impact of an income change on diet is a complex picture and is likely to be a number of factors working at the same time. Food selections are likely to be influenced by the social interaction, time factors and eating occasions that work provides. The Life Events Scale (Holmes & Rahe 1967) gives a quantitative insight into the level of stress that a change in financial state could present. Total household income can change for a variety of reasons but often a change in income occurs due to a change in employment of the household member. The scale also highlights the additional stress arising from 'change to a different line of work' and 'partner begins or stops work'. Even a 'change in eating habits' itself is ranked as a stress albeit a minor one.

Food choice may be altered as a matter of convenience without any particular or conscious preferences for different types of food. When people are preoccupied with work or other stressful events, they may consume more fast or convenience foods that are typically high in fat. If people eat what comes to hand and chose food that requires little or no preparation then it is likely that this will lead to a bias towards high energy/high fat foods rather than the other products. Some people may make deliberate decisions to change the quality, quantity or variety of food in order to economise during this period of change. Others may alter their routine of daily activities and consequently their meal patterns. Others may chose foods that they have not eaten for a long while as a treat.

"Food preferences" are usually taken to be a proxy for consumption but the present study points to some differences in patterns. Some subjects may report preferences or liking for foods they currently cannot obtain. The reported reductions in food preferences in the Income Decrease Group were mainly for non-essential, high fat, high status foods that have been targeted for reduction in recent health promotion campaigns. These results suggest that either through a conscious decision or reduced exposure, the income decrease group have reduced their liking for "non-essential" foods. The increased measured preferences for fresh vegetables indicated that they have increased liking for more "essential" foods. The qualitative analysis in the next chapter will unpack this further. In the Income increase group, these results are encouraging and suggest changes in preferences in line with health promotion advice of reducing meat products and increasing starchy foods.

The scores for 'Expectation of eating a healthy diet' were identical in both income change groups, and did not change between the two interviews. However, both income change groups reported an increase in "Perceived Need" to eat a healthy diet. This finding may reflect awareness of the reduced intake of basic healthy foods such as fish, rice, pasta and frozen vegetables in the Income Decrease Group and the increased intake of meals eaten out of the home in the Income Increase Group. There may also be a contribution from awareness of weight change in the Income Decrease Group. It may also be that taking part in the study made the people think more about dietary issues. Additionally, perceived social pressure to eat a healthy diet had decreased while perceived control over eating a healthy diet had also increased. This may be a result of increased home preparation of meals.

The longitudinal study found that "perceived difficulties" was the most important predictor of "Expectations of eating a healthier diet", irrespective of income change group. This is in line with findings from a recent survey carried out by the Institute of Food Research and the University of Glasgow Department of Human Nutrition team in 1995 of 600 men and women living in Glasgow and Reading (Paisley *et al*, in prep). Results suggest that perception of difficulty was the most important predictor of

expectation of eating a healthier diet and that reported barriers of cost and taste were the main predictors of difficulty of eating a healthy diet at all income levels. When compared to people on higher incomes, those on lower incomes perceived greater difficulty and barriers and depression and stress were identified as important predictors of difficulty of eating a healthy diet (Paisley *et al*, in prep).

It was hypothesised that changes in the food choices may only take place among people who are disturbed by the income change. This study provides some evidence of relationships between changes in food choice, food expenditure and psychological health. For those who had experienced a decrease in income the sub clinical assessment (HAD scale) at six months post change suggested that the worst the anxiety and depressive states of the person the more food choice had been altered. This was also associated with increasing food expenditure that may have been one source of worry. The study could not establish causal relationships so the inter-relationships between psychological health, food expenditure and modification of usual food choices could not be disentangled.

It is likely, that there was an effect of taking part in the study that influenced dietary changes between the two interviews through increasing awareness of food and nutrition concerns. Seasonality was found to have some effect on reported food intakes. In the primary interviews, carried out January to July 1995, reported intakes of rice were less towards summer while consumption of chocolate, crisps and beer increased. For the follow-up interviews carried out August 1995 to January 1996, there was one association only. Reported intake of salad vegetables was found to decrease towards interview carried out in winter. Seasonality may also explain the significant increases in eating away from home in both Income Change groups.

Women in the Income Decrease Group were observed to undergo a significant average weight gain matched by a significant average weight loss in the women of the Income Increase Group. The body weight measurements of men were found to be resistant to change. The results presented in this thesis are similar to work showing an

increasing likelihood to gain weight after job loss in British adults (Morris, Cook & Shaper 1992). However, the present study had no measures of body weight prior to employment changes. One explanation for the weight gain in the unemployed women is that energy intake was increased during the period of study or energy output was reduced. Although energy intake was not formally measured in this study, the food frequency lists does not indicate an increase in foods. On the other hand, it seems likely that energy output might be reduced following a reduction in employment related activities. However, the results on habitual consumption indicate that intakes of many foods have decreased, which suggests that reduced energy expenditure is the most likely reason for weight gain over a relatively short period of six months. There are a number of alternative possible explanations.

Smoking tends to enable individuals to remain slimmer than they do otherwise would be by suppressing appetite and stimulating the body's metabolic rate (Department of Health 1995). The present study found no evidence that changes in smoking behaviour were related to changes in body weight measured. The limited research into the effects of environmental temperature on physical activity and energy intakes suggests that adults are more active in cooler environments (Department of Health 1995) but seasonality of interviews was not significantly related to the changes in weight observed in the female participants of this study.

Another explanation for the weight gain may be that the change of life circumstances may disinhibit dietary restraint. Many people limit their food selections for healthier weight reduction concerns for example eating more fruit and vegetables rather than fatty foods. The consequences of income change are possibly different for men and women. Women may be more susceptible to these dietary restriction issues. In this study, the re-employed women may have been motivated to control their weight by peer pressure or by an increased self-esteem following a move to a higher household income. During this change of circumstances for the Income Decrease Group, these concerns may have been less pressing and exert less influence so fat intake rises.

Future research needs to examine these possibilities in greater depth using objective tools where possible.

Conclusion

To conclude, a change in income had a significant impact on food choice over a six month period. The volunteers represented households undergoing an unexpected change in income and this feature applies to broad sectors of the general population. But these findings should not be over exaggerated due to the broad nature of the study as it was geographically restricted and the volunteers may not representative of the Scottish and English population as they were not sampled using formal statistical techniques. The volunteers were a good representation of the typical increases and decreases in income in the general population in 1995 (Central Statistics Office 1996). It should be cautiously inferred that the dietary changes described in this study exist in other groups of consumers undergoing similar experiences. How widespread such experiences are in the whole of the UK population and what opportunities present themselves for behaviour modification, are research questions for further investigation. Future research should examine the effects of an income change in well defined homogenous population groups and carry out regional analysis to either confirm or refute these preliminary findings.

Inclusion:

- Aged 18 – 55 years
- In employment or actively seeking employment
- Had been at a previously stable household income for at least 6 months prior to change
- Had experienced involuntary rise or fall in household income 'recently'
- Could be interviewed within eight weeks of rise or fall of household income occurring
- Income change was related to paid or self-employment.

Exclusion:

- Consume a medically prescribed diet (e.g. diabetes)
- Pregnant or planning to become pregnant in next six months
- Planned early retirement
- In full-time higher or further education
- Change in household income due to birth, death or change of residence of a household member
- Re-employment envisaged to be of less than six months duration

Table 6.1: Volunteer selection criteria

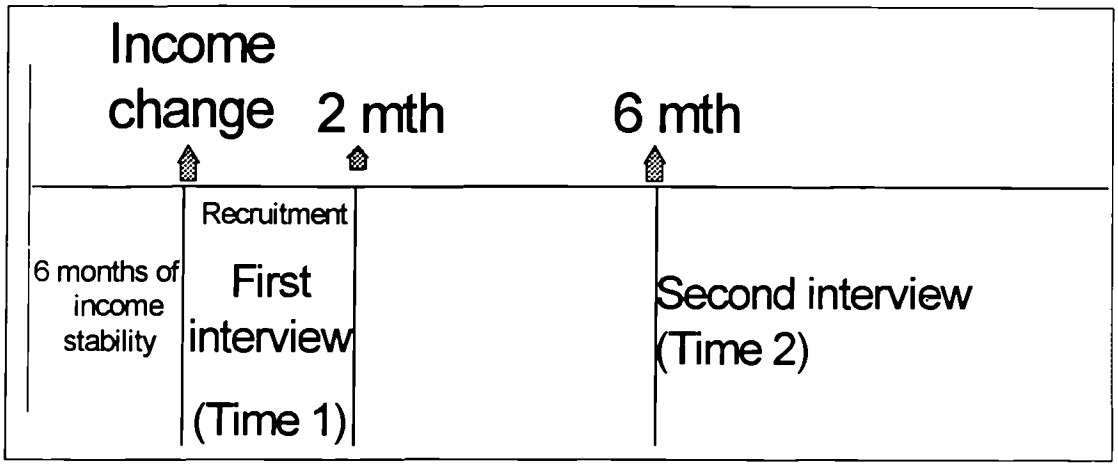


Figure 6.1 Timescale of data collection

	Income Decrease Group (n = 117)	Income Increase Group (n=72)
Income change[1]: %		
Direct	77	76
Indirect	23	24
Area of Residence: %		
Glasgow	64	62
Reading	36	38
Gender: %		
Women	58	43
Men	42	57
Age: mean, (SD) years	37.8 (11.5)	33.8 (10.6)
Housing Tenure: %		
Owned	39	36
Rented	61	64
BMI: kg/m^2(Mean, SD)		
Women	24.6 (5.9)	25.0 (4.5)
Men	24.9 (5.4)	24.3 (5.3)

[1] The Income change variable categorises the volunteers into 'direct' where the participant lost a job or became re-employed etc. 'Indirect' refers to volunteers whose partner lost a job or became re-employed etc.

Table 6.2: Some socio- demographic characteristics of the volunteers

	Income Change Study			
	Income Decrease Group (n = 117)	Income Increase Group (n=72)	All (n=189)	General Household Survey (n=13601)
No qualifications	13.0	10.1	12.0	31.0
Foreign or other qualifications	1.7	7.2	3.8	2.0
Commercial qualifications/ apprenticeships	25.2	18.8	22.8	11.0
O Level A-C or equivalent	13.9	7.2	11.4	23.0
GCE A Level or equivalent	8.7	15.9	11.4	11.0
Higher education below degree level	13.9	18.8	15.8	11.0
Degree or equivalent	23.4	21.7	22.8	11.0

Table 6.3: Highest qualification level attained by percentage of volunteers compared to the 1995 General Household Survey of persons aged 16-69 years not in full-time education (Office for National Statistics Social Survey Division 1997)

1995 income groupings	Income fell 4 or more deciles	Income fell 2-3 deciles	Income 'stable'*	Income rose 2-3 deciles	Income rose 4 or more deciles
Lowest	-	-	55.6	5.6	38.9
decile	-	-	*67.2*	*19.1*	*13.7*
2nd decile	-	-	64.3	14.3	21.4
	-	-	*76.3*	*14.8*	*8.9*
3rd decile	-	23.5	58.8	11.8	5.9
	-	*12.1*	*64.8*	*14.1*	*9.1*
4th decile	-	47.1	23.5	29.4	-
	-	*14.0*	*62.1*	*16.4*	*7.4*
5th decile	5.9	5.9	41.2	41.2	5.8
	5.0	*14.2*	*59.9*	*15.1*	*5.8*
6th decile	15.0	5.0	75	5	-
	8.4	*12.0*	*59.3*	*18.1*	*2.1*
7th decile	23.1	-	53.8	23.1	-
	8.6	*14.7*	*63.3*	*13.4*	-
8th decile	18.8	37.5	43.8	-	-
	12.2	*15.7*	*62.5*	*9.6*	-
9th decile	13.3	20.0	66.7	-	-
	10.7	*16.8*	*72.5*	-	-
Highest	22.2	11.1	66.7	-	-
decile	*11.9*	*12.3*	*75.8*	-	-

[1] Social Trends data are given in italics

* Stable in this context means a change between falling one decile and rising one decile.

Table 6.4: The Income Change Study adults moving between different household income groupings compared to the Social Trends data 1995 [1] (Central Statistics Office 1996)

	INCOME DECREASE GROUP (n = 97)	INCOME INCREASE GROUP (n = 53)
Age: mean, (SD)	38.2 (11.5)	33.5 (11.0)
	Percentages	Percentages
Area of Residence:		
Glasgow	63	60
Reading	37	40
Gender : women	61	42
Men	39	58
Qualifications:		
Degree/ HND / OND / vocational qualification	51	43
'A' / 'O' / GCSE / Highers / Standard grades	33	43
No formal qualifications	18	13
Housing Tenure: owned	65	60
rented	35	40
Car Ownership: yes	74	68
Household Composition:		
Living Alone	22	15
Couple	23	38
One parent with children	11	4
Couples with children	44	43

Table 6.5: Characteristics of the Sample at Follow-up

	Income Decrease Group (n=97)			Income Increase Group (n=53)		
	Post-change	Follow-up	Sig	Post-change	Follow-up	Sig
Household Income £ per week net	**165.60 (131.09)**	**160.58 (127.48)**	0.054	**239.93 (135.02)**	**304.95 (147.42)**	0.0010
Eating out at Cafés £ per week	**7.74 (15.71)**	**17.01 (28.12)**	0.0077	**11.61 (20.10)**	**19.75 (24.03)**	0.0232
Eating out at restaurants £ per week	**7.80 (16.47)**	**12.79 (28.74)**	0.3035	**14.55 (27.16)**	**25.46 (34.15)**	0.0041
Cooking for Pleasure (£ per week)	**7.68 (25.21)**	**7.61 (15.64)**	0.6753	**7.30 (15.99)**	**11.51 (20.70)**	0.2891

DATA are represented as equivalised Mean (± SD) or percentages as appropriate.

Table 6.6: Comparing Pre and Post change Income and Expenditure on Food

	INCOME DECREASE GROUP (n = 97)			INCOME INCREASE GROUP (n = 53)			
	greater intake	lesser intake	no change	greater intake	lesser intake	no change	Chi Square Sig
Meal Styles							
eating in cafés and restaurants	18.6	**51.5**	29.9	**47.9**	16.7	35.4	$p < 0.001$
"luxury" meals	16.5	**52.6**	30.9	27.1	22.9	50.0	$p < 0.01$
eating take away meals	17.7	**47.9**	34.4	29.2	20.8	50.0	$p < 0.01$
eating home-made meals	**34.4**	13.5	52.1	16.7	18.8	64.6	$p < 0.05$
"pre-cooked" meals	9.4	**37.5**	53.1	31.3	8.3	60.4	$p < 0.001$

Values are highlighted where over 33% of the income change groups had reported dietary change. Chi-square was performed on numbers of subjects in each group.

Table 6.7: Reported changes in meal styles and food types (Percentages) at follow-up

Meal Styles	**INCOME DECREASE GROUP** (n=97)	**INCOME INCREASE GROUP** (n=53)	Mann Whitney Sig
eating in cafés / restaurants	-0.9 (1.6)	0.4 (1.3)	$p < 0.001$
"luxury" meals	-0.8 (1.5)	n.s. 0.0 (1.3)	$p < 0.001$
eating take away meals	-0.7 (1.5)	n.s. 0.0 (1.0)	$p < 0.01$
pre-cooked meals	-0.5 (1.2)	0.3 (0.9)	$p < 0.001$
home made meals	0.4 (1.2)	n.s. 0.02 (1.0)	$p < 0.05$

DATA are presented as mean (SD).scores, derived from a single question on the perceived extent of change, scored -3 (extremely decreased) to +3 (extremely increased). **All mean changes are significantly different from midpoint (zero) unless otherwise indicated by n.s.**

Table 6.8: Changes in meal styles

	INCOME DECREASE GROUP (n = 97)			INCOME INCREASE GROUP (n = 53)			Chi Square Sig
	more	less	no change	more	less	no change	
Food Types							
Variety	21.9	27.1	51.0	**37.0**	17.4	45.7	$p < 0.05$
Quality	18.9	26.3	54.7	**36.2**	14.9	48.9	$p < 0.05$

Values are highlighted where over 33% of the income change groups had reported dietary change.

Table 6.9: Reported changes in meal styles and food types (Percentages) at the second interview, compared to primary interview

	INCOME DECREASE GROUP (n=97)	INCOME INCREASE GROUP (n=53)	Mann Whitney Sig
Food Types			
Variety	-0.1 (1.2)	0.4 (1.3)	$p < 0.01$

DATA are presented as Mean (SD). Mean scores were derived from a single question on the perceived extent of change, scored -3 (extremely decreased) to +3 (extremely increased).

Table 6.10: Measured changes in meal styles and food types

Current Food Consumption	INCOME DECREASE GROUP (n = 97)		INCOME INCREASE GROUP (n = 53)	
	Time 1	Time 2	Time 1	Time 2
Per Week	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
bowl of porridge	**0.7** (1.8)	**0.7** (1.4)	**0.1** (0.3)	**0.4** (0.9) *
one sausage, rasher of bacon or small beefburger, slice of ham or luncheon meat	**2.3** (3.2)	**2.6** (3.7)	**2.2** (2.2)	**3.3** (4.4) *
piece of fish (not fried)	**1.0** (1.3)	**0.7** (0.7) *	**0.7** (0.8)	**0.9** (1.0)
Serving of rice	**1.7** (1.4)	**1.2** (0.8) ***	**1.5** (1.2)	**1.5** (1.1)
Serving of pasta	**2.0** (1.5)	**1.6** (1.3) *	**1.7** (1.3)	**1.8** (1.4)
Serving of frozen vegetables	**1.7** (2.3)	**1.1** (1.4) **	**1.6** (1.8)	**1.3** (1.6)
Serving of salad	**3.7** (4.7)	**2.3** (2.4) **	**2.9** (2.5)	**2.2** (2.1) *

* $p < 0.05$, ** = $p < 0.01$ and *** = $p < 0.001$.

Table 6.11: Changes in Weekly Food Intake

Current Food Preferences Mean (SD)	INCOME DECREASE GROUP (n = 96) Time 1	Time 2	INCOME INCREASE GROUP (n=49) Time 1	Time 2
white bread	**1.0** (1.4)	**0.8** (1.4)	**0.8** (1.4)	**1.5** (1.0) *
Beefburgers	**0.1** (1.8)	**-0.6** (1.8) **	**0.4** (1.3)	**0.0** (1.7)
meat pies	**-0.2** (1.7)	**-0.4** (1.8)	**0.5** (1.3)	**-0.3** (1.8) **
Rice	**1.3** (1.3)	**1.4** (1.2)	**1.3** (1.1)	**1.8** (0.9) **
fresh vegetables	**1.8** (1.2)	**2.1** (1.0) *	**1.8** (1.2)	**1.8** (1.1)

Preference Measures range from -3 = 'extremely dislike' to 3= 'extremely like'

* = $p < 0.05$, ** = $p < 0.01$ and *** = $p < 0.001$.

Table 6.12: Changes in Food Preferences

Variable	INCOME DECREASE GROUP (n=96) Time 1	Time 2	INCOME INCREASE GROUP (n=49) Time 1	Time 2
brown or wholemeal bread	-0.008	0.25 *	0.03	0.03
Rice	-0.02	0.10	0.13	0.31*
cakes or pastries	0.21	0.06	-0.32	-0.02
whole milk	-0.01	0.38***	0.07	-0.11
Skimmed milk	-0.09	-0.07	-0.34	-0.10

* = $p < 0.05$, ** = $p < 0.01$ and *** = $p < 0.001$.

Table 6.13: Correlations between food consumption and preferences at both time points

	INCOME DECREASE GROUP (n=97)			
Variable	Time 1 No. of food choices changed		Time 2 No. of food choices changed	
	r	p	r	p
Equivalised food expenditure at time 1	-0.1779	0.099	-	-
Equivalised food expenditure at time 2	-	-	-0.2903	0.004
Psychological health at time 1	0.3447	0.001	-	-
Psychological health at time 2	-	-	0.2383	0.020

	INCOME INCREASE GROUP (n=53)			
Variable	Time 1 No. of food choices changed		Time 2 No. of food choices changed	
	r	p	r	p
Equivalised food expenditure at time 1	-0.2638	0.070	-	-
Equivalised food expenditure at time 2	-	-	0.1387	0.343
Psychological health at time 1	-0.3053	0.044	-	-
Psychological health at time 2	-	-	-0.1798	0.220

Table 6.14: Correlations between psychological health, food expenditure and changes in food choice

Variable	INCOME DECREASE GROUP (n=97)		INCOME INCREASE GROUP (n=53)	
	Time 1	Time 2	Time 1	Time 2
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Expectation	0.8 (1.5)	1.0 (1.6)	0.8 (1.9)	1.0 (1.5)
Attitudes	1.9 (0.8)	2.2 (0.7)	1.8 (0.9)	2.0 (0.8)
Subjective Norm	-1.5 (1.6)	-2.0 (1.3) ***	-0.9 (3.9)	-1.5 (1.7)
Perceived Need	4.9 (1.7)	5.4 (1.3) *	4.5 (1.8)	5.4 (1.5) **
Perceived Control	5.1 (1.7)	6.0 (1.4) ***	4.6 (2.0)	5.7 (1.7) **
Perceived Difficulty	-0.6 (1.7)	-0.7 (1.9)	-0.9 (1.6)	-0.5 (1.7)
Belief Evaluation	5.1 (1.9)	2.5 (1.9)	1.6 (2.1)	2.2 (1.6)

* $p < 0.05$, ** = $p < 0.01$ and *** = $p < 0.001$.

Table 6.15: Changes in attitudinal variables

	Step 4 β (Beta)	Significance
Attitude	0.23	< 0.05
Subjective Norm	-0.01	>0.05
Perceived Control	0.22	< 0.01
Perceived Difficulty	0.36	< 0.001
Perceived Need	0.21	< 0.05
Income Change Group	-0.04	> 0.05
Region	-0.03	> 0.05

Table 6.16: Regression of attitudinal measures with Expectation of eating a healthy diet as dependent variable at Time 2 (n=150)

Chapter Seven – Exploring food choices following a change in income

Introduction

It is often expressed in popular writings that 'you are what you eat' but this study considers the reverse to be true – you eat what (or who) you are. Therefore, it is hypothesised that food choices following an income change are likely to show income differentials that are attributable to both material and cultural factors. This chapter will explore some of the emerging themes from a preliminary analysis of the qualitative interview data collected at the first interview of the Income Change Study. It is hoped that the qualitative analysis might yield additional data to help explain the variations in diet choice over time observed in chapter Six. However, there are limitations to this approach as the data gathered relies heavily on the person's awareness of the how and why of individual changes in food choice. It will be attempted, wherever possible, to unpack material and cultural issues.

Methods

As the study has been previously described elsewhere (chapter 3, chapter 6) only the key measures used in the following analysis will be summarised here.

Equivalised household Income: Household income was defined as total household income comprising the sum of: personal earnings after tax, partner's earnings, money from others in, and external to, the household; unemployment benefit, income support, family credit; child benefit and other state benefits. This was equivalised using the scales of McClements (McClements 1977) to adjust for household composition. The household income reported at time 1 (up to eight weeks post-change) was also represented as proportion of the national average income for 1995 (£298.43 Source: Central Statistics Office 1996). This variable was divided into quintiles for use as an independent variable for multiple comparisons using analysis of variance. Points of division for quintiles were 0.1918, 0.4829, 0.6915 and 1.0271.

