

# Achieving '5 A Day':

an Exploratory Mixed Method Investigation of Consumers  
Who Attain the UK Fruit and Vegetable Recommendation



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## Abstract

Progress has been made in research identifying relationships between the food we eat, the lifestyles we lead, and the prevention of illness. We should each consume a minimum level of fruit and vegetables, 400g daily, to reduce incidence of 'chronic lifestyle diseases', with vast aggregate social and financial implications. Despite political intervention, however, and a focus upon '5 A Day: Just Eat More', there persists a general under consumption, with the concept of 'Food Choice' at the explanatory forefront. Most research on fruit and vegetable consumers has focussed on those who do not meet the daily recommended levels, identifying 'barriers' that restrict choice. This research however places the investigative emphasis on those who do attain the 5 A Day target, described in this study as 'High' fruit and vegetable consumers, exploring the reasons for this success and the management of high levels of fruit and vegetables within the diet.

A mixed method approach to investigate consumers in South East Northumberland was employed, using purposeful sampling and integrating research stages. Empirical and policy sources were investigated, and life course model implied as useful. Following discussions with health professionals and clinicians, in-depth exploratory interviews were conducted with mainly High (17/19) fruit and vegetable consumers. Results identified themes: general health, specific ill-health, spousal relationship with food, children, food history, seasonality, shopping, taste and flavour, time, and personal relationship with fruits and vegetables. These affected both quantity and type of vegetables and fruit consumed, and 'how' consumption was managed. A series of conceptual 'reasons' for high consumption were indicated though not all reasons experienced by all consumers to the same extent at the same time. The main constructs are; 'Environment(s)', 'Information(s)', 'Motivation(s)', 'Aims & Goals', 'Triggers / Trigger Point(s)', and 'Strategies and Management'. A typology was also proposed to categorise consumers based on enthusiasm, and consciousness towards High consumption.

A consumer survey, based on the identified themes, was completed by 239 respondents (148 High). It included a seven day food frequency questionnaire of nutritionally linked fruit and vegetable items. Factor Analysis was applied to both sections of the questionnaire, and subsequently Cluster Analysis. 34 factors were identified for attitude and behaviour. Of these, 16 exhibited significant mean difference between High and Low consumers. Six clusters were derived, with defining features between clusters being reasons for consumption, general enthusiasm and mood. 12 factors were derived as underlying the fruit and vegetable consumption itself.

Both the qualitative and quantitative stages of the research identified distinct types of fruit and vegetable consumer, implying an importance, not only of specific drivers to fruit and vegetable consumption, but also fruit and vegetable "consciousness", and levels of specific and general enthusiasm. Hence policy needs to recognise and target those influences and benefits specific to groups. It also needs to support both irregular and regular levels of High consumption, as well as the opportunity to target specific fruit and vegetable dietary patterns in relation to, for example, seasonality social consumption. Understanding how high levels of fruit and vegetable consumption is achieved and negotiated amidst other influences has been indicated as of real value to further research.

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## Abbreviations

AICR	American Institute for Cancer
BDA	British Dietetic Association
BHF	British Heart Foundation
BPA	Blood Pressure Association
DEFRA	Department for Environment, Food and Rural Affairs
DfCLG	Department for Communities and Local Government
DH	Department of Health
DIUS	Department of Innovation Universities and Skills
EPIC	European Prospective Investigation into Cancer and Nutrition
FDMS	Family Food Decision Making System
FOA	Food and Agriculture Organization
FSA	Food Standards Agency
FVTF	Fruit and Vegetable Task Force
HAPA	Health Action Process Approach
HAZ	Health Action Zone
HBM	Health Belief Model
HLC	Healthy Living Centres
HSC	Health Service Circular
HSE	Health Survey England
IGD	Institute of Grocery Distribution
IMD	Index of Multiple Deprivation
LFP	Local Food Projects
LFRA	Leatherhead Food Research Association
LIPT	Low Income Project Team
MAFF	Ministry of Agriculture, Fisheries and Food