Food Consumption

Habitual food intake of the volunteers was measured by a 33 item food frequency inventory based on a validated food frequency questionnaire (Paisley *et al* 1996).

Food Expenditure

Self-reported expenditure on food (grocery bill, takeaways, food consumed in cafés, restaurants and food bought for entertaining at home) was assessed as the amount currently spent per week and equivalised (McClements 1977). Information was also collected on reported pre-change expenditure.

Changes in meal and snacking patterns

To examine changes in meal and snacking patterns in the transitional period (i.e. the period of time from income change and first interview, approximately 4 to 8 weeks), volunteers were asked a series of initial questions phrased 'has the .....altered in any way? for the following seven prompts (i) "timing of meals", (ii) "frequency of meals", (iii) "length of meal preparation and cooking time", (iv) "timing of snacking", (v) "frequency of snacking", (vi) " type of snacking" and (vii) "amount of cooking meals". For each of these questions the first response was a yes/no response indicating if any changes had occurred, followed by an open response asking for descriptions of those changes.

Changes in meal styles

To examine changes in consumption of meal styles in the transitional period (i.e. the period of time from income change and first interview, approximately 4 to 8 weeks), volunteers were asked a series of initial questions phrased 'do you feel that your increase/decrease in household income has altered how often you eat....?' for the following eight meal styles (i) "home made foods and meals", (ii) "pre-cooked foods and meals", (iii) "luxury foods and meals", (iv) "healthy foods and meals", (v) "junk or fast meals", (vi) " in cafés or restaurants", (vii) "take-away foods and meals" and (viii) "cooking or baking for pleasure". No definitions of these foods or meal types were provided. For each of these questions the first response was a yes/no response

indicating if any changes had occurred, followed by an open response asking for descriptions of those changes.

The second set of questions attempted to elicit the perceived extent of change by asking volunteers to rate the extent of change on a seven category scale ranging from 'extremely increased' to 'extremely decreased' to the following question "Overall have you increased or decreased your consumption of / the amount of / the number of times ....? for the same eight meal styles.

Changes in food type

Changes in food type were assessed from responses to a series of questions phrased 'do you feel that your increase/decrease in household income has altered the .....' for the following six food types (i) "quantity of food you eat", (ii) "quality of food you eat", (iii) "the variety of foods and meals you eat" (iv) "the amount of fresh foods you eat" (v) "the amount of frozen foods you eat" and (vi) "the amount of canned or dried foods you eat". For each of these questions the first response was a yes/no response indicating if any changes had occurred, followed by an open response asking for descriptions of those changes. The qualitative information collected is used in the interpretation of results.

A second set of questions was asked in the format of "Overall have you increased or decreased your consumption of / the amount of / the number of times ....? for the same six food types. Responses were gathered on a 7 category scale ranging from 'extremely increased' to 'extremely decreased'.

Results

Seventy two adults who had recently experienced an increase in household income and one hundred and seventeen adults who had experienced an increase in household income participated in the study at baseline. Full sociodemographic details are shown in **Table 6.3** in the previous chapter. The most common reason for either the increase or decrease in household income was a direct change in employment of the respondent

(76 per cent of the Income Increase Group and 77 per cent of the Income Decrease Group), or by another member of the household (24 per cent of the Income Increase group and 23 per cent of the Income Decrease Group).

Income and Expenditure

Seven in every ten of the Income Increase Group reported altering their expenditure on food compared to 84% of the Income Decrease Group. **Table 7.1** outlines pre and post-change equivalised average income and expenditure on food. In the Income Increase Group mean change was + 73% and the mean Income Decrease Group mean change was -24%. The mean equivalised pre-change weekly income in the Income Increase Group was £198.49 per week that increased to an average income of £341.21. The mean equivalised pre-change weekly income in the Income Decrease Group was £253.64 which dropped to an average weekly total equivalised income of £191.96.

Table 7.1 shows the pre-change and current equivalised expenditure on food. In the Income Decrease Group there were significant decreases in the average amount of money spent on "eating out at cafés" (from £12.93 to £7.88 per week, $p<0.001$) "restaurants" (from £12.88 to £7.70 per week, $p<0.001$) and "cooking for pleasure" (from £11.55 to £7.74 per week, $p<0.01$). In the Income Increase Group there were no significant differences in the amount spent on these activities although average food expenditures after the income change were reported as 'higher'. Current reported expenditure on food was highest in the Income Increase Group (on average £43.12 per week) while the proportion of total household income spent on food (24%) was lower than for the Income Decrease Group (44%) ($p<0.01$).

Changes in Meal and Snacking patterns

The number of respondents reporting changes in meal and snack patterns are presented in **Table 7.2**. In general, more people in the Income Decrease Group than Income Increase Group reported changes. In the Income Decrease Group the most frequently reported changes was in the timing of snacks, followed by time for meal preparation

and these changes were significantly higher than in the Income Increase Group. In the Income Increase Group the most frequent changes were in the timing of meals.

Meal and snack patterns had been significantly altered by some people due to change in employment circumstances. Interview data suggested that the impact of an income change on meal patterns ranged from minor shifts in timing of meals to a radical overhaul of the individual's previous routine. One man in the Income Increase Group who had started a full-time job said *I'm actually working now and previously when I wasn't I think meals have changed by an hour"*. A woman in the Income Decrease Group who was looking for work said *"Timing of my meals changed? Very much so, when I was working I finished work at 5 o' clock and used to have my meal at half past five. Now I'm not working my male friend works until 7-8 and I wait till eat until then"*.

The meal occasion most vulnerable to change was breakfast. Interview data suggested this in both Income Change Groups but for different reasons. In the Income Increase Group breakfast was often skipped due to time constraints and in the Income Decrease Group, breakfast may be missed out routinely due to a changed time of rising. But the changes to meal and snack patterns were not always negative. Interview data suggested that for some people, this dynamic period of income change had promoted their review of their food choice towards consciously adopting a healthier lifestyle. In the Income Increase Group, one man said *"I'm eating more breakfasts that I used to do - I've given up eating biscuits mid-morning and I thought that breakfast would probably be better for me"*.

Reported changes to the timing and frequency of snacking were related to the change in daily routine. In general the interview data suggested that Income Increase Group reduced snacking while Income Decrease Group increased snacking. The availability of food to eat between meals at home and also the extra difficulty with snacking at work was a key factor in these changes of behaviour. Comparing two single men in their twenties, one man in the Income Increase Group said *"Snacking has decreased*

because when I was unemployed I didn't have anything else to do so I tended to snack a lot" while the man in the Income Decrease Group said *"Yes, I have probably increased snacking because I'm close to the kitchen and close to the food the temptation is there to have a snack whereas, previously, being divorced from food it never went through my mind"*. Snacks were likely to be firm favourites but eaten more often or at different times although there was some evidences from the interviews that in the Income Increase Group, that eating fruit as a snack had been adopted. A woman in the Income Increase Group reported substituting her favourite snack of a chocolate bar for an apple instead on a regular basis.

Changes in Meal Style and Food Type

Table 7.3 gives a summary of reported dietary changes that occurred in the transition period (between income change and first interview) by the two income change groups. Reported changes made since income change, collected at the first interview, were significantly different for the two income change groups. The Income Decrease group reported eating less at cafés and restaurants (64.5 per cent), eating less takeaways (57.9 per cent), and eating fewer luxury meals (60.7 per cent), while the Income Increase group reported eating more in cafés and restaurants (46.7 per cent, $p < 0.001$) eating more takeaway meals (42.6 per cent, $p < 0.001$) and eating more luxury meals (36.7 per cent, $p < 0.001$).

Analysis of the unstructured questions revealed reasons given for the reduction in meals eaten away from home by the Income Decrease Group. For instance eating out at cafés and restaurants, reasons included expense (62 per cent), and pre-change eating 'out' being linked to work (19 per cent). Over half (54 per cent) felt they would only enter a restaurant for a "special occasion". The group reduced consumption of 'luxury meals' also primarily due to expense (56 per cent). Volunteers' definitions of 'luxury' meals included steaks, roast joints, oriental style meals, curries and ice cream. For the Income Increase Group, increases in the opportunity of having "luxury" meals meant in the volunteers' views: the increased frequency of consumption of red meat joints and quality cuts (17 per cent), increased frequency of consumption of fish and chips

(23 per cent) and popular convenience foods such as pizzas and burgers (15 per cent). A third of the Income Increase group (30 per cent) reported being aware of increased opportunities and a choice to eat away from home.

The Income Decrease Group reported a reduced variety of foods (33.3 per cent), and a poorer quality of foods (33.3 per cent) compared to the Income Increase Group who reported eating a greater variety of foods (40 per cent, $p < 0.001$) and eating a better quality of food (45 per cent, $p < 0.001$). Trends were also seen for the Income Decrease Group to report eating a smaller quantity of food (38.3 per cent), eating fewer "junk/fast" meals (36.4 per cent), and increased consumption of home-made meals (36.4 per cent) compared to the Income Increase Group. In the Income Decrease Group 17% reported increasing the number of home made meals as it was cheaper to do so. In contrast 13% of the Income Increase Group said they had increased their intake of home made meals as they had more money to buy ingredients. Likewise in terms of recreational cookery, 20% of the Income Decrease Group reported cooking less in general, whilst 19% reported having more time to cook a proper meal. It appears that recreational cooking for hospitality may also be diminished. One woman in the Income Decrease Group said *"I would say with less income coming in I'm more reluctant to invite people - it can be expensive"*. The Income Increase group reported eating more fresh foods (38.3 per cent) and more "healthy" foods (36.7 per cent) compared to the Income Decrease Group. Interview data suggested that for many people, healthy foods equated with eating more fresh food.

The qualitative data suggested that for the Income Decrease group, variety was reported to have been constrained by the revised position of home cooking in the diet (51 per cent) and as a feature of bulk buying, e.g. "3 for 2" type offers on household foods (28 per cent). The qualitative data collected from the Income Increase Group showed that increased quality and variety of food in the consumers' view was purchasing more expensive brands (50 per cent), better cuts of meat (18 per cent), getting better value for money (14 per cent) and eating less "leftovers" (9 per cent).

One married man in the Income Increase Group said *"I eat more of a selection now than the usual pies and chips"*.

Quantitative findings that came from the post-coding of the qualitative data collected indicated that the Income Decrease Group had reduced the overall quantity of food consumed in a number of ways including eating smaller portions at each meal occasion (79 per cent), eating two main meals per day with no in-between eating (7 per cent), and storing less food at home (7 per cent). Reasons for the concentration on home cooking by the Income Decrease Group as the alternative to pre-cooked or convenience food were a reduction in food costs (58 per cent), for the pleasure received from home cooking (35 per cent) and the removal of time constraints due to loss of job (13 per cent). In 14 per cent of the Income Decrease Group the meals created by this renewed participation in home cooking were typically of 'one pot' main meals, for example stews, soups, chilli and spaghetti bolognaise while the rest of the Income Decrease Group reported cooking meals similar to ready made meals previously consumed.

Table 7.4 shows the measured extent of the dietary change. Significant variations in dietary change were evident between the two income change groups. The income change groups (Decrease vs. Increase) were found to be significantly different in the extent of reported dietary change to eating out in cafés and restaurants (-1.2 vs. 0.5, $p<0.001$), luxury meals (-1.0 vs. 0.3, $p<0.001$), eating takeaways (-1.1 vs. 0.5, $p<0.001$), variety (-0.9 vs. 0.5, $p<0.001$), quality (0.1 vs. 0.7, $p<0.001$), and quantity (-0.4 vs. 0.4, $p<0.001$).

In both Income Change groups some people claimed to be eating more fruit either because they can afford to eat more or because it is more accessible. Open responses show that in the Income Increase Group, 35% of the sample claimed to be eating more fruit because they did not feel cost was a barrier. One man in the Income Increase Group said *"to some extent when I'm sitting at home watching television I'm more likely to have an apple, I never did this previously as I didn't have the money"*. In

the Income Decrease Group, 28% said they had increased fruit intake since their drop in household income because it was more accessible. One man in the Income Decrease Group said *"an increase (in fruit)- I have more access to it at home and its there. I'd lift a piece of fruit as I'm passing"*. However, a further 11% of the Income Decrease Group claimed to have decreased intake for reasons of economy. Both the Income Decrease Group and Income Increase Group reported buying more fresh vegetables (18% and 24% respectively). For the Income Decrease Group this was characteristic of a move to bulk out stews in place of meat, and while some felt that fresh vegetables were expensive, they remained cheaper than meat. One woman in the Income Decrease Group said *"we're putting more veg in stews than meat whereas before we could have put one and a half pounds of mince now its a half pound for three of us because its so expensive"*. Open responses also show that 12% of the Income Decrease Group changed to consuming less expensive cuts of meat as well as decreasing meat, with a further 22% reporting buying bigger packs of poultry preparations. Other frequent responses in the Income Decrease Group included changing brand of spreading fat (25%), changing brands of breakfast cereals (25%), buying more cheddar (15%), buying less speciality cheese (13%), increasing consumption of baked potatoes (11%), buying more fresh fish and eating more bread which is cheap and filling (10%). In the Income Increase Group the only other notable change was buying brown bread instead of white bread.

Gender Differences in Frequency of Food Consumption

Comparisons of the frequency of food consumption data by gender revealed that during the time following income change, men were drinking more beer and lager than women were in both groups. In the Income Decrease Group, men were consuming more red meat and beer compared to women while in the Income Increase Group, women were consuming more rice, pasta, potatoes, cakes and less tinned vegetables than then men.

Age Differences in Frequency of Food Consumption

In the Income Decrease Group, people aged over 55 years old reported consuming more porridge and potatoes and less fruit juice and chocolate than people aged under 35 years old. Compared to older people, people aged under 35 years old reported consuming more chocolate in the Income Increase Group but less red meat, meat dishes, rice and wine.

Income Differences in Frequency of Food Consumption

The multiple comparisons by analysis of variance revealed two-way interactions for brown bread, baked meat products, meat dishes, chicken and salad vegetables (**Table 7.5**). It was found that for both income change groups, baked meat products was an 'elastic' (increasing consumption with increasing income) food group. For the Income Increase Group, other 'elastic' foods were brown bread, meat dishes and salad vegetables. Chicken was a significant 'inferior' (decreasing consumption with increasing income) good for the Income Increase Group. In contrast, for the Income Decrease Group, chicken was an 'elastic' food while brown bread, meat dishes and salad vegetables were found to be 'inferior' goods.

Discussion

Changes to meal and snack patterns included a change in length of meal preparation time in the Income Decrease Group. In general, even though the amount of cooking done by the respondent was reported as altered by a moderate proportion of both groups, this referred to an altered use of pre-prepared foods rather than a change in the domestic division of labour. Irrespective of which household member had directly experienced the income change, the dominant ideology was one in which feeding the household was woman's work. In some cases, where the woman had a new job or had suffered a job loss, the implication was that the husband's routine took precedence over hers.

The subjects participating in this study were actively recruited for a longitudinal study of income change. The questionnaire sections that are reported here reflect only the

immediate post-income change habits and the shorter term impact of income on diet choice which has already been discussed in the previous chapter. The qualitative data analysis complements the findings presented here and in the previous chapter. This triangulation approach differs from studies which uses qualitative methods alone which, providing illustrative data on why people may choose to eat certain foods, puts the evidence into a broader context. This study has described the broad changes to food choice in order to test the hypothesis that food choices following an income change are likely to show income differences which are attributable to material and cultural factors.

This research confirms gender differences suggested in other literature on the foods eaten (Graham 1984). In the Income Decrease Group, where it is surmised that "essential" foods were being eaten, men were more likely to have meat and in the Income Increase Group women were more likely than men to be vegetarians (Fiddes 1991, Willetts 1997). It emerged from the interview data that people in both groups had become more aware of eating fresh fruit as a snack. People were conscious of this change in food choice either due to the expense or increased availability.

Gender cannot be wholly discussed without taking account of age. It was apparent from the interviews that older people seemed more focused in their discussion of food. In both Income Change groups, 'traditional foods' was an important concern for older people. Economising challenged the content or frequency of 'Sunday dinners'. This was felt to be a negative consequence and the household were 'on their uppers'. Eating away from home, in cafes or restaurants were likely to be reduced by older people who said they would wait for a special occasion or eat before leaving the house. One man in the Income Decrease Group looking for work, discussed how he would eat at home before taking his three children to McDonald's where he would have a drink only and the children meals. He said that he preferred to operate this strategy of saving money rather than eliminate this family activity during his period of unemployment.

Younger people under the age of 35 years old, and often those aged in their twenties, were more likely to rely heavily on convenience foods or one pot cooking (e.g. chilli con carne, spaghetti bolognaise) in their food choices. Younger people, in both age groups were more likely to skip meals e.g. breakfast due to time constraints or to save expense, than older people. This is partly explained by the different life stage the younger people in the study were at, with fewer being married or having children than the older people.

Data from the present study suggests that income is the most powerful determinant of food choice although gender and age are significant factors in exploring the food choices after an income change. Irrespective of a rise or fall in household income baked meat products (meat pies, sausage rolls etc.) were 'elastic' foods. For the Income Decrease Group, salad vegetables and brown bread were found to be 'inferior' foods. The results presented here suggest that both a rise or a fall in income present challenges to choice and diet composition with potential health implications for people who do not have the appropriate skills to optimise food choices during a change in financial circumstances. The present study was unable to assess any 'Giffen' food stuffs (Giffen foods are defined as the rarer the good, the more is purchased) consumed by the volunteers.

A large proportion of people in both Income Change groups had consciously made changes to food expenditure. One important finding is the reported decreases in variety of foodstuffs consumed by the Income Decrease Group in a relatively short period of time following a change in household income. There is little evidence that has deomonstrated that such dietary change is maintained and if so, what the implications for nutrition and health are. Associations between decreasing variety and decreasing quality have been reported (Krebs-Smith, Smiciklas Wright, Guthrie & Krebs-Smith 1987, Kant *et al* 1993, Dowler & Calvert 1995). The present study indicates that 'variety' and 'quality' (in the participants' terms) are dramatically altered (in the participants' view) which varies by Income Change group. The Income Decrease group reported reduced quality and reduced variety while the Income

Increase group reported increased quality and increased variety. There has been concern that food spending is one expenditure most readily cut when unexpected expenses occur (Health Education Authority 1989, Kempson, Bryson & Rowlingson 1994). Decreasing the quality and variety of foods eaten may be one way of coping with an unexpected change in financial resources shown by the Income Decrease Group. Increases in food quality and food variety in the Income Increase Group may be a way in which food expenditure has been concentrated. Through the purchasing of better cuts of meat and by eating less 'leftovers', diet may be reduced in fat and would become less monotonous.

Quantity of food was also shown to be influenced by change in household income. The reported smaller quantity of food consumed by the Income Decrease Group may be a reflection of the reported decreases in both expenditure and frequency of eating take-away foods and eating out at cafés and restaurants compared to the reported increases in the expenditure and frequency of eating food away from home reported by the Income Increase Group. Eating away from home is one of the socially valued non-nutritional aspects of food consumption that is likely to promote enjoyment of food and well-being.

For the Income Decrease Group the cutting down or elimination of food consumption away from home may have been compensated for by the creation of time and opportunity for an increased frequency of home cooking. However, these opportunities may be within an environment of producing cost-effective familiar meals. The food frequency list showed that in this initial period since income change, the Income Decrease Group were reporting eating less red meat and less white bread compared to the Income Increase Group. From these data, it could be inferred that some nutritional aspects and overall diet quality might have improved in this initial period for the Income Decrease Group.

The reported increased consumption of foods away from home by the Income Increase Group may have implications for weight management, depending on the type of foods

consumed. Meals consumed in UK restaurants, public houses and takeaways are known to be relatively high in fat (MAFF 1994). Given the nutrient composition of meals eaten out of the home, people who become re-employed and experience a habitual increase in meals eaten out of the home, need to make careful selection of foods. Such people need to ensure that they maintain or increase their fruits and vegetables consumption and choose low fat alternatives to optimise dietary selection for weight management.

Conclusion

Income change has an impact on food choice immediately. 'Variety' and 'quality' (in the participants' terms) were reported to be dramatically altered during the initial period following the involuntary change in income of one of the household members. A number of strategies for economising on food were initiated in the Income Decrease Group. It is apparent that dietary alterations which occur during socio-economic transition are complex in their nature. For the Income Increase Group, eating patterns may form routines that correspond to work patterns and new interactions. The results reflect the immediate transitional habits in areas of food choice. It was impossible to measure food intake before the income change occurred and therefore no comparisons could be made in terms of specific foods pre-income change and in the initial period following the income change but rather descriptions of broad areas of food choice where changes have been reported to occur have been presented.

	Income Decrease Group (n=113)			Income Increase Group (n=61)		
	Pre-change	Post-change	Sig	Pre-change	Post-change	Sig
Household Income £ per week net	**253.64** (149.00)	**191.96** (165.98)	< 0.001	**198.49** (114.34)	**343.21** (209.13)	< 0.001
Eating out at Cafés £ per week	**12.93** (17.92)	**7.88** (15.35)	< 0.001	**9.81** (17.96)	**11.86** (18.94)	0.566
Eating out at restaurants £ per week	**12.88** (20.50)	**7.70** (16.10)	< 0.001	**9.27** (16.80)	**14.99** (25.29)	0.134
Cooking for Pleasure (£ per week)	**11.75** (23.34)	**7.74** (24.97)	< 0.01	**6.26** (14.58)	**7.78** (16.20)	0.360
Current Expenditure on Groceries £ per week	NA	**39.40** (19.27)		NA	**43.12** (21.09)	0.2531
% of money spent on food	NA	**44**		NA	**24**	< 0.01

DATA are represented as equivalised Mean (± SD) or percentages as appropriate.

Table 7.1: Comparing Pre and Post change Income and Expenditure on Food

Altered pattern	INCOME DECREASE GROUP (n = 107)		INCOME INCREASE GROUP (n = 60)		Chi Square Sig
	N	%	N	%	
Timing of meals	53	48.6	34	54.8	0.58
Frequency of meals	37	35.2	17	27.4	0.29
Length of meal preparation time	54	51.4	19	30.6	0.009
Timing of snacks	58	55.2	24	39.3	0.048
Frequency of snacks	53	51.0	24	39.3	0.24
Type of snacks	47	44.8	26	42.6	0.79
Amount of cooking done by self	48	45.3	24	38.7	0.50

Table 7.2: Reported changes in meal and snacking patterns (% who altered pattern)

	INCOME DECREASE GROUP (n = 107)			INCOME INCREASE GROUP (n = 60)			
	greater intake	lesser intake	no change	greater intake	lesser intake	no change	Chi Square Sig
Meal Styles							
eating in cafés and restaurants	5.6	**64.5**	29.9	**46.7**	10.0	43.3	< 0.001
"luxury" meals	5.6	**60.7**	33.6	**36.7**	11.7	51.7	< 0.001
eating take away meals	4.7	**57.9**	37.4	**42.6**	11.5	45.9	< 0.001
eating home-made meals	**36.4**	14.0	49.5	29.5	23.0	47.5	ns
"junk/fast" meals	12.1	**36.4**	51.4	21.7	18.3	60.0	< 0.05
recreational cookery	19.6	26.2	54.2	15.0	10.0	75.0	< 0.05
"pre-cooked" meals	15.0	23.4	61.7	23.3	8.3	68.3	< 0.05
"healthy" meals	24.3	11.2	64.5	**36.7**	5.0	58.3	ns
Food Types							
variety	23.1	**33.3**	43.5	**40.0**	10.0	50.0	< 0.001
quality	22.2	**33.3**	44.4	**45.0**	3.3	51.7	< 0.001
fresh	22.4	20.6	57.0	**38.3**	11.7	50.0	< 0.05
quantity	8.4	**38.3**	53.3	32.2	8.5	59.3	< 0.01

No definitions of these meal styles or food types were provided. Values are highlighted where over 33% of the income change groups had reported dietary change.