NECC	North East Chamber of Commerce
NHF	National Heart Forum
NOO	National Obesity Observatory
NTF	Nutrition Task Force
ONE	One North East
ONS	Office for National Statistics
PCT	Primary Care Trust
PHO	Public Health Observatory
SACN	Scientific Advisory Committee on Nutrition
SCT	Social Cognitive Theory
SDT	Self Determination Theory
SES	Socio-Economic Status
SHS	Scottish Health Survey
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTM	Transtheoretical Model
WCRF	World Cancer Research Fund
WDC	Wansbeck District Council
WHO	World Health Organisation

## Chapter One

### Introduction

#### *1.1 Introduction*

This thesis explores behavioural and attitudinal factors evident in the attainment of five or more portions of fruit and vegetables daily. The research utilises a mixed methods (Cresswell & Plano Clark, 2007) framework to achieve this.

The dietary minimum intake of five portions of fruit and vegetables, recommended by the World Health Organization (WHO, 1990), has been of political interest in the UK since 2000 (DH, 2000). It is argued that fruit and vegetable consumption which meets this level has a significant benefit both to the health of individuals (WHO, 1990) and to the health and finance of wider society (FVTF, 2010). Despite this, and national campaigns to increase intake, under consumption persists in the UK, at an average of 3.7 portions per day (DEFRA 2008).

A variety of disciplines such as nutrition and epidemiology, but also consumer research, has examined fruit and vegetable intake. Much of the relevant research has been pre-occupied with why consumption of 5 portions a day has not been achieved, with a focus on 'barriers' to consumption, particularly the prominent issues of 'accessibility' and 'availability'. Rather than concentrating on the barriers, this thesis takes an alternative and more 'positive' perspective by analysing the behavioural and attitudinal factors that contribute to the attainment of 5 a day portions of fruit and vegetables.

This chapter introduces the background to the thesis by identifying the importance of fruit and vegetables within the diet, the nature of fruit and vegetable consumption, and also the methodological approaches relevant to understanding it. The aim and objectives of the thesis are then outlined. Subsequently the chapter explains the thesis research design and anticipated contribution. The structure of the thesis is then outlined.



## *1.2 Fruit and Vegetables as Part of a Healthy Diet & Lifestyle*

The Department of Health (2007) recommends that the diet of a person over the age of five should be varied and balanced, incorporating starchy foods, meats, milk and dairy, low amounts of salt and added sugars, and include a wide selection of fruits and vegetables. Of this balanced diet, one third of overall consumption should be of foods classified as 'fruits and vegetables' (this is visually represented on the 'Eat Well Plate' within the UK; FSA 2007). Since the introduction of the recommendation of consumption of eating 80g of a variety of fruit and vegetables five times a day as a dietary minimum (WHO, 1990), (or '5 A Day'), fruit and vegetable consumption has increasingly become synonymous with a healthy diet. This has been driven by the formal promotion '5 A Day: Just Eat More' (DH, 2004) in the UK and continued as part of the 'Change 4 Life' campaign (DH, 2009).

The Consumer Attitudes to Food surveys conducted annually by the Food Standard Agency have shown an increase in public awareness of the need to consume such levels of fruit and vegetables. For example, in 2000, 43% of respondents recognized the need to eat five portions daily. In 2004 this figure had risen to 58%, and by 2007 had reached 78% (FSA, 2008). Other sectors and stakeholders also adopted promotion of the 5 A Day message. The food retail industry began including it in food labels. The NHS have utilised the message in medical advice. It became fundamental to 'local food project' frameworks with positions such as the '5 A Day Coordinator' being created.

A diet where fruit and vegetable consumption meets that recommended by health professionals is believed beneficial for the health of the individual and to wider society. Fruit and vegetables help in meeting certain nutritional requirements within the diet including vitamins, minerals, and phytochemicals (British Dietetic Association, 2006). These can be associated with particular types of fruits and vegetables such as 'leafy greens' (Bazzano et al, 2008). As well as being directly important to the body's function, fruit and vegetable consumption often features within a more healthful diet in general, i.e. it is more likely to meet the recommended shape of the healthy diet, for example low in certain fats and sugars. Fruit and vegetables are less 'energy dense' than other foods, are high in fibre and also increase satiety (Tetens & Alinia, 2009). These diets are likely to be consumed as part of a healthy lifestyle, with fruit and vegetables featuring within complex systems of health maintenance and prevention against chronic disease. The aggregated effect of ill health represents a significant burden and concern to the nation with regard to morbidity, mortality and finance, and as such has been the focus of policy attention.

Since the association of fruit and vegetable consumption with diet, lifestyle and health, some areas of ill health have become particularly important within the UK as a result of their prevalence,

growth, and preventability (in the sense of being influenced by consumer decisions). The NHS Cancer Plan (DH, 2000) highlighted that the influence of diet was second only to smoking in causes of cancer found commonly in the UK. Despite subsequent research suggesting only a modest effect within Europe of increasing fruit and vegetable consumption (Boffetta et al, 2010) the role of certain fruit and vegetables was identified as important in combating cancers of the mouth, esophagus, larynx, stomach, lungs, prostate, colorectum (World Cancer Research Fund, 2007).

The role of fruit and vegetables in the prevention of chronic heart complaints and vascular diseases is important. Almost 1.5 million people suffer from angina. Each year 300,000 suffer heart attacks, 110,000 die as a result of coronary heart disease (CHD) which represents the single biggest killer within England (DH, 2005). CHD is estimated to cost the UK economy around £7,055 million each year (BHF, 2005). The WHO (2002) described that in 2002, within the context of a developed country, around 30 percent of the incidences of CHD could be attributed to low consumption of fruits and vegetables. If low-intake consumers quadrupled their fruit consumption, their risk of heart disease would decrease by 15 percent (Law & Morris, 1998), supported by Dauchet et al (2006) who expressed for each additional portion (80g) consumed of 'fruit and vegetables', risk was reduced by 4 percent (7 percent for 'fruit' alone).

Nutrient elements within fruits and vegetable are associated with positive reduction in the risk of heart disease (Mirmiran et al, 2009) as well as association with wider lifestyle factors (Voutilainen et al, 2006). The effects of stroke can be extremely debilitating if not mortal. In the UK stroke represents the third most common cause of death costing in 2004 the NHS an estimated £2.8 billion, the wider economy £1.8 billion, and informal care £2.4 billion (Stroke Association, 2010). The attributable disease burden for stroke in developed countries as a result of consumption of fruit and vegetable below 600g/day is almost 20 percent (WHO, 2002a). Compared with the consumption of less than three servings of fruit and vegetables per day, those with an intake of three to five servings reduce the risk of stroke by 11 per cent, and those of more than five servings per day reduce the risk by 26% (He et al, 2006). A reduction in the potential risk of developing dementia and Alzheimer's disease by consumers with higher intake levels of fruit and vegetables has been illustrated (Hughes et al, 2010). It has been suggested that this is due to compounds found in certain fruits and vegetables having protective effects against the disease (Ritchie et al, 2010).

Fruit and vegetables (as part of the diet and healthy lifestyle) have a multi-level mediating role in the management of an individual's weight and health status. The causes of obesity have been described as "extremely complex encompassing biology and behaviour, but set within a cultural, environmental and social framework" (DIUS, 2007), representing a 'causal web' (Galea et al, 2010). Being obese has severe implications to the risk of ill-health, particularly chronic diseases such as

Type II diabetes, CVD, hypertension and stroke, and certain forms of cancer (WHO, 2010). Obesity is a risk factor in incidents of 'limiting longstanding illnesses' with impact upon quality of life (HSE, 2009). Obesity and associated illnesses in the UK are estimated to cost the NHS over £4 billion per year, and £16 billion to the wider economy (DH, 2009). Of particular importance, as highlighted in Foresight's 'Tackling Obesity' (DIUS, 2007), the level of obesity within the UK population is rising, and is currently at almost a quarter of all adults. A continued upward trend is projected unless a significant change in food consumption and lifestyle is adopted.