Table 7.3: Reported changes in meal styles and food types (Percentages)

	INCOME DECREASE GROUP (n=107)	**INCOME INCREASE GROUP** (n=60)	Mann Whitney Sig
Meal Styles			
eating in cafés and restaurants	**-1.2** (1.2)	**0.5** (1.2)	< 0.001
"luxury" meals	**-1.0** (1.2)	[+] **0.3** (1.1)	< 0.001
eating take away meals	**-1.1** (1.2)	**0.5** (1.3)	< 0.001
"junk/fast" meals	**-0.5** (1.2)	[+] **0.03** (1.1)	< 0.01
Food Types			
variety	**-0.9** (1.3)	**0.5** (1.0)	< 0.001
quality	[+] **0.1** (1.4)	**0.7** (1.0)	< 0.001
quantity	**-0.4** (1.0)	**0.4** (0.9)	< 0.001

DATA are presented as Mean (± SD). No definitions of these meal styles or food types were provided. Mean scores were derived from a single question on the perceived extent of change, scored -3 (extremely decreased) to +3 (extremely increased). All mean changes are significantly different from midpoint (zero) unless otherwise indicated by [+].

Table 7.4: Measured changes in meal styles and food types

Income Decrease Group Servings per week	**Women (n=67)**	**Men (n=50)**	Chi-square Sig
Red meat	1.0 (1.1)	1.6 (1.6)	0.0264
Meat pies	0.6 (1.0)	1.0 (1.2)	0.05
Beer	1.6 (4.5)	5.5 (7.7)	0.0012

DATA are presented as Mean (± SD).

Table 7.5: Significant gender differences in frequency of food consumption (Income Decrease Group)

Income Increase Group Servings per week	**Women (n=30)**	**Men (n=42)**	Chi-square Sig
Rice	1.8 (1.4)	1.2 (0.9)	0.03
Pasta	2.2 (1.4)	1.5 (1.1)	0.02
Potatoes	5.3 (3.5)	3.2 (2.6)	0.0061
Tinned vegetables	1.0 (1.1)	1.9 (1.7)	0.0306
Cakes	2.2 (2.2)	1.3 (1.6)	0.0492
Beer	1.5 (2.2	5.9 (7.8)	0.0073

DATA are presented as Mean (± SD).

Table 7.6: Significant gender differences in frequency of food consumption (Income Increase Group)

Income Decrease Group Servings per week	**Under 35 years (n=56)**	**Over 35 years (n=61)**	Chi-square Sig
Porridge	0.3 (1.0)	1.0 (2.2)	0.024
Fruit juice	5.0 (6.4)	2.6 (2.9)	0.010
Potatoes	2.1 (1.8)	2.9 (2.4)	0.049
Chocolate	2.6 (3.1)	1.4 (2.5)	0.021

DATA are presented as Mean (± SD).

Table 7.7: Significant age differences in frequency of food consumption (Income Decrease Group)

Income Increase Group Servings per week	Under 35 years (n=40)	**Over 35 years (n=32)**	Chi-square Sig
Red meat	1.2 (1.0)	2.3 (1.8)	0.001
Meat dish	1.0 (0.8)	1.6 (1.3)	0.034
Rice	1.2 (1.0)	1.8 (1.3)	0.033
Chocolate bar	2.7 (2.3)	1.2 (1.3)	0.001
Wine	1.5 (1.8)	3.2 (4.6)	0.037

DATA are presented as Mean (± SD).

Table 7.8: Significant age differences in frequency of food consumption (Income Increase Group)

Source of variation	df	Sums of Squares	Mean Square	F	P value
Brown bread					
Group	5	64.2	12.8	3.3	0.008
IIG or IDG†	1	0.06	0.06	0.02	0.904
% of NAI‡	4	63.9	16.0	4.1	0.004
Two way	4	85.7	21.4	5.4	0.000
Meat pies etc					
Group	5	3.9	0.8	0.5	0.755
IIG or IDG	1	0.7	0.7	0.5	0.498
% of NAI	4	3.8	1.0	0.6	0.629
Two way	4	16.7	4.2	2.8	0.027
Meat dish					
Group	5	8.7	1.7	0.9	0.453
IIG or IDG	1	0.02	0.02	0.01	0.917
% of NAI	4	8.5	2.1	1.2	0.333
Two way	4	34.1	8.5	4.6	0.001
Chicken					
Group	5	11.6	2.3	1.7	0.148
IIG or IDG	1	6.1	6.1	4.4	0.039
% of NAI	4	9.2	2.3	1.6	0.165
Two way	4	18.4	4.6	3.3	0.013
Salad					
Group	5	269	53.8	2.4	0.041
IIG or IDG	1	6.1	6.1	0.3	0.606
% of NAI	4	290	67.2	3.0	0.021
Two way	4	270	67.3	3.0	0.021

† IIG represents Income Increase Group and IDG represents Income Decrease Group

‡ NAI represents National Average Household Income in 1995

Table 7.9: Results of two-way Analysis of Variance for analysing Two Factors:Income Change Group and Quintiles for Proportion of the National Average Household Income at primary interview.

Chapter Eight – Diet choice in Glasgow: Income, variety and nutrition

Introduction

Deep fried Mars bars and the Clydebank Heartstopper are two recent Glasgow food fads that fit the popular media stereotypes of the Scottish Diet. The Scottish Diet Report (SHHD 1993) described Scotland as having *'a more unhealthy diet than any other country in the Western World' and the evidence suggests that the Scottish Diet is 'high in sweet and salty snacks, baked goods of inappropriate composition accompanied by excessive amounts of sugary drinks and alcohol. As a result, the Scottish Diet is characteristically low in antioxidant vitamins and fibre and contains an excess of fat, saturated fat, trans fatty acids, refined sugars and salts'* (SHHD 1993). The Scottish Diet has been portrayed as a diet high in meat pies, chips and alcohol and low in fruits and vegetables. This has been confirmed by national and local studies (Whichelow *et al* 1991, Tunstall-Pedoe, Smith, Crombie and Tavendale 1989, Gregory *et al* 1990, Bolton-Smith 1991, Anderson and Hunt 1992, Anderson *et al* 1994, Forysth *et al* 1994). The consultation process following the review of the evidence gave rise to the Eating for Health: A Diet Action Plan for Scotland document (Scottish Office 1996) which set a number of dietary targets for the year 2005 to guide key players in food and health in Scotland.

The secondary analysis of the MAFF funded Dietary Survey of Glasgow Adults 1994/95 presented in this chapter aims to examine the impact of income on variety and nutrition. Income-variety-nutrition relationships have been alluded to in the findings of the previous two studies. However these studies have been limited due to the recruitment methods employed (i.e. volunteer convenience samples). The present study used the Community Health Index to generate a quasi-representative sample of Glaswegians.

This analysis aims to test the hypothesis that income relates to the variety of food consumed in the diet and to differences in food and nutrition intake. Compared to the lower income groups, it was hypothesised that the higher income group reported food

and nutrient intakes more consistent with the Scottish dietary recommendations. One common approach of public health nutrition is to concentrate on the individual responsibility of the individual to 'comply' with dietary guidelines. This ignores social and economic factors that may constrain access and availability of healthier eating including dietary variety. Until recently, nutrition education operated within the framework of UK policy that emphasises the state's responsibility to enable individual to make informed choices (Dowler 1997).

The nutrient analysis system used, the Foodmeter (UK) 2 bar-code system, had the novel ability to examine the dietary data from the study week by the meal and snack occasion. A third objective was to test the hypothesis that differences in the consumption of a varied diet by household income may be expressed at the individual meal occasion level.

Methods

The current study analysed data from a dietary survey of adults born in and residing within the Glasgow city district between October 1994 and October 1995. A full account of the methods and protocol of the study are reported elsewhere (Anderson, Maher, Ha, Cooney, Eley, Martin, Vespaniani, Bruni & Lean in press). The protocol designed by Anderson and Lean is presented in **Appendix 6**. Ethical permission for this study was obtained from Greater Glasgow Community and Primary Care Local Research Ethics Committee. Power calculations based on the standard deviations for energy, fat, carbohydrate and iron from a previous weighed dietary survey in Scottish adults indicated that a sample size of 160 adults would be sufficient to exclude differences greater than 10% of SD for each measure in paired data with 90% confidence. The main measures used in the following analysis are described below.

Household income: Subjects reported their total annual household income in £5000 bands between '<£9,999' and '£40,000 and over' which were equivalised using the McClements scales (McClements 1977, McClements 1987). This scale is widely used in the UK (McClements 1987) and gives similar but not identical results to the linear equivalence scale recommended by the OECD Social Indictors Programme.

Other authors have concluded that the differences between the scales are too small to affect the statistical significance of the results (Caraher, Dixon, Lang & Carr-Hill 1998) although this was not formally tested in the present study. The equivalised gross annual household income variable was collapsed into four income groups (1) < £9,999; (2) £10,000-£19,999; (3) £20,000-£29,999; and (4) >£30,000 based on £10,000 increments and also household income was collapsed into eight categories based on £5,000 increments: (1) < £5,000; (2) £5,000-9,999; (3) £10,000-£14,999; (4) £15,000-£19,999; (5) £20,000-£24,999; (6) £25,000-£29,999; (7) £30,000-£34,999; and (8) £35,000 and over.

Dietary variety: Seven indicators of dietary variety were used in the present study. The major variable of interest, total diet variety was defined as the total number of different food and drink items consumed over the seven day period. Some investigators have used the number of individual foods consumed over a three day period as a reference standard (Kennedy, Ohls, Carolson & Fleming 1995). Other investigators have further distinguished between the total number of foods across all food groups and the number of foods consumed within each major food group (Fanelli & Stevenhagen 1985). The Foodmeter (UK) 2 system of food codes was used without modification to calculate variety score. Any dishes cooked at home for which the subjects had provided recipes were coded by major components. Composite dishes such as pizza or chicken curry were coded as individual items rather than separated into separate items similar to the coding scheme of Block, Dresser, Hartman & Carroll (1985). Condiments such as tomato ketchup and mayonnaise were counted as separate food times. The other six indicators of diet variety used the same Foodmeter (UK) 2 codes: 1) Diet variety excluding fruit and vegetables; 2) Fruit and vegetables variety; 3) Diet variety excluding fruit; 4) Fruit variety; 5) Diet variety excluding vegetables and 6) Vegetables variety.

Food intake: Consumption of specified foods were measured as average intake in grams per day estimated by Foodmeter (UK) 2 from the data inputted from the respondents' weighed food and drink diary.

Meal patterns : Foodmeter (UK) 2 generated printouts of weekly frequency of the three meal occasions (breakfast, lunch, dinner) and three snack occasions (pre lunch snack, pre dinner snack, after dinner snack).

Type and context of meals: The type and context of meal included breakfast and lunch/dinner foods. Breakfast types were 'tea and toast breakfast', 'cereal breakfast', 'fried breakfast' and 'bacon roll'. Lunch or dinner types were 'sandwich meal', 'jacket potato meal', 'meat and gravy meal', 'indian or chinese meal', 'burger or pizza meal' and 'fish supper' (battered white fish and chips). These data were collected from the seven day diaries which were handsearched for frequencies.

Average variety of foods per eating occasion: Variety was defined within this study as number of different food items including condiments per meal or snack occasion consumed over the study period week. This was calculated by Foodmeter (UK) 2.

Social class: Classification of social class was based on occupation (OPCS 1980) and included the subdivision of class III into 'manual' and 'non-manual'. The social class of the three students in the survey was left unclassified and along with 13 unemployed subjects was excluded from analysis using this variable.

Dietary targets: The dietary targets under study included food targets and nutrient guidelines for the Scottish population. Compliance with the following targets was investigated. The food targets were daily intakes at least 400 grams of fruits and vegetables, 34 grams of high fibre cereals and 180grams of bread. The nutrient targets were less than 35% percentage food energy from total fat, less than 11% percentage food energy from saturated fat and more than 50% percentage food energy from carbohydrate. Dichotomous 'compliance' variables were established where subjects were divided into compliance with target or non-compliance. These variables were used as dependent variables in a series of stepwise logistic regression analysis with a 'standard' set of sociodemographics for covariates. The standard set were gender, age, DEPCAT, paid work status, household income and Body Mass Index. For each food target a standard set, defined above, of socio-demographic

variables was incorporated into a stepwise logistic regression analysis to predict target compliance and non-compliance. This programme first selects the variable (variable A) that represents the best predictor. It then seeks the next best predictor (variable B) taking into account the effect of variable A. It continues until there are no variables left that further contribute to the prediction. The outcomes of each logistic regression analyses are presented in a table. The characteristics of the subjects who failed to meet each specific food target are listed in the order of their predictable capacity i.e. the order in which they were selected by the logistic regression. Any characteristics that were statistically significantly related to compliance but were not selected by the regression analysis are listed below then as a supplementary block.

Results

Representativeness of the sample

The sample of the Glaswegian adults had been randomly selected from the Community Health Index. An assessment of the representativeness of the sample to the Greater Glasgow population in 1994/95 in terms of gender, age, ethnicity and of the socio-economic structure was made. Socio-economic structure was defined by the Carstairs Deprivation Categories (DEPCAT). The latter is a method of quantifying relative deprivation of affluence in different localities and was previously derived from an analysis of Census data on the four area variables of overcrowding, male unemployment, low social class and non-ownership of a car (Carstairs and Morris 1981). It is usually applied to postcode sectors. The DEPCAT scores range from 1, representing the most affluent areas to 7 indicating multiply deprived (PHRU 1994).

Table 8.1 and **Table 8.2** show the comparison of the desired and the achieved sample composition by deprivation category (DEPCAT) and gender respectively. The representation of the achieved sample of 160 was close to the socio-economic breakdown of the actual Greater Glasgow Health Board population of that age group. DEPCATS 4 and 7 were underrepresented in the sample and there was a 15% overrepresentation of females in the sample.

The socio-demographic profiles of subjects who completed diaries are presented in **Table 8.3**. The sample was predominantly female, with slightly more (52.8%) than half the male sample aged between 18 and 50 years and most (71%) of the female sample in this younger age category. Subjects were mostly from social class 1-111nm, although, of the four income categories considered, the majority came from households with an income between £10000-£19999 per annum with no children aged under 18 living in the household. About one quarter (24.5%) of male and just over a third (36.4%) of female respondents were smokers. The mean BMI was in the overweight category for both men (25.8 ± 3.5 kg/m^2) and women (26.0 ± 4.9 kg/m^2) both before and after (25.8 ± 3.5 kg/m^2 for men and 25.7 ± 4.9 kg/m^2 for women) the study period. Almost all of the subjects had lived in Scotland for over 20 years and nearly 90% had lived in Glasgow for over 20 years (**Table 8.4**).

The impact of household income

Those subjects living on lower incomes had significantly lower weekly intakes of fruit ($p < 0.05$), oily fish ($p < 0.05$), poultry ($p < 0.01$) and significantly higher intakes of chips ($p < 0.05$). From comparing consumption of foods (**Table 8.5**) to examining macro and micronutrients by household income (**Table 8.6**), it was found that subjects from the higher income households had significantly higher energy intakes compared to subjects from the lower income households ($p<0.01$). Subjects from the lower income households had higher percentage energy from fat ($p<0.01$), higher percentage energy from saturated fat ($p<0.001$) and higher percentage energy from monounsaturated fat ($p<0.001$) compared to the higher income households (**Table 8.6**). The lower income households also had significantly higher density of sodium (per 1000 kcals) ($p<0.05$) and lower densities of potassium ($p<0.05$) niacin ($p<0.05$) and vitamin C ($p=0.0512$) than the higher income households.

A general trend was found with lower income and lower social class groups reporting less varied diets than the higher income. This confirms the findings of other studies (Dowler & Calvert 1995). Total diet variety was found to significantly differ by gross household income (**Figure 8.1 and Figure 8.2**) regardless of which indicator of variety is examined (**Table 8.7**). Further testing with simple factorial ANOVA

models with income and social class entered as factors, found no significant two way interactions on any of the variety indicators.

The case of fruits and vegetables

Collectively, the sample population reported eating 19 different types of fruit and 29 different types of vegetables. **Table 8.8** and **Table 8.9** show percentages of each type of fruit consumed over the 7 day period. At the $p<0.05$ level, a greater proportion of subjects from higher income households consumed apples (71% v. 33%), grapefruit (31% v 7%), strawberries (23% v. 7%), celery (17% v 7%), runner beans (34% vs 13%) and tomatoes (37% v 7%). The study found that higher social classes consumed more grapes (33% v 10%) and mushrooms (100% v 20%) than lower social classes. For fruit intake (g/day) and vegetables intake separately, increasing income is weakly related to increased consumption.

Fruits and vegetables: does more variety mean more consumed by everyone?

In general increasing variety appears to lead to increasing intakes shown by the overall sample Spearman correlations for fruit ($r = 0.7519$, $p <0.001$, vegetables $r = 0.5728$, $p <0.001$ and fruits and vegetables $r=0.7155$, $p <0.001$). When comparing individual correlations for each social grouping to the base correlations between intake and reported variety, associations were more pronounced for lower income groups (**Table 8.11**).

The impact of household income on meal patterns

Table 8.12 shows the average total number of meal and snack occasions per week and average number of each meal and snack type by household income. Those on lower incomes had significantly less mid morning snacks, lunches, pre dinner snacks and after dinner snacks, on average compared to those on higher incomes. Breakfast and dinner were unaffected by household income. These significant differences led to average total meals, average total snacks, average total meal and snack occasions varying significantly by household income. **Table 8.13** presents differences between average energy (kcals) per meal and snack occasion by household income. Those on

lower incomes were significantly more likely to have less energy intakes arising from lunch, less from dinner and less from main meals overall.

Table 8.14 presents differences in variety of foods consumed eaten per meal by household income. Those on lower incomes had significantly less varied lunch meals and less varied dinner main meals compared to those on higher incomes. For the main meal of lunch, subjects on incomes less than £10,000 had an average nine food items less compared to subjects earning greater than £30,000, Likewise, on average, those on lower incomes diets at dinner main meal on average included seven items less of food. Frequency of consumption of ten various meal types was influenced by household income. The evidence from the present study did not support the expected higher reported consumption of traditional 'meat and 2 veg' gravy meals in the lower income groups. Increasing income was related to the increasing frequency of consumption of cereal breakfast, Indian / Chinese meals and lower frequencies of fried breakfast foods **(Tables 8.15 and Table 8.16).**

Table 8.17 presents the significant differences between nutrient densities per meal by household income. The breakfasts, on average, of subjects from lower incomes were less dense in terms of protein, carbohydrate, calcium, NSP, iron, folate, riboflavin, thiamin and vitamin B6 and more dense in terms of retinol compared to subjects of higher incomes. Compared to those of higher incomes, subjects from lower incomes consumed pre lunch snacks that were significantly less dense in terms of vitamin B6 and vitamin C and after dinner snacks, that on average were higher in protein density. Compared to subjects on higher incomes, those on lower incomes consumed lunches that were significantly less dense in terms of NSP, iron and vitamin C and dinners, that were significantly more laden with total fat, saturated fat and monounsaturated fat

The impact of social class

At the $p<0.01$ level, estimated weekly intakes of vegetables, white bread and chips significantly varied by social class group membership. There was a trend for those from the manual social classes to consume more white bread and chips and less

vegetables. Considering macro and micronutrient profiles, these differences in food intakes may partly account for the higher percentage of total energy from saturated fat and monounsaturated fat and lower dietary densities for selective antioxidant vitamins such as vitamin C and E reported by the lower social classes. A general trend was found with lower social class groups reporting less varied diets than the high social class groups. This confirms the findings of other studies (Dowler & Calvert 1995). This is not to say that they prefer a more monotonous diet, but that other concerns constrain their choices. Total diet variety was found to significantly differ by social class. To a greater or lesser degree, these relationships between social class and variety are apparent regardless of which indicator of variety is examined. While social class was shown earlier to impact on variety of fruits and vegetables, actual intake relates much more weakly with these factors, increasing social class relating to increased vegetable (g/day) intake only.

The impact of gender

Although previous analysis found that fruits and vegetables intake was not differentiated by gender, this study found that, compared to men, women consumed significantly less fruit juice, whole milk, white bread, potatoes, fish, red meat and meat products while reporting a higher percentage total energy from polyunsaturated fat Very few strong association between nutrient densities and gender were found with the exception of zinc density ($p<0.001$). No relationships between diet variety and gender were found. In the case of fruits and vegetables, gender appears not to differentiate average intakes.

Food choices compared to Scottish Diet targets

The influence of socio-demographic characteristics on compliance with the dietary food targets for fruit and vegetables, cereals, bread and oily fish and the nutrient guidelines for percentage energy from fat, percentage energy from saturated fat and carbohydrate are shown in **Table 8.18**. Eight five per cent of the sample were not meeting the fruit and vegetables target of 400 grams per day. The outcome of the logistic regression analyses, it can be deduced that DEPCAT influenced compliance with the fruit and vegetables targets. Thus, subjects living in the affluent area of 1,

58.8% were failing to meet targets while subjects in the multiply deprived DEPCAT area 7, 88.5% were not meeting target. About four in five persons of the sample (83 1%) were not meeting the technical target of 34 grams per day of cereal. Age was the major predictor of compliance with the target. It would seem that the younger members of the sample were more likely to be regular cereal eaters. Very few subjects met (2.5%) the bread target of 180 grams per day. No variable was chosen by the logistic regression analyses as a predictor.

Seventy five per cent of the sample was not meeting the oily fish target of two portions per week at least 88 grams). It was found that the individual characteristics were income and age. The lower incomes were less likely to comply with the target. Subjects earning less than £9,999, 80% failed to meet target and 82% failed in the income group £10,000-£19,999 compared to 65% and 66% in income groups £20,000-£29,999 and over £30,000 respectively. Whilst there was an issue of income there was also the issue of age. Oily fish was less popular with the young. For example, in the income group £10,000-£19,999, 58% of 50 -65 years old were not complying compared with 95% of under 50 year olds. Likewise in the greater than £30,000 income group, 73% of 18-50 year olds were not achieving targets while 44% of greater than 50 year olds were not achieving targets.

Almost 66% of the sample did not achieve dietary targets for percentage energy from total fat (less than 35%). Income was a strong predictor of compliance, followed by age For instance, at the lower incomes, less than £9,999, 80% overconsumed fat in the diet compared to 46% of those earning over £30,000. Older subjects were more likely to comply with targets for example, in the group £10,000-£19,999, 78% of 18-50 years old did not comply while 50-65 years olds was 58%. About 79% of subjects did not comply with saturated fat targets. Income had predictive power with 93% of less than £9,999 complying with target, 84% of £10,000- £19,999, 74% of £20,000-£29,999 and 62% of greater than £30,000.

Discussion

Consuming a varied diet is a basic ingredient of healthier eating messages. In promoting a 'healthy' diet, although undefined, there is a consensus among experts about key elements that include dietary variety (Cannon 1992) which is particularly encouraged in the case of fruits and vegetables (Williams 1995). Recent research has suggested that low income groups select food on the basis of cost and taste not for health reasons and that lower income and lower social class families focus on meals rather than the individual value of individual foods (Caraher, Dixon, Lang and Carr-Hill 1998).

Income and dietary variety

The community dietary survey in Glasgow generated a consistent picture of dietary variety being differentiated by income and to a lesser extent by social class but surprisingly not by gender. Those living in households earning more than £30,000 per annum reported consuming, on average 46 foods per week more than those living on an annual income of less than £9,999 and suggested a linear income-variety relationship. But on closer inspection using £5,000 incremental cut-offs, the relationship was suggested to be subject to a threshold effect at £20,000 and be best described as two inverted V's. Dietary variety is regarded as an integral component of healthier eating by experts and consumers alike (Cannon 1992, Margetts, Martinez, Saba, Holm and Kearney 1997). The argument that there is no good or bad foods, only good and bad diets, depends on the total number of different foods consumed. Many individual foods contribute to a healthful diet, provided they consumed in moderate amounts and are incorporated into a significantly varied diet (Krebs-Smith *et al* 1987). Increasing the variety of food choice shifts the focus from individual foods to the quality of total diet (Kant *et al* 1993).

The study found that the food and nutrient profiles of the lower income groups compared the higher income group were consistent with previous large and small scale local and national studies (Tunstall-Pedoe *et al* 1989, Gregory *et al* 1990, Whichelow *et al* 1991, Anderson *et al* 1994). Those who were in receipt of higher incomes consumed a greater frequency of foods actively promoted for health. The

recent pan-EU survey of consumer attitudes to food, nutrition and health suggest that the healthy dietary guidelines are having some impact (Margetts *et al* 1997). In the survey, the percentage of the respondents mentioning balance and variety ranged from 11% in Greece to 74% in Belgium (the average for the European Union was 41%). Choosing a variety of foods across and within food groups is thought to improve eating patterns by providing the vitamins, minerals and other micronutrients that are required for optimum health (Krebs-Smith *et al* 1987).

Socio-economic factors and diet composition

This study used the public health nutrition approach of comparing groups intakes to national guidelines and uses terminology such as 'compliance' and 'achievers' and 'non-achievers'. From a social science perspective, this approach could be criticised as focusing too heavily on the psycho-social model of food and health. It could be argued that the underlying assumption of nutrition education is 'why are they doing as they are told by the experts'. This approach largely ignores structural and material factors that influence food choice and nutrition that have been examined in the previous studies of this thesis. However, this approach is commonly used in nutrition and does have some value in examining continuity or change in the Scottish Diet towards well-defined targets that are markers of better nutrition and health at the population level. It is recognised that 'compliance' with the dietary targets is not appropriate at the individual level as how can one achieve an intangible personal goal.

Deprivation factor, income or age but not education as expected largely predicted variations in compliance with the dietary targets. This was inconsistent with recent finding within a young population of 16 to 29 years olds in Glasgow where it was reported that a higher educational level was a significant predictor of compliance with the Scottish dietary targets (Scottish Office 1996).

Low socio-economic status assessed by deprivation score (DEPCAT) was the greatest predictor of complying with the fruits and vegetables target. Increasing intakes were related to increasing wealth. Subjects living on lower incomes (<£9,999) on average, consumed 390 grams of fruit and 667 grams of vegetables per week compared to

subjects living on higher incomes (> £30,000) who reported intakes, on average of 781 grams and 1037 grams respectively. Overall 85% of the sample were not complying with dietary targets indicating that there is still much improvement to be made to dietary quality in adults living in Glasgow. Annual household income predicted the compliance with targets for percentage energy from fat and with age predicted compliance with oily fish and percentage energy from total fat. Subjects, facing economic challenges were less likely to comply with these targets particularly if younger.

The case of fruits and vegetables

Does more variety of fruits and vegetables mean more consumed overall for everyone? This study reported that correlations between intake and reported variety were more pronounced for lower income groups. Lower income and lower social class families tended to consume less fruit and vegetables from a less diverse range of items but there were no differences in fruits and vegetables intake by gender in the present study. This was inconsistent with data from the National Food Survey (Ministry of Agriculture, Fisheries and Food 1997) which indicates that fruit and vegetables intakes vary by region, social class and gender. Although, the real costs of fruit in the UK has recently fallen (Ritson & Hutchins 1991, MAFF 1995) the general public perceive that fruit is expensive (Anderson *et al* 1994, Cox, Anderson, Lean & Mela 1998). The authors attribute this to historically high fruit prices in the UK (Ritson & Hutchins 1991) combined with the perception that fruit is expensive. Other authors have reported that access to cars and by implication to food supply are influenced by income and social class (Caraher *et al* 1998).

Income, meal patterns and dietary variety

Meal patterns provide information about the eaters and what is appropriate to them (Roos *et al* 1993). There have been concerns expressed by the scientific community as well as the mass media about the rising consumption of snacks at the expense of 'proper' meals. During the last half of this century, the number of 'traditional' cooked meals (e.g. the Sunday roast and all its accompaniments) has declined within British eating patterns. Competition from manufactured convenience food stuffs

combined with leisure and working 'anti-social hours' has led to changes in menu and meal patterns. In public health studies, skipping breakfast and eating snacks between meals have been classified as "bad" health habits (Belloc & Breslaw 1972, Segovia, Barlett & Edwards 1989, Sobal, Revicki & Defoge 1992) although this may not coincide with individual perceptions of their food choices.

It has been argued that notions of time, cyclicality and tradition (Goode, Curtis & Theophanus 1984, Gofton 1986) fundamentally shape eating. One third of the men and women skipped lunch (38% of men and 30% of women) during the week long study period. This corresponds well with data from a study of women in Helsinki where 27% skipped lunch (Prätälä, Pelto, Pelto, Ahola and Rasanen 1993). The adults of Glasgow in the present study rarely missed dinner shown by 94.3% of men and 86% reporting consuming dinner daily.

In the context of meal patterns, dinner was the most popular meal and was usually eaten within the home environment. The most popular lunch/dinner meal type was sandwich meal (76.2%) followed by Indian/Chinese meal (48.7%), burger/pizza meal (45%) and fish supper (32.5%). The high proportion of the Glasgow adults consuming 'ethnic' meals reflects the trend apparent in Britain towards savoury dishes, pasta, and 'ethnic' dishes that reflects a willingness to try new foods (Taylor Nelson 1990). Jacket potato meals were unpopular as only one fifth of the Glasgow adults reporting consuming the meal type more than once in the study week.

Household income was found to be significantly associated with the variety of foods consumed at lunch and dinner. For the lunch occasion, the higher incomes had nine food and drinks items, on average more than the lower incomes. For dinner, the subjects on higher incomes had a food base that was wider, on average seven food and drink items more than the subjects receiving lower incomes. This may account for the difference between the income groups discussed in, for instance, consumption of fruits and vegetables and fish would increases the variety of foods eaten at lunch and dinner. Lunches and dinners were often selected away from the home, in canteens, public houses, cafes and restaurants. These places tend to offer a high

proportion of high fat foods due to the limited availability of low fat choices or which may be chosen for cultural reasons, recognising the status conferred by certain foods. Data from the National Food Survey show that meals consumed in UK Restaurants, Public Houses and Takeaways contain 40.8% of energy from fat with 15% of energy supplied as saturated fat. Workplace meals currently provide a mean of 49.5% of energy from fat with 21.6% from saturated fat (MAFF 1995).

The NOP Survey of Breakfast trends in the UK 1997 (Kellogs 1997) found that Scots were among the most avid breakfast eaters with 64% eating breakfast every day compared to the UK average of 57%. Consumption of breakfast was even higher with about three-quarters of the adults in the present Glasgow-based survey having breakfast on a regular daily basis (81% of men, 69% of women). Only three adults (two women and one man) reported never eating breakfast. The breakfast foods reported by the Glasgow adults of this survey were quite similar to the overall breakfast trends in the UK (Kellogs 1997). Cereal was a clear favourite (NOP 72%, Glasgow survey 66%), followed by toast (NOP 52%, Glasgow survey 57%) and fried breakfast (NOP 13%, 40%). The proportion of Glasgow adults consuming fried breakfast exceeded the UK average. A further 33.7% reported eating a bacon roll as a breakfast food at least once a week. This was a cause for concern, considering the contribution of fried foods to intakes of total fat especially saturated fat.

Public health studies have given concern about the rise of snacking in Scotland (Anderson, Macintyre and West 1993). The availability and choice of convenient ready made snacks has supplied the demands of a modern 'time scarce' society (Gofton 1995). In the present study of adults aged between 18 and 65 years old, snacking accounted for 23% of all eating occasions at home. This may be indicative of an increase in the snacking phenomenon, as previous studies reported around 19% of eating occasions as 'snacks' (Taylor Nelson 1990, Taylor Nelson 1993). This still leads to the assumption that the majority of food was consumed as part of a 'formal' or 'proper' meal.

It was found that overall energy intake (kcals) was found to be significantly lower in the lower incomes with a linear gradient up to the higher incomes. There has been an

underlying assumption that adults living on a low income select less healthy foods at every meal and snack occasion. It is suggested that one explanation of the lower intakes for the foods promoted for good health by adults living on a low income have less opportunities to eat food per se. Their more affluent counterparts assume a greater frequency of meals and snacks, a greater variety of foods and greater intakes of healthier foods. As discussed earlier, breakfast and dinner were suggested as key meals for promoting dietary change in the lower incomes, due to the stable high frequency of the two main meals across the income groups.

Examining the nutrient densities of these two meals times provides results that confirm that dietary change is needed in this context. For breakfast, on average, the lower incomes were consuming meals that were less dense in terms of calcium, iron, folate, riboflavin, thiamin and vitamin B6 than the higher incomes. No significant differences were found in overall breakfast cereal consumption between the income groups although the higher income groups did consume significantly more high fibre cereal. On average, the dinners of the lower incomes were significantly more laden with saturated fat, and monounsaturated fat compared to the subjects on the higher incomes. Further work is needed to examine the reasons why and to design effective strategies to address dietary change at the evening main meal.

The impact of method used

There seems to be no reason to suspect that results in this study should be due to the method of collecting dietary data. No dietary assessment method can safely be qualified as a "gold standard" and it is "not realistic to give a special status to one of them (Plummer and Clayton 1993). The seven day weighed inventory has a high reliability and validity and although not without errors, it is a dependable method for estimation of nutrient intake and for relative comparison (Bingham, Nelson, Alison, Haraldsdottir, Loken, van Staveren 1988). A potential confounding factor might have been the consent to volunteer by the participants. Undoubtedly the demands placed upon subjects participating in weighed studies are high and this is reflected in the current study where most of the participants are in the non-manual social classes.

Conclusion

Compared to social class or gender, household income is a dominant predictor of variations in the diet of people living in Glasgow. It has been suggested the income-dietary variety relationship, observed previously in this thesis, is best described as an inverted V which has a threshold at £20,000 per annum.

	Desired*	Achieved	
DEPCAT	%	%	n
1	9.4	10.6	17
2	7.8	10.6	17
3	7.5	8.7	14
4	13.8	21.3	34
5	9.2	11.3	18
6	22.8	21.3	34
7	29.4	16.3	26
Total	100.0	100.0	160

* GGHB population of 18-65 years old 1995

Table 8.1. Representativeness of the sample of Glaswegian adults: Desired* and achieved sample composition by deprivation category (DEPCAT)

	Desired*	Achieved	
GENDER	%	%	n
Male	49.0	33.1	53
Female	51.0	66.9	107
Total	100.0	100.0	160

* GGHB population of 18-65 years old 1995

Table 8.2 Representativeness of the sample of Glaswegian adults: Desired* and achieved sample composition by gender

	Male		Female	
	n	%	n	%
Gender	53	33.1	107	66.9
Age				
18 - 50 years old	28	52.8	76	71.0
50 - 65 years old	25	47.2	31	29.0
Social Class				
I, II,	24	45.3	41	38.3
IIInm	2	3.8	31	29.0
IIIm	18	34.0	2	1.9
IV, V	6	11.3	20	18.7
Unemployed	3	5.7	10	9.3
Student	0	0	3	2.8
Household Income				
<£9,999	9	18.0	21	20.0
£10,000-£19,999	17	34.0	39	37.1
£20,000-£29,999	13	26.0	21	20.0
>£30,000	11	22.0	24	22.9
Children in household				
0	34	64.2	60	56.1
1	8	15.1	20	18.7
2	9	17.0	21	19.6
3	2	3.8	6	5.6
Smokers	13	24.5	39	36.4
Non smokers	40	75.5	68	63.6
Body Mass Index				
< 20	1	2.1	4	4.1
20 - 24.99	17	36.2	50	51.0
25 - 29.99	20	42.6	34	34.7
30 and above	9	19.1	10	10.2

Table 8.3: Socio-demographic profile of the sample of the present study

Length of time	Lived in Glasgow		Lived in Scotland	
	N	%	N	%
Less than 5 years	2	1.3	0	0
5-10 years	7	4.4	1	0.6
11-20 years	9	5.6	5	3.1
Greater than 20 years	142	88.8	154	96.3

Table 8.4: Cultural background of the Glasgow Dietary Survey subjects

Food (grams/week)	< £9,999 (n = 30) Mean	SD	£10,000 -£19,999 (n = 56) Mean	SD	£20,000 - £29,999 (n = 34) Mean	SD	> £30,000 (n = 35) Mean	SD	P value
Fruit	390	461	526	555	747	907	781	588	0.0396
Vegetables	667	766	911	843	1034	700	1037	688	0.1869
Fruit juice	108	239	272	520	363	790	571	1136	0.0780
High fibre cereal	162	393	179	514	184	437	111	119	0.8703
Other cereal	35	67	39	91	46	88	53	105	0.8375
Whole milk	494	1026	580	1192	306	824	508	1035	0.6922
Reduced fat milk	825	737	967	1234	1491	1138	1199	1263	0.0845
White bread	501	278	419	328	439	281	339	277	0.1785
Brown bread	122	249	164	241	169	204	261	286	0.1284
Pasta	238	327	216	267	250	318	318	279	0.7127
Rice	78	136	132	210	171	177	174	29	0.1129
Potatoes	374	261	439	410	370	63	433	335	0.8760
Chips	263	242	228	245	159	185	129	188	0.0455
Poultry	191	160	247	265	396	339	390	303	0.0030
All types of fish	138	140	143	147	196	177	242	267	0.0534
Oily fish	30	58	49	109	71	104	107	168	0.0471
Red meat	286	269	268	313	223	297	263	239	0.8376
Meat products	392	365	311	42	302	268	259	242	0.1881

Table 8.5: Intake (g/week) within key food groups by household income (Means and standard deviations)

	< £9,999 (n = 30)		£10,000 - £19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Energy (kcal)	1719	515	1996	495	2140	640	2109	494	0.0084
Percentage of the total energy									
Total fat	39	5	37	5	37	5	35	4	0.0042
Saturates	15	2	14	3	13	3	12	3	0.0013
Monosaturates	14	2	13	2	12	2	11	2	0.00001
Polyunsaturates	6	2	6	2	6	2	6	1	0.7444
Carbohydrate	44	5	44	7	44	7	46	5	0.3755

Table 8.6 : Nutrient intakes as percentage energy of the total energy in the diet by household income (Means and standard deviations)

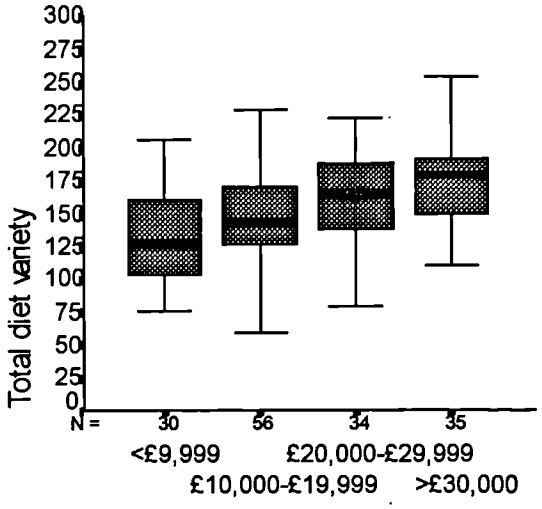
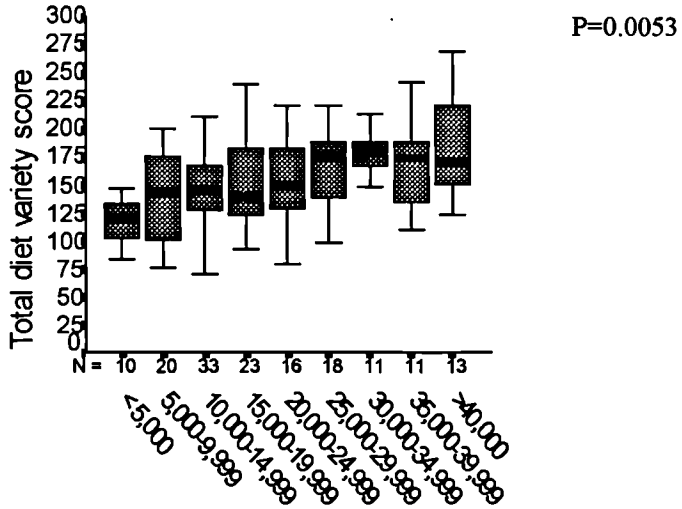


Figure 8.1: The 'linear' relationship between total diet variety and gross annual household income (equivalised into £10,000 increments) and Figure 8.2 : the 'threshold' relationship between total diet variety and gross annual household income (equivalised into £5,000 increments)



Diet variety indicator	< £9,999 (n = 30)		£10,000 -£19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		F-test for relation with income P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Total diet variety	132	38	150	46	161	39	178	40	7.08
									0.0002
Variety – FV	127	37	143	44	153	38	167	38	6.13
									0.0006
FV variety	6	4	8	4	9	4	10	5	8.53
									0.0000
Variety – F	131	37	149	45	159	38	175	39	6.74
									0.0003
F variety	2	2	2	2	3	2	4	2	7.05
									0.0002
Variety – V	128	37	145	45	155	38	172	39	6.48
									0.0004
V variety	4	3	5	2	7	3	7	3	6.44
									0.0004

FV = fruits and vegetables
F = fruit
V = vegetables

Table 8.7 : Indicators of diet variety by household income (Means and standard deviations)

Fruit	n	%
Apples	83	51.9
Bananas	77	48.1
Oranges	44	27.5
Grapefruit	30	18.8
Melon	27	16.9
Strawberries	23	14.4
Pears	22	13.8
Pineapple	16	10.0
Fruit salad	14	8.8
Grapes	12	7.5
Kiwi fruit	12	7.5
Peaches	12	7.5
Plums	7	4.4
Apricots	6	3.8
Raspberries	5	3.1
Rhubarb	2	1.3
Dates	2	1.3
Nectarines	2	1.3
Figs	1	0.6
All other fruit	0	0

Table 8.8: Proportion of sample consuming types of fruit consumed (%)

Vegetables	N	%
Tomatoes	109	68.1
Lettuce	90	56.3
Onions	79	49.4
Peas	70	43.8
Carrots	65	40.6
Baked beans	64	40.0
Cucumber	62	38.8
Mushrooms	55	34.4
Sweetcorn	39	24.4
Cabbage	29	18.1
Turnip	28	17.5
Peppers	27	16.9
Broccoli	27	16.9
Cauliflower	27	16.9
Beetroot	21	13.1
Courgette	18	11.3
Runner or French beans	17	10.6
Vegetables stir fry mix	16	10.0
Brussels	11	6.9
Celery	10	6.3
Mixed vegetables	9	5.6
Spinach	7	4.4
Broad beans	5	3.1
Leeks	5	3.1
Avocado	3	1.9
Beansprouts	1	1.3
Aubergines	2	1.3
Chickpeas	1	0.6
Lentils	1	0.6
All other vegetables	0	0

Table 8.9 Proportion of sample consumed vegetables (%)

Intake (grams/day)	< £9,999 (n = 30)		£10,000 -£19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		F-test for relation with income P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Fruits	56	66	75	79	107	130	111	84	2.85
									0.04
Vegetables	95	109	130	120	148	100	148	98	1.62
									0.19
Fruits and vegetables	151	133	205	177	254	183	260	147	3.08
									0.02

Table 8.10 : Average daily fruits and vegetables intake by household income (Means and standard deviations)

Base	Fruit (g/day) by F variety R	Vegetable (g/day) by V variety R	Fruits and vegetables (g/day) by FV variety R
All sample	**0.7519**	**0.5728**	**0.7155**
Income			
1	0.7860	0.7231	0.8508
2	0.7808	0.5233	0.6567
3	0.6931	0.5019	0.6383
4	0.6301	0.6607	0.7850

Table 8.11 Correlations between fruits and vegetables intake and variety by income

Meal patterns (Per week)	Household Income < £9,999 (n = 30) Mean	SD	£10,000 -£19,999 (n = 56) Mean	SD	£20,000 - £29,999 (n = 34) Mean	SD	> £30,000 (n = 35) Mean	SD	P value
Breakfasts	5.97	2.1	6.39	1.2	6.50	1.1	6.60	1.0	0.2441
M d morning snacks	2.87	2.3	4.09	2.1	4.14	2.2	4.66	1.8	0.0077
Lunches	6.27	0.9	6.18	1.3	6.59	0.9	6.89	0.3	0 0057
Pre-dinner snacks	3.67	2.0	4.29	2.0	4.12	2.1	5.29	1.3	0 0068
Dinner	6.87	0.3	6.84	0.5	6.85	0.4	6.90	0.2	0.6216
After dinner snacks	4.99	2.2	6.07	1.4	6.00	1.6	5.49	1.6	0.011
Total meals	19.1	2.4	19.4	2.0	19.9	1.3	20.5	1.1	0.0100
Total snacks	9.9	2.6	8.4	3.5	8.3	3.6	11.4	4.6	0.0011
Total meal and snack occas ons	30.5	4.9	33.9	4.7	34.2	4.3	35.9	3.9	0.0001

Table 8.12: Meal patterns by household income

Average energy (kcal) per ocassion	Household Income < £9,999 (n = 30) Mean	SD	£10,000 -£19,999 (n = 56) Mean	SD	£20,000 - £29,999 (n = 34) Mean	SD	> £30,000 (n = 35) Mean	SD	P value
Breakfast	248	136	262	158	284	221	325	153	0.2468
Mid morning snack	164	126	202	155	160	115	119	83	0.0295
Lunch	424	162	495	185	518	179	553	161	0 0283
Pre-dinner snack	232	229	194	153	159	123	184	118	0.3211
Dinner	643	189	754	259	813	254	819	268	0 0193
Supper	344	240	370	204	414	228	286	143	0 0709
All main meals	1315	380	1511	458	1615	516	1697	642	0 0067
All snacks	740	433	767	357	733	344	589	256	0 1181