Despite growing awareness within the scientific community and also the general public of the importance of fruit and vegetable consumption, the diet of the majority of the population does not meet the relative proportions of consumption from the different food groups (as outlined as healthy). Diets are relatively high in sugary and fatty foods, and low in the consumption of fruit and vegetable (Nutrition Forum, 2002). There is a long tradition of fruit and vegetable consumption within the population existing at a level lower than that recommended. At the turn of the 20<sup>th</sup> century fruits and vegetables were not represented in the 'Cost-of-Living Index' as they were such a small part of the diet of the urban working class (Drummond & Wilbraham, 1959). From 1942 up till 2004/5, the general direction of vegetable consumption of UK adults, per person per week, has declined, with a slight recovery from 1995-2004/5. Fruit consumption during the same period has increased almost fourfold to around 800g per week (BHF, 2007; fruit juice was excluded from 'fruit'). As reported by the Fruit and Vegetable Task Force (FVTF, 2010), fruit juices made up 27% of total fruit consumption in 2007, up from 5% in 1974, and aggregate fruit consumption has risen by 8% since 2000. Recent vegetable consumption represents relative stability.

Regarding portions consumed, the Health Survey of England (HSE, 2003) indicated that the average number of portions consumed per day is 3.5 in the case of women, and 3.2 portions per day by men. More recently the Living Costs and Food Survey (2008) indicated that the consumption figure was 3.7 in 2008 (but this had fallen from near 3.9 from the previous year). The Health Profile (2007) highlighted the percentage of people achieving the recommended daily intake of 5 portions is around 24 per cent, but varies greatly between geographical ward location, from 11 per cent to 38 per cent.

### *1.3 Aims and Objectives*

It is the aim of this thesis to address the questions:

**‘What are the factors affecting how people achieve ‘5 A Day’ intake of fruits and vegetables?’ and ‘what are the policy implications of these findings?’**

In order to address these questions the objectives of the thesis are:

1. To describe the policy context driving the 5 A Day public health message.
2. To examine the empirical findings and approaches to the investigation of fruit and vegetable consumption and to derive the contribution of theoretical approaches to food choice research and therefore the conceptual approach driving this thesis.
3. To explore, utilising qualitative means, the relationship consumers have with the fruit and vegetables they purchase and eat, and the way in which consumers of over five servings of fruit and vegetables daily manage to incorporate them into their diet.
4. To formulate the relationships identified in the qualitative work into a set of hypotheses as a guide to quantitative analysis.
5. To examine, using quantitative methods, the attitudinal and behavioural factors affecting fruit and vegetable intake of over five servings per day and to profile consumers achieving these intake levels.
6. To discuss the policy implication of the key findings.
7. To reflect upon the research process and make recommendations for future research.

### *1.4 Research Design*

#### *1.4.1 The Research Aim*

The aim of the thesis is to identify and explore the factors associated with the successful consumption of recommended levels of daily fruit and vegetable consumption as indicated by these high consumers; in particular how this has been achieved, why it has been achieved, and triggers facilitating high consumption. In so doing, policy implications will be identified and reflections made on the existing body of knowledge of the subject.

### 1.4.2 Conceptual Framework

The thesis draws on the variety of approaches that have been utilised for the purpose of examining fruit and vegetable consumption in particular, and consumer behaviour generally. The importance of dietary health within food policy has provided a further dimension to the framework. Nutrition has been framed by consumption, no longer “solely dictated by hunger” (Lindeman & Sirelus, 2001) and the influences of freedom of choice regarding dietary practices. The associated burden of dietary ill health has thus been addressed as a consequence of food choices. Food consumer behaviour is highlighted because it investigates the understanding of food choices at the level of the individual, as well as aggregate associations with consumption (such as demographics). Conceptual and empirical work has attempted to explain why particular foods, in this instance fruit and vegetables, are chosen within the diet.

The body of empirical knowledge includes investigations that look at the influences or mediating factors involved in fruit and vegetable consumption (and associated health behaviour research). These range from individual demographic characteristic assessments to more complex decision making. Importantly it indicates that there is the potential for complicated and multi-dimensional influences to be evident. Therefore the thesis has been conceptually framed to recognise, and encompass, the wide range of influences on food choice.