Table 8.13: Average energy (kcals) per occasion by household income

Variety of food	Household Income								P value
	< £9,999 (n = 30)		£10,000 -£19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Breakfast	8.5	4.1	7.9	4.5	8.9	3.6	9.3	4.0	0.3966
Mid morning snack	5.0	4.1	7.2	5.0	7.7	4.8	5.6	2.9	0.0315
Lunch	15.0	5.6	16.8	6.6	19.3	5.7	24.2	7.1	0.0001
Mid afternoon snack	6.1	4.2	6.6	4.4	6.1	4.4	8.9	4.8	0.1485
Dinner	17.5	9.2	21.8	9.9	24.5	11.7	24.8	12.6	0.0310
Supper	10.2	6.1	12.8	11.8	12.6	5.2	10.8	4.9	0.4530
All main meals	41.0	15.4	46.5	15.2	52.7	15.5	58.3	15.1	0.0001
All snacks	21.3	9.2	26.6	16.1	26.4	10.4	24.7	8.9	0.2572

Table 8.14: Variety of foods per meal by household income

Meal types (per week)	Household Income			
	< £9,999 (n = 30)	£10,000 -£19,999 (n = 56)	£20,000 - £29,999 (n = 34)	> £30,000 (n = 35)
	%	%	%	%
Tea and toast breakfast	36.7	46.4	44.1	42.9
Cereal breakfast	43.3	42.9	32.4	11.4
Fried breakfast	53.3	50.0	64.7	77.1
Bacon roll	56.7	66.1	70.6	77.1
Sandwich meal	43.3	28.6	14.7	8.6
Jacket potato meal	80.0	82.1	79.4	71.4
Meat with gravy meal	43.3	37.5	38.2	22.9
Indian/chinese meals	73.3	58.9	32.2	31.4
Burger/pizza meal	60.0	60.7	44.1	51.4
Fish 'supper' (with chips)	63.3	62.5	70.6	77.1

Table 8.15: Ten meal types by household income (Percentages not consuming meal type)

Meal types (frequency per week)	Household Income								P value
	< £9,999 (n = 30)		£10,000 -£19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Tea and toast breakfast	1.9	2.2	1.6	2.1	1.2	1.4	1.6	2.0	0.5054
Cereal breakfast	2.0	2.3	2.5	2.7	2.8	2.7	3.9	2.4	0.0189
Fried breakfast	0.8	1.0	0.7	0.9	0.5	0.8	0.3	0.6	0.0512
Bacon roll	0.7	1.1	0.6	1.0	0.4	0.7	0.3	0.6	0.1470
Sandwich meal	1.5	1.8	2.0	1.9	3.2	2.0	3.1	1.7	0.0002
Jacket potato meal	0.2	0.5	0.2	0.6	0.3	0.6	0.4	0.7	0.4444
Meat with gravy meal	0.8	0.8	1.2	1.5	1.3	1.4	1.3	1.0	0.4085
Indian/chinese meals	0.4	0.8	0.7	1.0	1.2	1.2	1.2	1.2	0.0042
Burger/pizza meal	0.7	1.0	0.6	0.9	0.9	1.2	0.7	0.9	0.7665
Fish 'supper' (with chips)	0.4	0.7	0.5	0.7	0.4	0.6	0.3	0.6	0.4686

Table 8.16: Frequency of consuming ten meal types by household income (means and standard deviations)

Nutrient intakes adjusted for energy (per 1000 kcals)	Household Income								P value
	< £9,999 (n = 30)		£10,000 -£19,999 (n = 56)		£20,000 - £29,999 (n = 34)		> £30,000 (n = 35)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Breakfast									
Protein (g)	29.6	11.1	35.5	11.9	36.0	9.1	33.4	7.3	0.0458
Carbohydrate (g)	135	54	146	46	161	36	164	40	0.0285
Calcium (g)	499	192[a]	715	393[a]	734	350[a]	635	243	0.0127
NSP (g)	5.6	5.6	6.1	6.1	6.5	5.6	9.3	6.3	0.0500
Iron	6.8	7.0[a]	7.2	4.5[b]	6.7	3.0[c]	11.1	7.8[abc]	0.0026
Folate	143	149[a]	158	130[bc]	148	87	248	141[abc]	0.0019
Retinol	320	197	315	192[a]	245	128	207	147[a]	0.0006
Riboflavin	1.0	0.8[a]	1.6	1.2	1.7	1.1	1.8	1.0[a]	0.0104
Thiamin	0.8	0.6[a]	0.9	0.6	0.9	0.5	1.2	0.5[a]	0.0198
Vitamin B6	0.9	1.0[a]	1.1	0.9[b]	1.1	0.7	1.7	1.1[ab]	0.0202
Pre lunch snack									
Vitamin B6	0.3	0.3[a]	0.7	0.7	0.5	0.5	0.8	0.7[a]	0.0064
Vitamin C	7.2	10.9[a]	34.2	71.5	16.8	33.9[b]	75.8	57.5[ab]	0.0123
Lunch									
NSP	4.8	2.4[a]	5.8	3.0	6.0	2.2	6.8	2.6[a]	0.0091
Iron	4.7	1.1	5.7	1.9	5.5	1.6	5.7	1.6	0.0409
Vitamin C	20.6	25.0	21.7	25.2	27.9	22.7	36.9	36.8	0.0499
Dinner									
Total Fat	45.3	6.6	44.6	7.0	44.1	7.1	39.3	7.9	0.0020
Saturated Fat	15.8	3.4[a]	14.8	4.2	14.4	4.0	13.0	3.0[a]	0.0207
MUFA	17.3	3.4[a]	15.7	3.5[b]	15.0	3.0[a]	13.2	2.2[ab]	0.0007
After dinner snack									
Protein	31.9	22.4[a]	21.5	10.6[a]	22.5	8.5[a]	23.5	12.9	0.0091

[a,b],and [c] indicate significant difference found by Bonferroni tests

Table 8.17: Nutrient densities per meal by household income (Significant differences only)

	Outcome of logistic regression		
Food target	**Variables selected**	**Successful predictors %**	
Fruit and vegetables (400g/day)	DEPCAT	meets target	0.0
		fails to meet target	100.00
		Total	83.93
High fibre cereals (34g/day)	AGE	meets target	0.0
		fails to meet target	100.0
		Total	83.22
Bread (180g/day)	none	meets target	0.0
		fails to meet target	100.0
		Total	97.2
Oily fish (88g/day)	INCOME	meets target	28.95
	AGE	fails to meet target	93.33
		Total	76.22
Percentage energy from total fat (< 35%)	INCOME	meets target	22.92
	AGE	fails to meet target	92.63
		Total	69.23
Percentage energy from saturated fat (< 11%)	INCOME	meets target	0.0
		fails to meet target	100.0
		Total	79.58
Percentage energy from carbohydrate (> 50%)	none	meets target	0.0
		fails to meet target	100.0
		Total	86.62

Table 8.18 Logistic regression analysis: Significant variable for predicting whether or not food and nutrient intakes were met

Chapter Nine– Final discussion, conclusions and future directions

The main aim of this thesis has been to carry out original studies to add to the literature on the impact of income on "healthy" eating practices. The studies were carried out mainly in Scotland but may offer insights into associations between income and diet in other cultural contexts. The findings set out in Chapters 4 to 8 have provided evidence of the income and food variety relationship, the income and food expenditure relationship, income and healthy eating practices and the impact of being labelled unemployed on healthy eating practices. The following themes emerged from the findings across the three studies. Conclusions and recommendations for future research will be highlighted in the text in bold.

Paying more for food: food expenditure in lower income households

Compared to higher income households, people living on a lower income spend a higher proportion of their income on food (Dobson *et al* 1994, Central Statistics Office 1995, Leather 1996). In the Income Change Study the Income Decrease Group were found to be spending 44% of their weekly income on food and the Income Increase Group were spending 24% at the initial interview.

A positive linear gradient between food expenditure and income was found in the survey of mothers with young children and in the Income Change Study. The survey of mothers of young children found that total food expenditure ranged from £47.42 in the lowest quintile (of income) to £87.99 in the highest quintile (of income) and considering food expenditure in supermarkets (where the majority of the sample did the majority of their shopping) this ranged from £32.55 in the lowest quintile to £62.01 in the highest quintile.

Spending on food is one expenditure that is most readily cut when unexpected expenses occur (Health Education Authority 1989, Kempson *et al* 1994). In the Income Change study, seven out of every ten of the Income Increase Group altered their expenditure on food (increasing outlay) compared to 84% of the Income Decrease Group (cutting back on spending).

The Dietary Survey of Glaswegian adults did not collect data on food expenditure This prevented the conduct of analysis of calories or nutrients per pound spent by across income groups. Other authors have carried such calculations (Leather 1996, James *et al* 1997) from which it has been concluded that, compared to those living on higher incomes, the poor purchase much more efficiently in terms of calories and nutrient per pound with the exception of antioxidant vitamins which are found in the more (historically) expensive Mediterranean vegetables such as peppers. **From the studies it could be concluded that the poor were spending a greater proportion of their income on food, than people living on higher incomes.**

Women as the main providers of food

Women were over-represented in the three studies presented in this thesis. From the 477 research participants, 334 (70%) were female volunteers. Bearing this in mind together with the body of high quality research into women and food, gender issues could not be ignored.

In the survey of mothers of young children, household income and personal (the woman's) income was found to be significantly associated with food expenditure Partner's income (if living with female respondent) was not related to food expenditure although it did correlate to the woman's personal income. From these findings it is suggested that the women spend on food proportionately to their own accessible resources. As such, monies from their partner did not play a significant role on food provision implying that women are still the main providers of food. The majority of food shopping was carried out by women (either the female research participants themselves or the spouses or partners of the male respondents) in the Income Change Study but the survey of mothers of young children did not ask this question. The expectation of eating a healthy diet for the mothers was more related to personal income rather than overall household income.

The dominant ideology that feeding the household was a woman's work emerged from the accounts of the Income Change Study research participants. Irrespective of

which household member (male or female) had directly experienced the income change, i.e. in instances where the woman had a new job or had suffered a job loss, the implication of the accounts was that the husband's routine took precedence over hers. **It can be concluded that providing food (and therefore a healthy or less healthy diet) for the family was the main responsibility of a woman in the household.**

Going hungry?: Buffering the effects of a drop in income on food

Reductions in both quantity and quality of food in order to economise were reported by the Income Decrease Group of the Income Change Study. In unemployment studies, activities involving expense are known to decline (Warr and Payne 1983) and shortage of money is repeatedly reported as the greatest source of concern (Warr 1987). The omission of studying credit card use prevented an appreciation of its buffering effects of adjusting to a lower income. From the reported food expenditure data, it was obvious that for some households credit cards were being used to purchase food, as food expenditure far outstripped incoming household income. During the interviews, none of the individuals spoke explicitly about skipping more than one meal per day or going hungry which has been reported by studies of parents living on benefits (National Children's Home 1991). In the present study, this may have been left undiscovered due to the methodology or was not evident in the initial weeks following a change in income or at six months i.e. the study period was too short. **In the absence of reporting, it was assumed that all the individuals in the Income Change study were meeting their basic food needs.**

'Keeping up appearances': adaptation to different life circumstances

There was a strong feeling from the interviews of the Income Decrease Group that reducing expenditure on food, a flexible item of expenditure compared to accommodation costs and utility costs, was the crux of adaptation to different life circumstances. The drop in income was not the same for each family and some adjusted with little impact on their 'healthy' eating practices. In their accounts of adapting to family life on a lower income, individuals did discuss the need for 'keeping up appearances'. Two examples illustrate the importance of using familiar

brand names for key foods in family meals such as Kellogg's breakfast cereals and for maintaining pleasureable 'mainstream' eating out occasions for the whole family such as a meal at McDonalds fast food restaurants. In these cases, strategies evolved that did not disturb previous household routines or the equilibrium of everyday life in the previous financial situation. For example, one mother surreptitiously inserted economy cornflakes into Kellogg's boxes prior to breakfasting. In another instance, when the family went to a McDonald's restaurant, the father would buy McDonald 'happy meals' for the children while the adults ordered a cup of coffee only, having eaten a sandwich earlier in the day. **From the accounts recorded, transcribed and analysed, it emerged that there was a strong desire to maintain 'mainstream' or 'normal' social eating practices.**

The impact of being unemployed on 'healthy' eating practices

The literature suggests that over the past 20 years, unemployment has increasingly become highly concentrated within certain families i.e. that if one parent is unemployed it is much more likely that the other parent (in two adult households) is also unemployed (Davies *et al* 1992). In the parents of young children study extended case control analysis, the household characteristics were matched closely. In effect, unemployed mothers were matched with employed mothers who were living on the same income (with the same partnership status and number of similar aged children). Unemployment was superficially related to some healthy eating practices but these was also related to income. The findings suggested that it was the 'being unemployed' label over and above the income that constrained 'healthy' eating practices in the one special case of the consumption of fruits and vegetables. Employed mothers were twice as likely to eat 240g of fruits and vegetables per day than the unemployed mothers. But on further discussion, this conclusion was naïve as no data was collected on debts and outgoings from any of the parents. The data on income, which was collected as disposable income, does not automatically equate to available income. As such this is a self-criticism of all the studies that the benefit of hindsight and experience can allow. **Further studies need to have a fully comprehensive list of income and outgoings.** The present studies did partially

devise a set of questions to collect data on incoming monies but singularly failed to capture insights to outgoing monies.

Income, food and distress

Evidence suggests that living on a lower income is a distressing experience for many families (Health Education Authority 1989, National Children's Home 1991, Dobson *et al* 1994, Dowler and Calvert 1995). Centring on psychological distress, the 30-year-old Life Events Scale (Holmes and Rahe 1967) rates a change in financial state, a change to a different line of work, partner begins or stops work and even a change in eating habits as distinct stressors. The Income Change Study hypothesised that changes in food choice may only take place in those people who are disturbed by the income change. It can be concluded from the findings of the present study that the worst the anxiety and depressive states of the individual, the more food choices had been altered since the involuntary change in income. Food expenditure, which is likely to have been a major source of worry, was also associated with psychological distress. **As the Income Change study could not establish causal relationships between income, food and distress so the inter-relationships between psychological health, food expenditure and modification of usual food choices could not be disentangled.**

Living on a lower income means eating a less varied diet

Choosing a variety of foods across and within food groups is thought to improve eating patterns by providing vitamins, minerals and other micronutrients that are required for optimum health demonstrated in US studies (Kant *et al* 1993, Krebs-Smith *et al* 1987). In the lone parents study conducted in London (Dowler and Calvert 1995) the authors argue that a lack of variety of food in the diet is linked with nutritional inadequacy.

A pronounced relationship between income and dietary variety was found in the survey of mothers in Glasgow and in the dietary survey of Glasgow adults aged 18 to 64 years old. From the data it can be concluded that living on a lower income means eating a less varied diet. The functions of Foodmeter UK (2) provided evidence that

lower incomes were related to lower dietary variety at the total diet level and at an individual meal occasion level. **Therefore it is recommended that health promotion activities need to consider advocating variety at each mealtime whereever possible.**

The nature of the income-variety gradient across income groups

Findings from all three studies consistently suggested that there was a strong relationship between income and food variety consumed. But the measures of food variety used in previous original research studies differ widely and the studies presented in this thesis have used different approaches. Most authors have attempted to classify variety that takes into account all the broad food (and drink) groups using a FFQ (examples vary from very short to 199 items). This approach was used in the earlier studies of this thesis such as the Glasgow parents study. The Glasgow Parents study, using variety scores derived from a short FFQ found that having access to a higher level of income was positively associated with a wider food base. This strong association held true if 'income' was gross household income, personal gross income or partner's (if living together) gross income per annum. Furthermore, the income-variety relationship was best described as an 'inverted V'.

Secondary analysis of the variety-income relationship in a quasi-random sample of people living in Glasgow suggested that £20,000 may be a threshold for the direction (negative or positive) of the income-dietary variety association. The seven-day food and drink diary approach used in the Glaswegian survey to generate different dietary variety scores allowed a wider observation of the 'fine-grain' of the income-variety relationship. In this survey, variety of foods consumed over a 7 day period across income groups from £5,000 to over £40,000 was observed to be related to income as two 'inverted Vs' with £20,000-£24,499 as a turning point. **From the findings from the two studies it can be concluded that there is a 'inverted V' relationship between income and variety with £20,000 as a turning point.**

The role of shopping and cooking practices on monotonous diets

The individuals in the Income Change Study reported variety to be as major issue in their food choices. Individuals had actively tried to increase dietary variety if their available income had risen. One married man in the Income Increase group said 'I eat more of a selection now than the usual pie and chips'. According to the qualitative data, variety was diminished in the Income Decrease Group. From the accounts of this group, it emerged that the adaptation to a more monotonous diet was aided by an increased frequency of cooking at home from raw ingredients. The repertoire of recipes was often limited and typically 'one pot' meals were prepared such as stews, soups, chilli and spaghetti bolognaise. A less varied diet was also a feature of bulking buying for example the '3 for 2 offers' or the 'link and save' offers and by eating leftovers from meals prepared the day before. **It can be concluded that lower income families focus on meals rather than on the individual value of individual foods** confirming the findings of Caraher *et al* (1998). The dietary survey of Glaswegian adults found that the most popular lunch dinner types, across all income groups, were Indian or Chinese meal, burger or pizza meal and fish supper which are all high in fat content.

The impact of an income change on meal patterns

Meal and snack patterns had been significantly altered by some people due to the change in employment circumstances in the Income Change study. Interview data suggested that the impact of the income change on meal patterns ranged from minor shifts in timings of meals to a radical overhaul of the individual's previous routine. Breakfast was the most vulnerable meal occasion to changes, being skipped routinely for different reasons. Some individuals in the Income Increase Group had been motivated to review their food choices towards consciously adopting a healthier lifestyle. Snacking was liable to increase in the Income Decrease Group with the extra availability of food to eat between meals at home which had been more difficult to eat at work. The Income Decrease Group, mainly due to expense, reduced 'eating out' at cafés and restaurants. **It was concluded that the impact of a change in income on meal patterns, although variable from one individual to the next, was significant in most cases.**

Variety and income related independently of fruits and vegetables

It has been suggested that fruits and vegetables, partly due to their discreet nature in food composition tables and partly due to the relationship that exists between income and fruits and vegetables, must make a major contribution to explaining the income-variety relationship i.e. those living on higher incomes eat more fruits and vegetables and therefore eat a more varied diet (Pauline Lee, personal communication). From the dietary survey, due to its comprehensive assessment of diet (assumed to be accurate as possible), a number of measures, including overall dietary variety score, overall variety except fruits and vegetables score, fruits and vegetables score, overall variety except fruit, fruit score, consistently presented the same picture of the income-variety relationship. A variety-income relationship was robust irrespective of the income measure used. So it could be conclusively said that **income is associated with dietary variety per se**.

Dietary choices across income groups

Differences in food intakes by income in the parents study indicated that higher household incomes were associated with lower intakes of white bread, biscuits and higher intakes of high fibre breakfast cereals, chicken, rice and pasta. Not surprisingly in the light of these results carbohydrate intakes were suggested to be positively correlated with increasing incomes. **Food changes evidence from the Income Change Study may support the view that less healthy eating in low-income groups may be a consequence of less healthy eating when a household income decreases involuntarily.**

Implications for diet and disease in Scotland

The Scottish diet has been portrayed as a diet high in meat pies, chips and alcohol and low in fruits and vegetables. This has been confirmed by national and local studies (Whichelow *et al* 1991, Tunstall Pedoe *et al* 1989, Gregory *et al* 1990, Bolton-Smith 1991, Anderson and Hunt 1992, Anderson *et al* 1994, Forsyth *et al* 1994). The survey of parents showed that increasing incomes were related to carbohydrate intakes. No evidence was found of this relationship in the study for fat intakes. But

evidence from, the Dietary Survey of Glaswegian adults strongly suggested that lower incomes were related to higher percentage energy from total fat and saturated fat.

A change in income appeared to have some association with weight gain or loss in women. The body weight measurements of men were more resistant to change. The results presented in this thesis are similar to work showing an increasingly likelihood to gain weight after job loss in British adults (Morris *et al* 1992). But the findings of the study of this thesis is limited as it has no measures of body weight prior to employment changes.

Women in the Income Decrease group were observed to undergo a significant average weight gain matched by a significant average weight loss in the women of the Income Increase Group. The explanation for the weight gain in the unemployed women is based on the results of the frequency of food consumption which indicates that intakes of many foods have decreased. Smoking was discounted as playing a significant role which left two main plausible explanations for the changes in body weight. Energy expenditure may have been reduced and this lead to the weight gain over the relatively short period of six months. An alternative explanation is that the change in income and related life circumstances may disinhibit dietary restraint. Frequently, people will limit their food selections for health conscious reasons and weight reduction concerns, for example, eating more fruit and vegetables rather than fatty foods. It is suggested that women may be more susceptible to dietary restraint issues. The re-employed women may have been motivated to control their weight by peer pressure or by an increased self esteem following a move to a higher household income. **Further research needs to examine these possibilities in greater depth using objective tools where possible.**

The sections above have presented the main salient themes that emerged across the studies of this thesis. Issues underlying the findings of this thesis that demand further discussion to clarify their value will be presented in the following sections.

The Income Change Study, income mobility and time lags

In the UK, very few studies have considered a change in income on food choice and as such the original study presented in this thesis has much to offer in breaking new ground. It has presented a methodological design that could be tested by others and improved for best practice in research in this important area. It is recognised that the present Income Change study is not ideally designed. **Researchers who would wish to pursue this area further are recommended to utilise variables on seasonal consumption of foodstuffs and changes in the nation's wealth (when they are available) to control for the population changes on food choices and 'healthy' eating practices. Also future investigators would benefit from a more systematic sampling frame and a greater 'power' achieved from a larger number of individuals followed up in the study over a longer period of time.**

There may be a time lag between job loss and changes in expenditure. Unemployment may affect diet in one of three ways (Roos *et al* 1991). It may be detrimental causing financial problems and/or changes in social contacts and daily routines for example causing anxiety about wasting unfamiliar foods. It may result in the unemployed having more time for purchasing and preparing foods and they have a better opportunity to improve the quality of their diet by looking for bargains. Finally the unemployed may try to maintain their former lifestyle and follow a diet similar to the one they had before their first lost their job (Prättälä *et al* 1997). Professor John Hills, reviewing the work of Jarvis and Jenkins (1997) on the income trajectories in the UK, concluded that 'someone's chances of being poor this year are greatly increased if they have been poor in recent years' (Hills 1998). This issue should be borne in mind in designing and interpreting research in this area.