Reflecting this, the Food Choice Process Model has been prominent in driving the approach undertaken. The model conceptualizes a number of important components; ‘influences’, which incorporate personal, environmental and some social factors, and ‘personal food systems’ which develop into food choice values (Sobal & Bisgoni 2009). Negotiations (or ‘strategies’) between values exist, along with balances and ‘priorities’ (Connors et al, 2001). These are instrumental to an individual’s classification of foods and situational contexts. The model identifies that practical food strategies develop from this (Falk et al 2001, Devine et al 2006, 2009). It therefore reflects a sense of positivity towards the enacting of particular food behaviours which aligns itself to approaching the positive consumption of fruit and vegetables. The model represents a comprehensive description of the interplay between different components.

The Food Choice Process Model represents a ‘life course’ approach (Devine 1998); acknowledging that time, and experiences over time, are important in a person’s relationships with foods, and the role of particular influences. As such the model indicates that food choices are part of a dynamic framework. Existing and potential dietary changes are represented in relation to a person’s ‘food trajectory’, with inherent features including ‘turning points’ and ‘transitions’ (Sobal & Bisgoni, 2009, Olsen 2005).

The Food Choice Process Model is therefore formative to the thesis in three ways; first, the role of multiple influences (both internal and external) and the negotiations inherent between them; second, the strategies involved in consumer behaviour; and third the importance of recognising time and dynamism in understanding consumption. The approach is also suited to developing a mixed method approach to research (as outlined in Chapter Four). A number of other behaviour theories have been recognised as important to the conceptual background; aspects of the Theory of Planned Behaviour (Greene et al, 2004), concepts of self efficacy (Brug et al, 1996), Stages of Change (Bogers et al 2004), and Health Belief Model (Glanz & Rimmer, 2008) for example. In addition a food policy framework has been adopted, in particular the role of food in health. This suits the nature of the investigation and its relationship with the topic of fruit and vegetable consumption.

#### *1.4.3 Empirical Background*

Fruit and vegetable consumption has been explored by a number of academic areas. A range of methods have been utilised, for example trials and interventions, secondary analysis of large data sets, primary collection of both qualitative and quantitative data, and review frameworks. In a review of the subject, Pollard et al (2002) categorises research findings into those factors that influence what someone is able to buy and those that influence what the person chooses to consume, thus highlighting different aspects to the consumption process. Kilcast et al (1996) and Shepherd et al (1996) investigated practical approaches to increasing 'food access'; overcoming barriers and removing constraints. They also indicate attitudinal differences between high and low fruit and vegetable consumers.

A variety of empirical knowledge is relevant to this research. Influences on consumption are investigated both as internal and external to the individual consumer. The body of knowledge indicates the role of important environments, such as the home and people therein (Valentine 1999, Marshall & Anderson 2002, Bove et al 2003) and outside of the home such as at work (Backman et al, 2011) and shopping (Anderson et al, 2001). Reported internal influences include sensory issues such as taste, as well as psychosocial attitudinal influences such as perceived health consequences (Brug, 1995) and negotiations in complex 'personal food systems' (Sobal & Bisgoni, 2009). The thesis draws attention to the multi-faceted influences indicated in the empirical background with research based on more encompassing theories such as the Theory of Planned Behaviour, Stages of Change and Food Choice Process Model. The role of time, past behaviour, and influences on food trajectories is highlighted, as well as some empirical and theoretical undertakings on the development of coping strategies and dietary management. In addition the thesis demonstrates,

from the body of knowledge, the association of certain demographic and social profiles with fruit and vegetable consumption.

#### *1.4.4 Methodological Approach, Data Collection & Analysis*

The thesis concentrates on the results for high fruit and vegetable consumers in deprived wards (IMD) of South East Northumberland. The participants and respondents were sampled using a thematic health link to a number of organisations, many within the Wansbeck district local authority area. The thesis utilises a mixed methods design to meet its aims and develop the research model (Figure 4.2, Chapter Four), where there is integration between qualitative and quantitative methods. Interviews with health professionals, as well as consumer interviews, are utilised to inform the development of the consumer survey. A food frequency tool is used to identify high fruit and vegetable consumption to guide the consumer interview. The consumer survey collected respondent information from 239 consumers, 148 consuming at least 5 portions of fruits and vegetables per day.