The language of monitoring healthy practices

Some of the studies of the present thesis have used the public health nutrition approach of comparing group intakes to national guidelines using terminology such as 'compliance' and 'achievers' and 'non-achievers'. It is now recognised that this approach largely ignores the structural and material factors that influence food choices and nutrition. This approach, commonly used in nutrition, does have some

value in assessing change in the Scottish diet towards defined targets that are markers of better nutrition and health at the population level. It should remain explicit, at all times, that 'compliance' with the dietary targets is not appropriate at the individual level.

The Glasgow dietary survey found that deprivation influenced the fruit and vegetables targets with 88.5% not achieving targets in area 7 (most deprived) compared to 58.8% not achieving target in the most affluent area 1. For oily fish, (fish was one of the foods found to be significantly reduced by the Income Decrease group after their fall in household income), the lower incomes were less likely to comply or achieve with the target. Of those living on incomes below £9,999, 80% failed to meet target compared to 46% of those living in households earning over £30,000. Confirming the findings of Caraher *et al* (1998), **it can be concluded that those in lower income groups selected foods on the basis of cost and taste.**

A note on the samples used in this thesis

Many of the study respondents were living on incomes above the national Scottish average of £298.43 in 1995 (Central Statistics Office 1996) i.e. the samples used in the original studies presented here were predominantly advantaged. For instance 84% of the parents in the first study were owner occcupiers compared to 52% in the general population of Scottish. A question was attempted to be used where respondents indicated which band their home was classified as in the Council Tax bandings in Scotland (A-H) but the item non-response for this question was the highest of all questions in all the studies carried out (>50%). Data that were successfully collected was unusable for the group. Some indicator of the value of the homes of the owner-occupiers as a marker of affluence would have been of value. The Income Change Study respondents were also more highly qualified than the general population but as no comparable data exists on the 'income mobile', it is not possible to say if this is open to bias or not.

The individuals, representatives from households undergoing an involuntary change in income (either a rise or a fall) did not share the same 'income change' either in

absolute or relative terms. The individuals under present study were fairly similar to the sample population of the Social Trends data which describes individuals whose income rose or fell two to three deciles, rose or fell four or more deciles or remained stable (where stable includes a rise or fall of up to a decile) from the 10 decile starting points. The most common reason for either the increase or the decrease in household income was a direct change in employment of the respondent (76% of the Income Increase group and 77% of the Income Decrease group) or by another member of the household (24% of the Income Increase Group and 23% of the Income Decrease Group). The mean pre-change weekly income in the Income Increase Group was £198.49 that increased on average to £341.21. The mean equivalised pre-change weekly income in the Income Decrease Group was £253.64 which dropped to an average weekly total income of £191.90. The individuals and their experiences may give a good representation of individuals changing income in 1995 but it is difficult to be clear about the value of these findings bearing in mind income mobility and the income trajectories described by Jarvis and Jenkins (1997).

Different subtle calculations of measures of income were found to have little notable impact on results and it was assumed that these measures could be used interchangeably in future studies as equivalence was good.

The above sections have discussed some important issues to consider when interpreting the value of the findings from this thesis. The chapter continues with a discussion of the implications of these findings for health policy in Scotland and concludes with a reflection on the research process.

Implications for health policy in Scotland

The findings of the present thesis confirm previous work (Dobson *et al* 1994, Dowler and Calvert 1995) of the centrality of income to healthy eating practices. Any local or national health strategy has to be based on interventions which wholly consider the impact of the income base on individual and family food chocies. For example, the pricing of fruits and vegetables needs to be affordable to those on limited income who are spending a high proportion of their available income on food. The results of this

research has shown that when experiencing an involuntary decrease in income, foods which are often promoted for inclusion in healthy eating practices such as fish, pasta amd rice are decreased as a common experience of these individuals under study. Foods with beneficial effects for health should be accessible to fulfil the needs of all the nation and not based on economic resources. Those living on a low income may not be the same people each year. For instance, individuals in this study of 1995 may be significantly better off now in 1999. But there is strong evidence from which to conclude that even a 'blip' into poverty is likely to result in that individual being persistantly poor (Hills 1998) and based on the contribution of this thesis to the literature, this may have adverse effects on 'healthy' eating practices.

Conclusions

The studies of the present thesis, like all studies, have methodological limitations and possible biases. However, after considering the problems of each study, it seems reasonable to make the following conclusions:

- the poor were spending a greater proportion of their income on food, than people living on higher incomes;
- providing food (and therefore health) for the family was the main responsbility of a woman in the household;
- that all the individuals in the Income Change study were meeting their basic food needs;
- there was a strong desire to maintain 'mainstream' or 'normal' social eating practices following an involuntary decrease in household income;
- there is a 'inverted V' relationship between income and variety with £20,000 as a turning point;
- lower income families focus on meals rather than on the individual value of individual foods and on cost and taste of the food rather than its nutritional content;
- the impact of a change in income on meal patterns, although variable from one individual to the next, was significant in most cases;

- income was associated with dietary variety per se;
- food changes evidence from the Income Change Study may support the view that less healthy eating in low-income groups may be a consequence of undesirable dietary change when a household income decreases involuntarily;
- different subtle calculations of measures of income were found to have little notable impact on results and it was assumed that these measures could be used interchangeably in future studies as equivalence was good.

Recommendations

For future research into the area of income and 'healthy' eating practices, the following recommendations were made:

- studies need to have a fully comprehensive list of income and outgoings;
- dietary interventions and health promotion activities need to consider advocating variety at each mealtime whereever possible;
- studies need to examine the possibilities that a change in income affects weight management in greater depth using objective tools where possible;
- researchers who would wish to pursue this area further are recommended to utilise variables on seasonal consumption of foodstuffs and changes in the nation's wealth (when they are available) to control for the population changes on food choices and healthy eating practices;
- future investigatons would benefit from a more systematic sampling frame and a greater 'power' achieved from a larger number of individuals followed up in the study over a longer period of time;

A reflection on the research process

The conduct of the research studies presented in this thesis has raised my awareness of methodological problems of investigating diet choice-income relationships. This section will report on my thoughts on the issues associated with making observations of individual behaviour within the context of social and cultural norms for behaviours

and the problems in organising the collection and analysis of data to look at the relationship of income to diet and nutrition, bearing in mind the large number of inter-related factors.

Social scientists and nutritionists have faced the inherent difficulties of interpreting individual variation in behaviour as parts of group wide patterns of a phenomena. The approach of nutritionists have emphasised descriptions of diet framed in terms of average or typical diets and the research presented in this thesis was carried out within this medico-dietetic culture. This perspective may result in misleading conclusions about these 'average' diets as the approach assumes shared attitudes and beliefs within the group. After a revisiting to the sociological approach to diet and income, I argue that diet and nutritional issues can be better understood using a perspective that recognises individual variability in diet choice within groups of people Variability in social descriptives can then be linked with variability in diet. The conduct of a programme of research on income and diet leads to my suggestion that I now readily seen the multifactorial nature of income (and income-related) and diet and nutrition and accept that I have not been able in this relatively short period of research training to investigate income-diet relationships with great depth and rigour. The research studies of this thesis are limited in their cross-sectional approaches to income and diet. The Income Change Study breaks from that mould with its prospective approach but the study remains limited by a lack of long term follow-up, an available population derived variable to control for changes in food consumption over time per se and the multiplicity of the variables under study. My future work in this area will aim to obtain or generate more robust validated measures, controlling for population change, over along period of nutrition surveillance. I believe that a failure to investigate fully the effects of income on food choice could lead to inappropriate characterisation and thus inappropriate intervention policies and I would urge that researchers should be highly critical of studies presented in the field of income and diet.

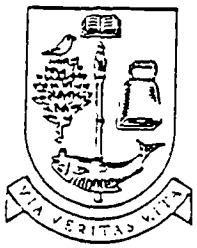
Appendix 1:

Questionnaire used in the parents of young children study

Questionnaire on pages 226 to 245

CONFIDENTIAL

FOOD AND EATING QUESTIONNAIRE 1994



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Thank-you very much for agreeing to complete this questionnaire. Your help with our research is greatly appreciated.

The following questions ask about your food intake, your opinions about diet and about your income and family. The whole questionnaire should take about 30 minutes to complete. Please go through the questions fairly quickly rather than spending a long time thinking about your answers. When you have finished the questionnaire, please check to make sure that you have answered all the questions.

Section 1. Your diet

1. How much bread do you usually have per day?

	Number of slices or rolls per day
White bread or roll	
Brown or wholemeal bread or roll	

2. Which of the following do you most often use butter /margarine/reduced fat spread (please delete as appropriate)?

Please state the brand ----------

3. How many cups of tea do you usually have per day? ---------- cups

4. How many cups of coffee do you usually have per day? ---------- cups

5. How many teaspoons of sugar do you usually have in: tea ---------- teaspoons
coffee ---------- teaspoons

The food list on the next page contains foods that you may eat in a typical week. We would like you to try and estimate how often you eat these foods, either per week or per month.

If you usually eat a given food <u>one or more times per week</u>, please write the actual number of times in the 'per week' column.

However, if you eat the food <u>less than once per week</u>, please estimate how often you eat the food per month and write this number in the **'per month'** column. If you eat the food less than once per month or not at all, please write **'0'** in the **'per month'** column. For example:

Foods eaten	How often?	
	per week	per month
Bowl of porridge		3
Bowl of high-fibre cereal (e.g. Bran-flakes, All-bran)		0
Bowl of other type of cereal (e.g. Rice-Krispies, Puffed Wheat)	5	

This example shows that porridge is eaten three times per month, a high-fibre cereal is eaten less than once per month or not at all, while other cereals are eaten 5 times per week.

6. Please complete the following about your own usual food intake. Please give your answers as number of times **per week** OR **per month.**

Foods eaten by you personally	How often?	
	per week	per month
1. Bowl of porridge		
2. Bowl of high-fibre cereal (e.g. Bran-flakes, All-bran)		
3. Bowl of other type of cereal (e.g. Rice-Krispies, Puffed Wheat)		
4. One glass of fruit juice		
5. Serving of red meat (e.g. beef, lamb, pork) not in meat dish		
6. One sausage, rasher of bacon or small beefburger, slice of ham or luncheon meat		
7. Meat pie, sausage roll, bridie, quiche		
8. Meat dish (e.g. chilli, curry, shepherds pie, lasagne)		
9. Piece of fish (not fried)		
10. Tinned fish		
11. Serving of chicken or turkey		
12. Serving of cheese (e.g. in a sandwich)		
13. Chips, fried, mashed or roast potato		
14. Boiled or jacket potatoes		
15. Serving of rice		
16. Serving of pasta		
17. Serving of fresh vegetables		
18. Serving of frozen vegetables		
19. Serving of tinned vegetables eg. baked beans		
20. Serving of salad (e.g. coleslaw, mixed green salad)		
21. One orange, apple, banana or other fruit		
22. Serving of tinned fruit		
23. One plain biscuit eg. rich tea		
24. One chocolate biscuit		
25. One piece of cake or pastry		
26. Other dessert eg. ice-cream		
27. One small bar of chocolate or bag of sweets		
28. Packet of crisps		
29. Half pint of beer or lager		
30. One glass of wine or one short (e.g. brandy, whisky)		
31. Number of pints of whole milk (used by yourself only)		
32. Number of pints of semi-skimmed or skimmed milk (used by yourself only)		

Section 2. Your opinions about food

This section consists of questions which you should answer by placing a cross in the box which best describes your opinion. Please mark only one box per question.

Although some questions may seem very similar, it is important that you answer all the questions.
You do not need to refer to previous questions.

There are no right or wrong answers; we simply want to know how you feel about different food-related issues.

1. Do you think that your current diet is

☐	☐	☐	☐	☐	☐	☐
extremely unhealthy	very unhealthy	quite unhealthy	neither	quite healthy	very healthy	extremely healthy

2. Do you think that the current diet of the average person of the same sex and age as yourself in this country is

☐	☐	☐	☐	☐	☐	☐
extremely unhealthy	very unhealthy	quite unhealthy	neither	quite healthy	very healthy	extremely healthy

3. Do you agree or disagree that you should try and make your diet more healthy

☐	☐	☐	☐	☐	☐	☐
disagree very strongly	disagree strongly	disagree slightly	neither	agree slightly	agree strongly	agree very strongly

4. Do you agree or disagree that the average person of the same sex and age as yourself in this country should try and make their diet more healthy

☐	☐	☐	☐	☐	☐	☐
disagree very strongly	disagree strongly	disagree slightly	neither	agree slightly	agree strongly	agree very strongly

5. Do you feel that you are

☐	☐	☐	☐	☐	☐	☐
very underweight	quite underweight	slightly underweight	correct weight	slightly overweight	quite overweight	very overweight

6. Do you feel that the average person of the same sex and age as yourself in this country is

☐	☐	☐	☐	☐	☐	☐
very underweight	quite underweight	slightly underweight	correct weight	slightly overweight	quite overweight	very overweight

7. To what extent have you changed your diet in the past in order to control your weight?

☐	☐	☐	☐	☐	☐	☐
not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent

8. Please estimate how often you think the **average person of the same sex and age as yourself in this country**, eats the following foods. We realise that this is difficult but please try to estimate as well as you can.

If you think that the average person usually eats a given food **one or more times per week**, please write the actual number in the **'per week'** column.

However, if you think that the average person usually eats a given food **less than once per week**, please write this number in the **'per month'** column. If you think that the average person eats the food **less than once per month or not at all**, please write **'0'** in the **'per month'** column.

Please give your answers as number of times **per week** OR **per month.**

Foods eaten by the average person of the same sex and age as yourself in this country	How often ?	
	per week	**per month**
1. One sausage, rasher of bacon or small beefburger, slice of ham or luncheon meat		
2. Meat pie, sausage roll, bridie, quiche		
3. Piece of fish (not fried)		
4. Tinned fish		
5. Boiled or jacket potatoes		
6. Serving of rice		
7. Serving of pasta		
8. Serving of fresh vegetables		
9. Serving of frozen vegetables		
10. Serving of tinned vegetables eg. baked beans		
11. Serving of salad (e.g. coleslaw, mixed green salad)		
12. One orange, apple, banana or other fruit		
13. Serving of tinned fruit		
14 One plain biscuit eg. rich tea		
15. One chocolate biscuit		
16. One piece of cake or pastry		
17. One small bar of chocolate or bag of sweets		
18. Number of pints of whole milk		
19. Number of pints of semi-skimmed or skimmed milk		

	Number of slices or rolls per day
20. White bread or roll	
21. Brown or wholemeal bread or roll	
22. Type of spread most often used	Butter /Margarine /Reduced-fat spread (please delete as appropriate)

9. Do you think that it would be unenjoyable or enjoyable for you in the next six months to:-

	extremely unenjoyable	quite unenjoyable	slightly unenjoyable	neither	slightly enjoyable	quite enjoyable	extremely enjoyable	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely unenjoyable	quite unenjoyable	slightly unenjoyable	neither	slightly enjoyable	quite enjoyable	extremely enjoyable	not applicable

10. Do you think that it would be foolish or wise for you in the next six months to:-

	extremely foolish	quite foolish	slightly foolish	neither	slightly wise	quite wise	extremely wise	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely foolish	quite foolish	slightly foolish	neither	slightly wise	quite wise	extremely wise	not applicable

11. How likely is it that in the next six months the average person of the same sex and age as yourself in this country will...

	extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely
eat an unhealthy diet	☐	☐	☐	☐	☐	☐	☐
get heart disease	☐	☐	☐	☐	☐	☐	☐
get cancer	☐	☐	☐	☐	☐	☐	☐
put on weight	☐	☐	☐	☐	☐	☐	☐

12. How likely is it that in the next six months you will...

	extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely
eat an unhealthy diet	☐	☐	☐	☐	☐	☐	☐
get heart disease	☐	☐	☐	☐	☐	☐	☐
get cancer	☐	☐	☐	☐	☐	☐	☐
put on weight	☐	☐	☐	☐	☐	☐	☐
	extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely

13. Do you think that it would be harmful or beneficial to you in the next six months to:-

	extremely harmful	quite harmful	slightly harmful	neither	slightly beneficial	quite beneficial	extremely beneficial	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely harmful	quite harmful	slightly harmful	neither	slightly beneficial	quite beneficial	extremely beneficial	not applicable

14. Do you think that it would be unpleasant or pleasant for you in the next six months to:-

	extremely unpleasant	quite unpleasant	slightly unpleasant	neither	slightly pleasant	quite pleasant	extremely pleasant	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely unpleasant	quite unpleasant	slightly unpleasant	neither	slightly pleasant	quite pleasant	extremely pleasant	not applicable

15. How much control do you have over whether you...

	no control at all						total control	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	no control at all						total control	not applicable

16. How difficult or easy would it be for you to:

	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable

The questions on the next three pages may seem repetitive but it is important to our research that you answer them all. You have nearly finished this section of the questionnaire!

17. 'Most people who are important to me think that in the next six months I should...'

	agree very strongly	agree strongly	agree slightly	neither	disagree slightly	disagree strongly	disagree very strongly	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	agree very strongly	agree strongly	agree slightly	neither	disagree slightly	disagree strongly	disagree very strongly	not applicable

18. How likely is it that in the next six months you will...

	extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely	not applicable

19. To what extent do you feel that you need to make the following changes in the next six months ?

	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable

20. To what extent do you feel that the average person, of the same sex and age as yourself in this country, needs to make the following changes in the next six months?

	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable

21. To what extent have you changed your diet in the past to:

	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable

22. To what extent have you maintained the changes you made in the past to:

	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	☐
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	☐
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	☐
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	☐
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	☐
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely great extent	a very great extent	a great extent	moderate extent	slight extent	a very little extent	not at all	not applicable

23. How difficult or easy was it in the past for you to...

	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	☐
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	☐
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	☐
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	☐
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	☐
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable

24. Were the following changes that **you** made in the past difficult or easy to maintain?

	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable
eat a healthier diet	☐	☐	☐	☐	☐	☐	☐	☐
eat more bread (all types)	☐	☐	☐	☐	☐	☐	☐	☐
use less butter and margarine	☐	☐	☐	☐	☐	☐	☐	☐
eat less sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
eat more potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐	☐
eat more vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	☐
eat less cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐	☐
eat more fruit	☐	☐	☐	☐	☐	☐	☐	☐
use skimmed or semi-skimmed milk instead of whole milk	☐	☐	☐	☐	☐	☐	☐	☐
	extremely difficult	very difficult	quite difficult	neither	quite easy	very easy	extremely easy	not applicable

The next part of this section is slightly different from the previous part. Remember that the best way to answer the questions is to go through them quickly rather than spend a long time thinking about your answers.

25. Would you want to eat more or less of the following than you currently eat if cost were not an issue:

	very much less	much less	slightly less	neither	slightly more	much more	very much more	not applicable
high-fibre breakfast cereals	☐	☐	☐	☐	☐	☐	☐	☐
other types of breakfast cereals	☐	☐	☐	☐	☐	☐	☐	☐
white bread	☐	☐	☐	☐	☐	☐	☐	☐
brown or wholemeal bread	☐	☐	☐	☐	☐	☐	☐	☐
sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐	☐
fish	☐	☐	☐	☐	☐	☐	☐	☐
potatoes (not including chips)	☐	☐	☐	☐	☐	☐	☐	☐
vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐	☐
fruit	☐	☐	☐	☐	☐	☐	☐	☐
cakes, biscuits and pastries	☐	☐	☐	☐	☐	☐	☐	☐
sweets and chocolate	☐	☐	☐	☐	☐	☐	☐	☐
whole milk	☐	☐	☐	☐	☐	☐	☐	☐
skimmed or semi-skimmed milk	☐	☐	☐	☐	☐	☐	☐	☐
fruit juice	☐	☐	☐	☐	☐	☐	☐	☐
cheese	☐	☐	☐	☐	☐	☐	☐	☐
	very much less	much less	slightly less	neither	slightly more	much more	very much more	not applicable

26. How important to you is buying food that is good value for money?

very unimportant	quite unimportant	slightly unimportant	neither	slightly important	quite important	very important
☐	☐	☐	☐	☐	☐	☐

27. How much value for money do you think **you** get, or would get, from buying the following?

	extremely poor value	very poor value	quite poor value	neither	quite good value	very good value	extremely good value
a healthy diet	☐	☐	☐	☐	☐	☐	☐
bread (all types)	☐	☐	☐	☐	☐	☐	☐
butter and margarine	☐	☐	☐	☐	☐	☐	☐
sausages, burgers and pies	☐	☐	☐	☐	☐	☐	☐
potatoes (not chips)	☐	☐	☐	☐	☐	☐	☐
vegetables (not potatoes)	☐	☐	☐	☐	☐	☐	☐
cakes, pastries and biscuits	☐	☐	☐	☐	☐	☐	☐
fruit	☐	☐	☐	☐	☐	☐	☐
skimmed or semi-skimmed milk	☐	☐	☐	☐	☐	☐	☐
whole milk	☐	☐	☐	☐	☐	☐	☐
	extremely poor value	very poor value	quite poor value	neither	quite good value	very good value	extremely good value

28. Do you agree or disagree that it is difficult for **you** to eat healthily when:

	agree strongly			neither			disagree strongly
cooking for friends or other guests	☐	☐	☐	☐	☐	☐	☐
eating out at friends' houses	☐	☐	☐	☐	☐	☐	☐
eating out (other)	☐	☐	☐	☐	☐	☐	☐
eating take-away food	☐	☐	☐	☐	☐	☐	☐
eating snacks	☐	☐	☐	☐	☐	☐	☐
cooking meals for your partner and yourself	☐	☐	☐	☐	☐	☐	☐
cooking meals for your children and yourself	☐	☐	☐	☐	☐	☐	☐
your partner or children want food that you find hard to resist	☐	☐	☐	☐	☐	☐	☐
you are bored	☐	☐	☐	☐	☐	☐	☐
you feel depressed	☐	☐	☐	☐	☐	☐	☐
you feel stressed	☐	☐	☐	☐	☐	☐	☐
	agree strongly			neither			disagree strongly

29. To help improve the nation's health, howmuch of the following do you think people in Britain should eat:

	eat more	eat the same amount	eat less	stop eating	do not know
dietary fibre	☐	☐	☐	☐	☐
polyunsaturated fat	☐	☐	☐	☐	☐
starchy carbohydrate	☐	☐	☐	☐	☐

30. To help improve the nation's health, how much of the following do you think people in Britain should eat:

	eat more	eat the same amount	eat less	stop eating	do not know
potatoes (baked and boiled)	☐	☐	☐	☐	☐
bread (white, brown and wholemeal)	☐	☐	☐	☐	☐
cereals (breakfast, rice and pasta)	☐	☐	☐	☐	☐
fruit and vegetables	☐	☐	☐	☐	☐

31. Which one of the following do you think contains the most dietary fibre?

1 average slice of wholemeal toast ☐
small tin of baked beans ☐
1 medium apple ☐
average portion of raw salad (e.g. lettuce, tomato, cucumber) ☐
Do not know ☐

32. Which one of the following do you think contains the **most** dietary fibre? (Assume equal weights of foods)

wholemeal bread ☐
brown bread toasted ☐
digestive biscuits ☐
cream crackers ☐
Do not know ☐

33. Please state whether you think the following statements are true or false

a. Butter contains more fat than margarine

definitely true	probably true	do not know	probably false	definitely false
☐	☐	☐	☐	☐

b. Skimmed and semi-skimmed milk contain **less** fat than whole milk

definitely true	probably true	do not know	probably false	definitely false
☐	☐	☐	☐	☐

c. Baked and boiled potatoes contain **more** fat than chips or roast potatoes

definitely true	probably true	do not know	probably false	definitely false
☐	☐	☐	☐	☐

d. Roast pork, beef and lamb contain **more** fat than chicken without the skin

definitely true	probably true	do not know	probably false	definitely false
☐	☐	☐	☐	☐

34. Do you think that in the next six months you will have more or less money to spend on food than you do at present?

a great deal more	a lot more	slightly more	the same amount	slightly less	a lot less	a great deal less
☐	☐	☐	☐	☐	☐	☐

Please state whether for you it is likely or unlikely that:

35. 'The taste of my diet would get worse if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

36. 'I would spend more time than usual preparing and cooking meals if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

37. 'I would spend more money than usual on food if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

38. 'I would get less support than usual from my family if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

39. 'Eating a healthier diet in the next six months would be good for my health'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

40. 'Eating a healthier diet in the next six months would be good for my family's health'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

41. 'My weight control would be easier if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

42. 'I would feel more hungry than usual if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

43. 'My diet would become less monotonous than usual if I were to eat a healthier diet in the next six months'

extremely likely	quite likely	slightly likely	neither	slightly unlikely	quite unlikely	extremely unlikely
☐	☐	☐	☐	☐	☐	☐

44. **Within the next six months would the following be good or bad for you?**

	extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
a. The taste of my diet getting worse	☐	☐	☐	☐	☐	☐	☐
b. Spending more money than usual on food	☐	☐	☐	☐	☐	☐	☐
c. Spending more time than usual preparing and cooking meals	☐	☐	☐	☐	☐	☐	☐
d. Getting less support than usual from my family	☐	☐	☐	☐	☐	☐	☐
e. Eating a healthier diet which is good for my health	☐	☐	☐	☐	☐	☐	☐
f. Eating a healthier diet which is good for my family's health	☐	☐	☐	☐	☐	☐	☐
g. My weight control being easier	☐	☐	☐	☐	☐	☐	☐
h. My feeling more hungry than usual	☐	☐	☐	☐	☐	☐	☐
i. My diet becoming less monotonous than usual	☐	☐	☐	☐	☐	☐	☐
	extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad

Section 3. Personal information

This is the final section of the questionnaire. Please complete the following questions about yourself and your household. If you do not know your exact income, benefits or shopping bills, please make estimates where possible.

We realise that this information is rather personal, but it is very important for our research. Please note that all information you give will be completely confidential; we do not ask for your name or address.

1. Your sex Male / Female (please delete as appropriate)

2. Your age _____ yrs

3. Your weight _____ kgs or _____ stone_____ lbs

4. Your height _____metres or _____ ft _____ ins

5. Which of the following qualifications do you have? (Please tick as many boxes as applicable)

☐'O' level or GCSE ☐'A' level or Highers ☐Academic degree ☐Postgraduate degree

☐Professional qualification ☐Technical /vocational qualification ☐other (please specify)

6. How many other adults (aged over 18 yrs, **not including yourself**) with whom you share **all** bills (**including food**) are there in your household

_____

7. Is one of these adults your partner ? Yes /No (please delete as appropriate)

8. How many children of the following ages are there in your household ?

under 2 years old _____

2 - 4 years old _____

5 - 7 years old _____

8 - 10 years old _____

11 - 12 years old _____

13 - 15 years old _____

16 - 18 years old _____

9. What is the job title of the main earner in your household (if unemployed, please give title of previous job) _____

Title of previous job if currently unemployed _____

If you are currently unemployed, please answer questions 10 and 11. If you are currently employed, please go to question 12.

10. How much unemployment benefit do you receive £_____/fortnight

11. How much did you earn in your previous job
after paying tax and National Insurance £_____/month
(Now please go to question 13)

12. How much do you earn per month after paying tax and National Insurance £_____/month

13. How much income support do you receive £_____/fortnight

14. If you are currently living with a partner, how much do they earn per month £_____/month
after paying tax and National Insurance

15. How much money do you get from other people who live with you which
is used for food, bills, rent etc. £_____/week

16. How much money do you get from other people that you know,
who do not live with you, which is used for food, bills, rent etc. £_____/week

17. How much family credit, child benefit, £_____/fortnight
one parent benefit or other benefit do you get

18. How much housing benefit plus council tax benefit do you get £_____/fortnight

19. How much money does your household (this includes yourself and any other adult with whom you live and share all bills) get per year from employment, benefits, other people and other sources, after paying tax and National insurance (please tick appropriate box)?

☐less than £5,499	☐between £5,500 and £9,900	☐between £9,901 and £15,000	☐between £15,001 and £21,900	☐greater than £21,901

20. What type of accomodation do you live in (please tick appropriate box)?
☐own house/flat ☐rented house/flat ☐rented bedsit ☐bed and breakfast

21. If you own your own home and **do not have a mortgage**, what is your council tax band _____

22. Approximately how much money do you spend on food in a typical week Total £_____/week
(including food eaten away from home
(e.g. at restaurants, at work, take-aways, chocolate bars)

23. Approximately how much do you spend on food in the supermarket £_____/week

24. Approximately how much do you spend on food in your local shops £_____/week

25. Do you own or have access to a car for food shopping yes/no (please delete as appropriate)

26. Do you usually take **public transport/taxi /walk/go by car** when you do your main food shop? (please delete as appropriate)

27. Do you own or use a freezer yes/no (please delete as appropriate)

28. Do you own or use a fridge yes/no (please delete as appropriate)

29. Do you own or use a cooker yes/no (please delete as appropriate)

Thank-you for completing this questionnaire. Your help in our research is very much appreciated.

Could I please ask you to check through the questionnaire to make sure that you have not missed out any questions.

If you have any further comments about this questionnaire, we would like to hear from you. Please feel free to use the space below for your comments.

A freepost envelope is enclosed for you to return the questionnaire.

Thank-you.

Appendix 2: Equivalence scales devised by McClements to allow comparisons between varying household size and composition (McClements 1977).

	Before housing costs	After housing costs
1st adult (head of household)	**0.61**	**0.55**
Spouse of head	**0.39**	**0.45**
Other 2nd adult	**0.46**	**0.45**
3rd adult	**0.42**	**0.45**
Each subsequent adult	**0.36**	**0.40**
Each dependent aged 0-1	**0.09**	**0.07**
Each dependent aged 2-4	**0.18**	**0.18**
Each dependent aged 5-7	**0.21**	**0.21**
Each dependent aged 8-10	**0.23**	**0.23**
Each dependent aged 11-12	**0.25**	**0.26**
Each dependent aged 13-15	**0.27**	**0.28**
Each dependent aged 16 or over	**0.36**	**0.38**

Appendix 3: Healthy eating post-hoc categories modified from HEBS Healthy Eating Quiz

The Coding scheme is marked in bold.

A1. Type of milk used

Ordinary **4,** Semi-skimmed **2,** Skimmed **1**

A2. Type of spreading fat used

Butter **8,** Margarine **6,** Reduced fat spread **2**

A3. Frequency of eating biscuits, cakes or pastries per week

6 or more times **6,** 3-5 times **4,** once or twice **2**

A4. Frequency of eating sweets, chocolates, and confectionery per week

6 or more times **6,** 3-5 times **4,** once or twice **2**

A5. Frequency of eating chips or crisps per week

6 or more times **6,** 3-5 times **4,** once or twice **2**

A6. Frequency of eating sausages/meat pies/ burgers per week

6 or more times **8,** 3-5 times **6,** once or twice **2**

B1. Number of slices of bread (or equivalent in rolls or chapatis etc.) consumed per day

6 or more **8** 4-5 **6** 2-3 **2**

B2. Frequency of eating boiled or baked potaotes, rice, pasta or noodles per week

6 or more times **8** 3-5 times **6** once or twice **2**

B3. Categorise the variety of staples eaten per week *

Potatoes, pasta and rice **8** rice and potatoes, potatoes and pasta **6**

Pasta and rice **2** Pasta only, rice only, potatoes only **1**

B4. Frequency of eating breakfast cereal per week

6 or more times **8** 3 -5 times **6** once or twice **2**

(add 2 points if it is usually wholewheat/wholegrain variety)

B5. Number of portions of fruit and vegetables (fresh, frozen or tinned) eaten per day?

6 or more **8** 3-5 **6** 2 **2**

This replaces the original question 'How do you spread margarine/buetter on bread? Responses: Thickly (score 8), medium (score 6) and thinly (score 2).

* This replaces the original question 'How many potatoes (about the size of an egg) do you usually eat as part of a meal? Responses: 5 or more (score 8), 4 (score 6), 3 (score 2) and 1-2 (score 1)

Appendix 4:

Postal questionnaire for Income Change Study - Baseline

Questionnaire pages 250 - 265

The questionnaire has three kinds of questions. The first asks you to tick a box to indicate the answer that applies to you, the second asks you to circle your response and the other asks you to simply write an answer on the line provided.

Your responses will be STRICTLY CONFIDENTIAL.

ABOUT YOURSELF

1. You are

   Male ☐
   Female ☐

2. How old are you?

   _____ years old

3. What is your current weight? _____

4. What is your height? _____

5. Do you have any of the following educational qualifications?
   (Please tick all relevant boxes)

   O levels, GCSE or equivalent ☐
   A Levels, Higher or equivalent ☐
   Technical/vocational qualification ☐
   Degree ☐
   Postgraduate ☐
   Professional qualification ☐
   None ☐
   Other _____

6. How do you describe your ethnicity?

African	☐	Caribbean	☐	Indian	☐
Asian	☐	Chinese	☐	Pakistani	☐
Bangladeshi	☐	European	☐	White	☐
Black	☐				

7. How do you describe your religion?

_____

8. How physically active would you say you are?

very active	☐
quite active	☐
neither active nor inactive	☐
quite inactive	☐
very inactive	☐

9a. Do you smoke cigarettes?

yes regularly *(go to question 9b)*	☐
no	☐
occasionally (usually less than one cigarette per day)	☐

9b. On average, about how many cigarettes do you smoke a day?

_____ Cigarettes

DECREASE IN HOUSEHOLD INCOME

10. Putting together all sources of income in the household, which phrase below best describes the amount of money you, as a household, have to spend each week now, compared to before your household income decreased?

more than before	☐
same as before	☐
about three quarters of before	☐
about half as much as before	☐
about one quarter of before	☐
less than one quarter of before	☐

11. Six months ago, were you... ?

Looking after the home and/or family	☐
In full-time work (permanent employee)	☐
In part-time work (permanent employee)	☐
In full-time work (temporary employee)	☐
In part-time work (temporary employee)	☐
Job sharing	☐
Self-employed	☐
Unemployed	☐
Student	☐
Not stated above (please specify	

_____

12. Was your home..?

rented	☐
owned	☐

13. Was your telephone...?

outgoing and incoming calls	☐
incoming calls only	☐
neither, no telephone	☐

14. Was there a car or van available for use by you or any members of your family?

Yes	☐
No	☐

15. How much did your household spend on the following items at the moment and six months ago?

ITEM	AMOUNT PAID	
	AT THE MOMENT	SIX MONTHS AGO
Rent/Mortgage		
Heating		
Telephone		
Transport		
Doing any sport and exercise		
Watching videos at home		
On books/newspapers		
Going to the pub		
Eating out in cafes/takeaways		
Eating out in restaurants		
Cooking for pleasure		
Going to the cinema/theatre		
Playing lotteries/gambling		
Any other leisure		
Cigarettes		
Alcohol		

16. To what extent do you worry about money?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

17. Six months ago, to what extent did you worry about money?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

18. How much money does your household (this includes yourself and any other adult with whom you live and share all the bills) get from employment, benefits and other sources, after paying tax and National Insurance. This information is essential for the project. Your answers are completely anonymous and will be treated confidentially.

AT THE MOMENT				SIX MONTHS AGO			
£ per week		**£ per month**		**£ per week**		**£ per month**	
Under £ 106	☐	Under £ 458	☐	Under £ 106	☐	Under £ 458	☐
£ 106 - £ 190	☐	£ 459 - £ 825	☐	£ 106 - £ 190	☐	£ 459 - £ 825	☐
£ 191 - £ 288	☐	£ 825 - £ 1250	☐	£ 191 - £ 288	☐	£ 825 - £ 1250	☐
£ 289 - £ 421	☐	£ 1250 - £1825	☐	£ 289 - £ 421	☐	£ 1250 - £ 1825	☐
£422+	☐	£1826+	☐	£422+	☐	£1826+	☐

	AT THE MOMENT	SIX MONTHS AGO
19. How much money is/was contributed by others not living in household which was used for food, bills, rent etc.?	£ per month	£ per month
20. Household Benefits:unemployment benefits, family credit,child benefit, one parent benefit?	£ per month	£ per month

ABOUT THINGS IN YOUR HOME

21. Please circle the answer to show whether you have any of the following items in your home at present and six months ago?

ITEM	AT THE MOMENT		6 MONTHS AGO	
TELEPHONE	Yes	No	Yes	No
COLOUR TELEVISION	Yes	No	Yes	No
BLACK AND WHITE TELEVISION	Yes	No	Yes	No
WASHING MACHINE	Yes	No	Yes	No
TUMBLE DRIER	Yes	No	Yes	No
FRIDGE	Yes	No	Yes	No
COOKER	Yes	No	Yes	No
FREEZER	Yes	No	Yes	No
DEEP FAT FRYER	Yes	No	Yes	No
VACUUM CLEANER	Yes	No	Yes	No
DISH WASHER	Yes	No	Yes	No
VIDEO RECORDER	Yes	No	Yes	No
HI-FI	Yes	No	Yes	No
CD PLAYER	Yes	No	Yes	No
MICROWAVE OVEN	Yes	No	Yes	No
HOME COMPUTER	Yes	No	Yes	No
RADIO	Yes	No	Yes	No
CASSETTE PLAYER	Yes	No	Yes	No
CENTRAL HEATING	Yes	No	Yes	No

ABOUT YOUR FOOD PREFERENCES

The next section of the questionnaire is concerned with how much you like certain foods compared to how much you liked them six months ago. For some people, their preferences will not have changed and you should mark below the box 'the same as 6 months ago' or for instance you may never eat that type of food and you should feel free to indicate that in the box below 'I never eat that foodstuff'

Please mark the box under your response.

22. Do you currently like whole milk ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

23. Do you currently like skimmed or semi-skimmed milk....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

24. Do you currently like brown or wholemeal bread....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

25. Do you currently like white bread....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

26. Do you currently like butter....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

27. Do you currently like margarine....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

28. Do you currently like reduced-fat spreads (e.g. Delight) ?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

29. Do you currently like fruit juice....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

30. Do you currently like sausages....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

31. Do you currently like bacon....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

32. Do you currently like beefburgers ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

33. Do you currently like meat pies....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

34. Do you currently like lean cuts of red meat (e.g. beef, lamb or pork) ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

35. Do you currently like other cuts of red meat (e.g. beef, lamb or pork) ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

36. Do you currently like chicken or turkey ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

37. Do you currently like fish, fresh, frozen or tinned ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

38. Do you currently like Cheddar cheese....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

39. Do you currently like speciality cheese (e.g. Brie)....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

40. Do you currently like potatoes....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

41. Do you currently like chips....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

42. Do you currently like rice....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

43. Do you currently like pasta....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

44. Do you currently like fresh vegetables (e.g. carrots not including potatoes)?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

45. Do you currently like frozen vegetables (e.g. peas, carrots)....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

46. Do you currently like apples....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

47. Do you currently like other fresh fruit (e.g. bananas, oranges, grapes)....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

48. Do you currently like plain biscuits (e.g. Digestive) ....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

49. Do you currently like chocolate biscuits (e.g. Hobnobs)....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

50. Do you currently like cakes (e.g. sponge cakes pastries)....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

51. Do you currently like chocolate....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

52. Do you currently like crisps....?

extremely less than 6 months ago	much less than 6 months ago	slightly less than 6 months ago	the same as 6 months ago	slightly more than 6 months ago	much more than 6 months ago	extremely more than 6 months ago
☐	☐	☐	☐	☐	☐	☐

BELIEFS QUESTIONNAIRE

Please answer the following questions on your opinions about your 'diet'. Please note that 'diet' does not refer to a special slimming diet prescribed by a doctor. It means 'the food that you eat'.

1. To what extent do you agree or disagree with the following statements:

eating a healthy diet.....	disagree strongly	disagree moderately	disagree slightly	neither	agree slightly	agree moderately
• is good for my health	☐	☐	☐	☐	☐	☐
• is good for my heart	☐	☐	☐	☐	☐	☐
• means that meals take a long time to prepare and cook	☐	☐	☐	☐	☐	☐
• means that meals do not taste very good	☐	☐	☐	☐	☐	☐
• is expensive	☐	☐	☐	☐	☐	☐
• means that you do not get very good value for money	☐	☐	☐	☐	☐	☐
• means that you do not enjoy your food very much	☐	☐	☐	☐	☐	☐
• means that your family does not enjoy your food very much	☐	☐	☐	☐	☐	☐
• means not eating some foods that you like	☐	☐	☐	☐	☐	☐
• means not being able to eat quick convenience foods	☐	☐	☐	☐	☐	☐
	disagree strongly	disagree moderately	disagree slightly	neither	agree slightly	agree moderately

2. Please state whether you think the following would be good or bad for you:

If eating a healthy diet.....	extremely good	quite good	slightly good	neither	slightly bad	quite bad
• was good for my health that would be	☐	☐	☐	☐	☐	☐
• was good for my heart that would be	☐	☐	☐	☐	☐	☐
• meant that meals take a long time to prepare and cook, that would be	☐	☐	☐	☐	☐	☐
• meant that meals do not taste very good, that would be	☐	☐	☐	☐	☐	☐
• was expensive, that would be	☐	☐	☐	☐	☐	☐
• meant that I did not get very good value for money, that would be	☐	☐	☐	☐	☐	☐
• meant that I did not enjoy my food very much, that would be	☐	☐	☐	☐	☐	☐
• meant that my family did not enjoy their food very much, that would be	☐	☐	☐	☐	☐	☐
• meant that I could not eat some foods that I like, that would be	☐	☐	☐	☐	☐	☐
• meant not being able to eat quick convenience foods, that would be	☐	☐	☐	☐	☐	☐

	extremely good	quite good	slightly good	neither	slightly bad	quite bad

3. Do you think that for <u>you</u> eating a healthy diet is...

extremely harmful	quite harmful	slightly harmful	neither	slightly beneficial	quite beneficial	extremely beneficial
☐	☐	☐	☐	☐	☐	☐
extremely unpleasant	quite unpleasant	slightly unpleasant	neither	slightly pleasant	quite pleasant	extremely pleasant
☐	☐	☐	☐	☐	☐	☐
extremely difficult	quite difficult	slightly difficult	neither	slightly easy	quite easy	extremely easy
☐	☐	☐	☐	☐	☐	☐
extremely unenjoyable	quite unenjoyable	slightly unenjoyable	neither	slightly enjoyable	quite enjoyable	extremely enjoyable
☐	☐	☐	☐	☐	☐	☐
extremely foolish	quite foolish	slightly foolish	neither	slightly wise	quite wise	extremely wise
☐	☐	☐	☐	☐	☐	☐

4. "Most people who are important to me think that I should eat a healthy diet"

agree strongly	agree moderately	agree slightly	neither	disagree slightly	disagree moderately	disagree strongly
☐	☐	☐	☐	☐	☐	☐

5. To what extent do you feel that you need to eat a healthy diet?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

6. How likely is it that next week you will eat a healthy diet?

extremely unlikely	very unlikely	quite unlikely	neither	quite likely	very likely	extremely likely
☐	☐	☐	☐	☐	☐	☐

7. How much control do you have over whether you eat a healthy diet?

no control at all						total control
☐	☐	☐	☐	☐	☐	☐

INSTRUCTIONS

Now please check that you have answered ALL the questions.

Thank you very much for your help.

If your interview date is in less than four days time please bring this questionnaire with you to the interview.

If your interview date is in more than four days time please return the questionnaire in the FREEPOST envelope provided.

Appendix 5:

Semi-structured interview schedule for Income Change Study - Baseline

Questionnaire pages 267 - 292

You are assured that all the responses you give will be treated confidentially and will not be disclosed to any other sources.

HOUSEHOLD COMPOSITION

1. Can you briefly tell me who lives with you in your household at present and lived with you six months ago?

- **b.** What is the person's relation to you?
- **c.** Their sex?
- **d.** Their age?
- **e.** Whether they are currently in work or of school age?

a.	**b. Relation** e.g. son	**c. Sex** M/F	**d. Age**	**e. Job Status** e.g. part-time worker	Six months ago, did the named person, live with you?
1		M/F			Yes/No
2		M/F			Yes/No
3		M/F			Yes/No
4		M/F			Yes/No
5		M/F			Yes/No
6		M/F			Yes/No
7		M/F			Yes/No
8		M/F			Yes/No
9		M/F			Yes/No
10		M/F			Yes/No

YOUR EATING HABITS AND YOUR FAMILY'S PREPARATION OF MEALS

Thinking of a typical day

2a. Can you tell me what meals in general you usually eat..?

2b. Can you tell me what snacks (in between meals) in general you usually eat..

3a. Do you yourself plan, prepare and cook the household's meals always, usually or occasionally or only very rarely, or not at all?

yes - always	☐
yes - usually	☐
yes - occasionally	☐
yes - rarely	☐
no - do not prepare meals	☐

3bi. How did you learn to cook?

3bii. Do you have a favourite dish that you especially like to prepare, for everyday meal times?

3biii. Do you have a favourite dish that you especially like to prepare, for special occasion?

3c. Who prepares and cooks the meals you don't prepare?

- ☐ husband/wife/partner
- ☐ son/daughter
- ☐ brother/sister
- ☐ other relative
- ☐ friend/neighbour
- ☐ restaurant/take away

3d. How often, on average, do you eat meals at home prepared by someone else?

- ☐ every day
- ☐ 4-6 times a week
- ☐ 2-3 times a week
- ☐ once a week
- ☐ once a fortnight or less often

YOUR EATING HABITS AND YOUR FAMILY'S PREPARATION OF MEALS

Compared to six months ago....

4ai. Has the timing of your meals altered in any way? Yes/No

If Yes, further details:

4aii. To what extent has the timing of your meals changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

4bi. Has the frequency of your meals altered in any way? Yes/No

If Yes, further details:

4bii. To what extent has the frequency of your meals changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

4ci. Has the length of meal preparation and cooking time, for you, altered in any way? Yes/No

If Yes, further details:

4cii. To what extent has the preparation and cooking time of your meals changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

Compared to six months ago....

4di. Has the timing of your 'snacking' (i.e. anything eaten between meals) altered in any way? Yes/No

If Yes, further details:

4dii. To what extent has the timing of your snacking changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

4ei. Has the frequency of your snacking altered in any way? Yes/No

If Yes, further details:

4eii. To what extent has the frequency of your snacking changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

4fi. Has the type of snacks you eat altered in any way? Yes/No

If Yes, further details:

4fii. To what extent has the type of snacks you eat changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

4gi. Has the amount of cooking meals you do for the household altered in any way?

Yes/No

If Yes, further details:

4gii. To what extent has the amount of cooking you do changed?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

***ADMINISTER FOOD FREQUENCY QUESTIONNAIRE

INCOME CHANGE AND FOOD CONSUMPTION

5. To what extent has having an decrease in income altered the amount of money your household spends on food?

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

6. Since your decrease in household income, have you changed or altered your consumption of any of the following foods you may eat?

6ai. breakfast cereals (Pbs: porridge,uncooked,other) Yes/No

If Yes, further details:

6aii. Overall, have you increased or decreased your consumption of breakfast cereals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6bi. bread (Pbs: white,wholemeal/brown,other) Yes/No

If Yes, further details:

6bii. Overall, have you increased or decreased your consumption of bread?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6ci. spreading fats (Pbs: butter, margarine,other) Yes/No

If Yes, further details:

6cii. Overall, have you increased or decreased your consumption of spreading fats?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6di. red meat (Pbs: lean meat,sausages, burgers, pies,quiches,other) Yes/No

If Yes, further details:

6dii. Overall, have you increased or decreased your consumption of red meat?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6ei. poultry (Pbs: chicken,other) Yes/No

If Yes, further details:

6eii. Overall, have you increased or decreased your consumption of poultry?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6fi. fish (Pbs: fresh,canned,other) Yes/No

If Yes, further details:

6fii. Overall, have you increased or decreased your consumption of fish?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6gi. eggs (Pbs:farm, free-range) Yes/No

If Yes, further details:

6gii. Overall, have you increased or decreased your consumption of eggs?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6hi. cheese (Pbs: cheddar, speciality, other,) Yes/No

If Yes, further details:

6hii. Overall, have you increased or decreased your consumption of cheese?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6Ii. potatoes, (Pbs:chips, baked/boiled, other) Yes/No

If Yes, further details:

6Iii. Overall, have you increased or decreased your consumption of potatoes?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6ji. milk Yes/No

If Yes, further details:

6jii. Overall, have you increased or decreased your consumption of milk?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6ki. vegetables (Pbs: fresh, salad, frozen, canned, baked beans) Yes/No

If Yes, further details:

6kii. Overall, have you increased or decreased your consumption of vegetables?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6li. fruit (Pbs: fresh, canned frozen, other) Yes/No

If Yes, further details:

6lii. Overall, have you increased or decreased your consumption of fruit?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6mi. puddings (Pbs: ice-cream, pastry pudding) Yes/No

If Yes, further details:

6mii. Overall, have you increased or decreased your consumption of puddings?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6ni. snack foods (Pbs: sweets/chocolate, biscuits, cakes, crisps) Yes/No

If Yes, further details:

6nii. Overall, have you increased or decreased your consumption of snack foods?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

6oi. drinks (Pbs: tea, coffee, spirits, lager/beer) Yes/No

If Yes, further details:

6oii. Overall, have you increased or decreased your consumption of drinks?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

INCOME CHANGE AND FOOD CHOICE

7ai. Do you feel that your decrease in household income has altered how often you eat home made meals? Yes/No

If Yes, further details:

7aii. Overall, have you increased or decreased your consumption of home made meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7bi. Do you feel that your decrease in household income has altered how often you cook or bake for 'pleasure' or therapeutic reasons? Yes/No

If Yes, further details:

7bii. Overall, have you increased or decreased your amount of recreational cookery?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7ci. Do you feel that your decrease in household income has altered how often you eat pre-cooked meals? Yes/No

If Yes, further details:

7cii. Overall, have you increased or decreased your consumption of pre-cooked meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7di. Do you feel that your decrease in household income has altered how often you eat plated (i.e. portioned) meals? Yes/No

If Yes, further details:

7dii. Overall, have you increased or decreased your consumption of 'plated' meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7ei. Do you feel that your decrease in household income has altered how often you eat 'luxury' meals? Yes/No

If Yes, further details:

7eii. Overall, have you increased or decreased your consumption of 'luxury' meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7fi. Do you feel that your decrease in household income has altered how often you eat 'healthy' meals? Yes/No

If Yes, further details:

7fii. Overall, have you increased or decreased your consumption of 'healthy' meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7gi. Do you feel that your decrease in household income has altered how often you eat 'junk' or 'fast' meals? Yes/No

If Yes, further details:

7gii. Overall, have you increased or decreased your consumption of 'junk' or 'fast' meals?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7hi. Do you feel that your decrease in household income has altered the quantity of food you eat? Yes/No

If Yes, further details:

7hii. Overall, have you increased or decreased the amount of food you eat?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7Ii. Do you feel that your decrease in household income has altered the quality of the food you eat? Yes/No

If Yes, further details:

7Iii. Overall, have you increased or decreased the quality of the foods you eat?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7ji. Do you feel that your decrease in household income has altered the variety of foods and meals you eat? Yes/No

If Yes, further details:

7jii. Overall, have you increased or decreased the variety of foods you eat?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7ki. Do you feel that your decrease in household income has altered the amount of fresh foods you eat? Yes/No

If Yes, further details:

7kii. Overall, have you increased or decreased your consumption of fresh foods?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7li. Do you feel that your decrease in household income has altered the amount of frozen foods you eat? Yes/No

If Yes, further details:

7lii. Overall, have you increased or decreased your consumption of frozen foods?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7mi. Do you feel that your decrease in household income has altered the amount of canned or dried foods you eat? Yes/No

If Yes, further details:

7mii. Overall, have you increased or decreased your consumption of canned or dried foods?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7ni. Do you feel that your decrease in household income has altered how often you eat at cafes or restaurants? Yes/No

If Yes, further details:

7nii. Overall, have you increased or decreased the number of times you eat out in a cafe or restuarant?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

7oi. Do you feel that your decrease in household income has altered how often you eat carry outs or take aways? Yes/No

If Yes, further details:

7oii. Overall, have you increased or decreased the number of times you eat carry outs or takeaways?

	extremely increased	moderately increased	slightly increased	no change	slightly decreased	moderately decreased	extremely decreased
TOTAL AMOUNT EATEN	☐	☐	☐	☐	☐	☐	☐

***** ADMINISTER ABOUT YOUR FOOD PREFERENCES**

HEALTH BEHAVIOURS

8. How physically active would you say you were, six months ago...?

- ☐ very active
- ☐ quite active
- ☐ neither active nor inactive
- ☐ quite inactive
- ☐ very inactive

9. Did you smoke cigarettes?

- ☐ yes regularly *(go to question 3b)*
- ☐ no
- ☐ occasionally
  (usually less than one cigarette per day)

9b. Still thinking about six months ago, on average, about how many cigarettes did you smoke a day?

_____ Cigarettes *(go to question 3c)*

ABOUT YOUR FAMILY AND THE BUYING OF FOOD

Now I'd like to focus more on your family and food. So I'd like you to tell me

10a. What is your current family's average weekly spending on food ?
(i.e. shops not cafes/canteens)

10b. Who mainly does the food shopping for your household?

10c. Does [the person named above] usually do the food shopping accompanied by anyone else?

10d. How much do you feel that they influence you in what foods you buy?

a great deal ☐ a little ☐ not at all ☐

10e. How many times is the food and grocery shopping done for your household?

more than once daily	once daily	once every 2-3 days	once every 4-6 days	once a week	once a fortnight	less often
☐	☐	☐	☐	☐	☐	☐

10f. Where is most of the shopping done?

Interviewer:Write name and also code whether

corner shop	small food store	large supermarket	van or mobile shop
☐	☐	☐	☐

10g. How far away is this from your home?

- ☐ under 200 yards
- ☐ 200 yards, under quarter of a mile
- ☐ quarter of a mile, under half a mile
- ☐ half a mile, under one mile
- ☐ one mile, under 2 miles
- ☐ 2 miles, under 4 miles
- ☐ 4 miles or over

10h. Do you feel that the distance of your regular shopping place caused you problems?

10i. How do you get to the shops when you go food or grocery shopping?

- ☐ walk
- ☐ car/van driven by respondent
- ☐ car/van driven by someone else
- ☐ bus/minibus
- ☐ taxi
- ☐ bicycle
- ☐ other (specify)

10j. Does anyone else regularly do the food shopping for your family?

- ☐ husband/wife/partner
- ☐ son/daughter
- ☐ brother/sister
- ☐ other relative
- ☐ friend or neighbour
- ☐ other_____

10k. What are the main reasons for doing food shopping at the named place above?

_____

RECENT CHANGES IN YOUR FAMILY'S BUYING OF FOOD

Now I'd like to talk about your how and where you shop now compared to what you did six months ago. So I'd like you to think about how and where you shop now and compared to six months ago...

11a. Has your family's average weekly spending on food changed?
(i.e. shops not cafes/canteens) *(If yes, go to question 11b, 11c, 11d)*

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

11b. Has who mainly does the food shopping for your household changed?

Yes/No

If Yes, further details:

11c. Has who goes food and grocery shopping changed?

Yes/No

If Yes, further details:

11d. Has the frequency of food shopping for your household changed?

Yes/No

If Yes, further details:

11e. Has the place where your household does most of the shopping changed?

Yes/No

If Yes, further details:

(If yes go to question 11f below)

11f. How far away is this?

- ☐ under 200 yards
- ☐ 200 yards, under quarter of a mile
- ☐ quarter of a mile, under half a mile
- ☐ half a mile, under one mile
- ☐ one mile, under 2 miles
- ☐ 2 miles, under 4 miles
- ☐ 4 miles or over

11g. Has your way of getting to the shops when you go food or grocery shopping changed?

Yes/No

If Yes, further details:

11h. Has your household's present pattern of food shopping changed?

Yes/No

If Yes, further details:

RELATIVE DIFFICULTIES IN HOUSEHOLD EXPENDITURE

To what extent are you currently worried about paying for the following?

12a. rent/mortgage

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

12b. paying for bills

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

12c. buying food for the household

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

12d. travelling around

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

12e. recreation

not at all	a very little extent	slight extent	moderate extent	a great extent	a very great extent	extremely great extent
☐	☐	☐	☐	☐	☐	☐

13. Six months ago, would your worries about the above have been different?

Yes/No

If Yes, further details:

***ADMINISTER HOSPTIAL ANXIETY AND DEPRESSION SCALE

PHYSICAL MEASUREMENTS

14. HEIGHT 1 _____
2 _____
3 _____

15. WEIGHT 1 _____
2 _____
3 _____

16. TRICEP SKINFOLD THICKNESSES 1 _____
2 _____
3 _____

FOOD FREQUENCY QUESTIONNAIRE

Your Typical Weekly Food Intake

Thinking about the foods that you eat, in general, please answer the following questions on your usual use of spreads, bread, tea, coffee and sugar in drinks. For the spreads question, please state the brand you use and the number of times per day you use each of the spreads listed. If you did not use the spreads or breads listed, please write '0' in the 'Number per day' column.

1. How much bread do you usually have per day?

	Number of slices or rolls per day
White bread or roll	
Brown or wholemeal bread or roll	

2. Which of the following spreads do you most often use

(please tick to indicate, and state brand)

Butter	
Margarine	
Reduced- Fat spread	

3. How many cups of tea do you have per day? _____ per day

4. How many cups of coffee do you have per day? _____ per day

5a. How many teaspoons of sugar do you usually have in tea? _____tspns

5b. How many teaspoons of sugar do you usually have in coffee? _____tspns

The food list on the next page contains food that you may eat in a typical week. We want you to try and estimate how often you had these foods to eat either per week or per month. If you usually have a given food to eat one or more times per week, please write the actual number in the 'per week' column. If you do not eat the food, then please write '0' in the 'per week' column. However, if you have the food to eat less than once per week, please estimate how often you had the food to eat per month and write this number in the 'per month' column. If you have the food to eat less than once per month, please write '0' in the 'per month' column.

Example:

Foods you eat	How often? per week	per month
Bowl of porridge		3
Bowl of high-fibre cereal (e.g. bran-flakes, Al-bran)	0	
Bowl of other type of cereal (e.g. rice-krispies, puffed wheat)	5	

This example shows that porridge was eaten three times per month, a high fibre cereal was not eaten at all, while another type of cereal was eaten 5 times a week.

6. Please complete the following about your current typical food intake.
Please give your answers as number of times per week OR per month

Foods eaten	How per week	often? per month
Bowl of porridge		
Bowl of high fibre cereal (e.g. Bran Flakes, All-Bran)		
Bowl of other type of cereal (e.g. Rice Krispies, Puffed Wheat)		
One glass of fruit juice		
Serving of red meat (e.g. beef, lamb, pork)		
One sausage, rasher of bacon or small beef burger, slice of ham or luncheon meat		
Meat pie, sausage roll, bridie, quiche		
Meat dish (e.g. chilli, curry, shepherd's pie, lasagne)		
Piece of fish (not fried)		
Tinned fish		
Serving of chicken or turkey		
Serving of cheese (e.g. in a sandwich)		
Chips, fried or roast potatoes		
Boiled or jacket potatoes		
Serving of rice		
Serving of pasta		
Serving of fresh vegetables		
Serving of frozen vegetables		
Serving of tinned vegetables e.g. baked beans		
Serving of salad (e.g. coleslaw, mixed green salad)		
One orange, apple , banana or other fruit		
Serving of tinned fruit		
One plain biscuit e.g. rich tea		
One chocolate biscuit		
One piece of cake or pastry		
Other dessert e.g. ice cream		
One small bar of chocolate or bag of sweets		
Packet of crisps		
Half pint of beer or lager		
One glass of wine or one short (e.g. brandy, whisky)		
Number of pints of whole milk (used by yourself only)		
Number of pints of semi-skimmed or skimmed milk (used by yourself only)		

ABOUT YOUR FOOD PREFERENCES

This questionnaire is concerned with the food you <u>like</u> to eat. For some people, you will never eat the food stuff stated and you should therefore mark the appropriate box 'I never eat that food stuff'.

1. How much do you like whole milk....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

2. How much do you like skimmed or semi-skimmed milk....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

3. How much do you like brown or wholemeal bread....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

4. How much do you like white bread....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

5. How much do you like butter....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

6. How much do you like margarine....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

7. How much do you like reduced-fat spreads (e.g. Delight)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

8. How much do you like fruit juice....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

9. How much do you like sausages....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

10. How much do you like bacon....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

11. How much do you like beefburgers....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

12. How much do you like meat pies....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

13. How much do you like lean cuts of red meat (e.g. beef, lamb or pork)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

14. How much do you like other cuts of red meat (e.g. beef, lamb or pork)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

15. How much do you like chicken or turkey....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

16. How much do you like fresh, frozen or tinned fish....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

17. How much do you like Cheddar cheese....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

18. How much do you like speciality cheese (e.g. Brie)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

19. How much do you like potatoes....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

20. How much do you like chips....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

21. How much do you like rice....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

22. How much do you like pasta....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

23. How much do you like fresh vegetables (e.g. carrots)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

24. How much do you like frozen vegetables (e.g. peas, carrots)...?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

25. How much do you like apples....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

26. How much do you like other fresh fruit (e.g. bananas, oranges, grapes)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

27. How much do you like plain biscuits (e.g. Digestive)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

28. How much do you like chocolate biscuits (e.g. Hobnobs)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

29. How much do you like cakes (e.g. sponge cakes pastries)....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

30. How much do you like chocolate....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

31. How much do you like crisps....?

extremely dislike	dislike very much	slightly dislike	neither dislike nor like	slightly like	like very much	extremely like
☐	☐	☐	☐	☐	☐	☐

HAD Scale

This questionnaire is designed to help us find out about your emotional feelings. Please read each item and place a tic in the box opposite the reply which comes closest to how you have been feeling during the past week (includic today). Don't take too long over your replies. Your immediate reaction to each item will probably be more accurat than a long thought-out response.

Tick only one box in each section

I've been feeling tense or 'wound up':

- Most of the time . . . . . ☐
- A lot of the time . . . . . ☐
- Time to time, occasionally . . . . . ☐
- Not at all . . . . . ☐

Worrying thoughts have been going through my head:

- A great deal of the time . . . . . ☐
- A lot of the time . . . . . ☐
- From time to time but not too often . . . ☐
- Only occasionally . . . . . ☐

I've still been enjoying the things I used to enjoy:

- Definitely as much . . . . . ☐
- Not quite so much . . . . . ☐
- Only a little . . . . . ☐
- Hardly at all . . . . . ☐

I've been feeling cheerful:

- Not at all . . . . . ☐
- Not often . . . . . ☐
- Sometimes . . . . . ☐
- Most of the time . . . . . ☐

I've been getting a sort of frightening feeling as if something awful was about to happen:

- Very definitely and quite badly . . . . . ☐
- Yes, but not too badly . . . . . ☐
- A little, but it doesn't worry me . . . . . ☐
- Not at all . . . . . ☐

I've been able to sit at ease and feel relaxed:

- Definitely . . . . . ☐
- Usually . . . . . ☐
- Not often . . . . . ☐
- Not at all . . . . . ☐

I've been able to laugh and see the funny side of things:

- As much as I always could . . . . . ☐
- Not quite so much now . . . . . ☐
- Definitely not so much now . . . . . ☐
- Not at all . . . . . ☐

I've been feeling as if I'm slowed down:

- Nearly all the time . . . . . ☐
- Very often . . . . . ☐
- Sometimes . . . . . ☐
- Not at all . . . . . ☐

I've been getting a sort of frightened feeling like `butterflies' in the stomach:

- Not at all . . . . . ☐
- Occasionally . . . . . ☐
- Quite often . . . . . ☐
- Very often . . . . . ☐

I've been looking forward to things with enjoyment:

- As much as ever I did . . . . . ☐
- Rather less than I used to . . . . . ☐
- Definitely less than I used to . . . . . ☐
- Hardly at all . . . . . ☐

I've been losing interest in my appearance:

- Definitely . . . . . ☐
- I don't take so much care as I should . . ☐
- I may not take quite as much care . . . . ☐
- I take just as much care as ever . . . . . ☐

I've been getting sudden feelings of panic:

- Very often indeed . . . . . ☐
- Quite often . . . . . ☐
- Not very often . . . . . ☐
- Not at all . . . . . ☐

I've been feeling restless as if I have to be on the move:

- Very much indeed . . . . . ☐
- Quite a lot . . . . . ☐
- Not very much . . . . . ☐
- Not at all . . . . . ☐

I've been able to enjoy a good book or radio or TV programme:

- Often . . . . . ☐
- Sometimes . . . . . ☐
- Not often . . . . . ☐
- Very seldom . . . . . ☐

Appendix 6 – Description of the Dietary Survey of Glaswegian adults

A dietary survey of adults was conducted within the Glasgow city district to collect appropriate data for the validation of the Foodmeter (UK) 2 system.

Methods

Ethical permission for this study was obtained from Greater Glasgow Community and Primary Care Local Research Ethics Committee. Power calculations based on the standard deviations for energy, fat, carbohydrate and iron from a previous weighed dietary survey in Scottish adults indicated that a sample size of 160 adults would be sufficient to exclude differences greater than 10% of SD for each measure in paired data with 90% confidence.

Protocol

Field work for this study was undertaken between October 1994 and October 1995. A random sample of names of adults aged 16-65 was obtained from the Community Health Index (CHI) of Greater Glasgow Health Board (GGHB). Prior to contacting the subjects, a letter was sent to the individual's General Practitioner explaining the study and exclusion criteria (namely diabetes, pregnancy, residence in institutions, mental illness). Practitioners were given a period of three weeks to respond before any possible participants were contacted. Individuals were then contacted by letter to briefly explain the study and invited to participate by returning a reply paid letter.

Individuals who agreed to take part in the study were then contacted again and an appointment made to visit them in their home where possible. On the first visit (which lasted approximately 30-45 minutes) the study was discussed in more detail and basic information on socio-demographic characteristics were collected. Socio-demographic data was collected as categorical data as far as possible to avoid "sensitive" issues. Thus income and age were obtained as category rather than continuous variables. Other details included marital status, household composition, employment status, occupation, smoking status and medications. Confidentiality of

data was stressed. Respondents were invited, but not obliged to provide a fasting blood sample.

Following these procedures, the principal researcher (Mrs Linda Maher SRD) instructed and demonstrated to subjects how to record food and drink intake. All subjects were provided with a food recording diary in A4 format with card covers. information on The Department of Human Nutrition, University of Glasgow. including a telephone number and contact name (the research dietitian). Four pages per day were provided for recording details of food descriptions (e.g. cooking methods, cut of meat), food weights (derived from Salter food scales) as served, and weight of left overs. Two extra pages per day were also available for recipe details (description of foods, weights and serving portions) and descriptions of food eaten outside the home (menu item and catering outlet). Written instruction on weighing and recording was also provided. Cross check questions on type of milk, bread and spread, use of sugar and milk in hot beverages, alcohol consumption, use of table salt. dietary supplements and other medications were also included.

SALTER Selectronic 2200 food scales with tare facility were given to each subject and the importance of accurate weighing was emphasised. Advice was also given on using household measures to describe portion sizes and a single (double-sided) A4 sheet depicting three portion sizes of 15 commonly eaten foods (to aid assessment of portion weight estimation) was provided. Respondents were also invited to retain the packaging from manufactured food to assist the identification of specific food produce.

Subjects were asked to weigh and record all foods and drinks consumed over the following seven consecutive days. It was stressed that participants should eat their usual diet (no matter how "bad" or "good" they perceived that to be). All subjects were given a demonstration of how to use the food scales and record food weights. Following this demonstration, height, weight and a triceps skinfold thickness were also measured.

The second visit took place within three days of the food diary completion so that the blood sample could be taken as close to the food intake reporting period. Diaries were checked by the principal researcher for legibility, weight appropriateness and exact details of food and drinks recorded. Recipe details were also checked where provided. Respondents were also probed for omissions, particularly drinks and confectionery. Unusual food weights were queried, often by re-weighing crockery or food portions such as milk in tea or spread on bread.

Diary data were manually entered on the COMP-EAT nutritional analysis programme, using average portion weight data (MAFF 1994) when foods or drinks had not been weighed. Completed diaries were then analysed by Foodmeter (UK) 2.

Subjects

The names of 1138 adults resident in Glasgow city were provided from the Community Health Index. One third (33%) of these were ineligible for the study and a further 47% could not be contacted. Of the 407 adults who were eligible and contacted about the study, 55.3% refused to participate, 5.4% returned unusable diaries and 39.3% provided usable diaries (n=160). Of these, 120 (75%) also provided fasting blood samples. Reasons for refusals included perceived difficulties with weighing and recording food, time limitations, chronic illness, slimming and blood sampling procedures.

Possible limitations of the Survey

Although continuously updated and widely employed for population based surveys the Community Health Index proved to be quite out of date, with a large number of subjects who could not be contacted. There were also a large number of subjects who were perceived as ineligible for the study by their General Practitioners. This unfortunately meant considerable administrative time was wasted and a small number of GP's commented that they had received rather a lot of requests about their patients. The refusal rate of 55% was similar to that in other studies, but the

completion rate was very high, indicating that those who agreed to participate usually carried on to the end of the survey. No diary which had been completed was rejected on the grounds of details of information on foods and weights provided although some of the low energy intakes recorded suggest that some people may have under recorded.

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