The analysis of the consumer interview results provide a thematic analysis of factors important in fruit and vegetable consumption, as well as describing a typology of fruit and vegetable consumers based on enthusiasm and awareness. The analysis of the consumer survey data compares significant difference between high and low consumers in respect of attitudes and behaviours, thereby identifying the association with consumption. The analysis also utilises multivariate techniques, reducing both the consumption data, and attitudes and behaviours, to underlying factors. Attitudes and behaviours are further analysed using a cluster approach for suitable profiling. The results of these stages are drawn together for comparative observations.

#### *1.4.5 Anticipated Contribution*

The thesis represents a novel conceptual approach to the exploration of; in particular, high fruit and vegetable consumers' successful achievement of the recommended health level (5 portions per day). By doing so, adds to the existing body of literature regarding the determinants of high fruit and vegetable consumption. Further contributions are to fruit and vegetable policy, and also the reflection of using a mixed method research framework to explore this topic.

### *1.5 Structure of the Study*

The thesis presents the study in seven further chapters. The Fruit and Vegetable Policy chapter reviews the food, health and 5 A Day policy under “New Labour”, identifying guiding themes and methods in the context of other policies. The next chapter covers the state of empirical knowledge, drawing on a range research and theories relating to the determinants of fruit and vegetable consumption. Chapter four presents the methodological stage of the thesis, outlining the approach utilised and methods developed for the purpose of data collection and analysis. The following two chapters present the findings relating to the qualitative and quantitative research, and chapter seven discusses the key results. Chapter eight concludes the thesis, highlighting policy implications as well as future research and methodological opportunities.



## Chapter Two

### UK Policy Context

#### *2.1 Introduction*

The thesis investigates the determinants of high levels of fruit and vegetable consumption and addresses these in relation to policy implications. This chapter describes the advancement of a fruit and vegetable policy in the UK, and the role of '5 A Day' within this. These developments are framed by scientific results linking protection against major illnesses with consumption, for example cancer, cardiovascular diseases, and mental health such as dementia and Alzheimer's. National health costs and consequences, as well as individual's health have been implicated in under consumption (Chapter One). The consumption of high levels of fruit and vegetables is also associated with an overall healthier diet and lifestyle. This has led to recognition that fruit and vegetables are an important part of tackling health issues such as obesity and related diseases.

Table 2.1 presents a summary of 5 A Day in its various policy related guises. The majority of the policies presented within this chapter were introduced by the "New Labour" Government from 1997. This coincided with a new wave of research linking the strength of fruits and vegetables to diet, as well as representing particular political values. Most of the policy refers to health, as it is here that the concern surrounding fruit and vegetable consumption has been most prominent.

In the earlier policy developments, fruit and vegetable consumption was not noted as 5 A Day directly in the form as it became latterly known. 5 A Day is the designated nomenclature used within this thesis however it is variously referred to within the literature and this highlights the many manifestations of fruit and vegetable consumption as an active concept. The chapter approaches the development of a 5 A Day fruit and vegetable policy by outlining those policies key to its creation, advancement, and various forms. The chapter makes use of white papers as an indicator of interest and intentions in the formation of a fruit and vegetable policy.

Table 2.1 5 A Day Represented in Policy

Year(s)	Detail	5 A Day Representation
1990	World Health Organisation (WHO) identifies nutritional requirement of 400g fruit and vegetables per day, or five portions of 80g each.	Nutritional Requirement
1998	<i>Acheson Report: Independent Inquiry into Inequalities in Health</i>	
1999	<i>Saving Lives: Our Healthier Nation</i>	
2000	<i>NHS Plan &amp; Cancer Plan</i>	
2000	UK, NHS Plan/Cancer Plan set five portions of fruit and vegetables as a consumption target to address prominence of preventable disease.	Daily Target
2000-2001	Five a day Pilot Studies utilise community level interventions to assess potential to address incidents of low consumption.	Pilot Study
2003	<i>Tackling Health Inequalities</i>	
2003	<i>Food &amp; Health Action Plan</i>	
2003	'5 A Day; Just Eat More (fruit & veg)' used as a trademark for industry labeling and health promotion purposes to aid consumers.	Logo & Promotional Tool
2003 (-2006)	'5 A Day Community Action Plan' is rolled out to 66 Primary Care Trusts to support and develop local initiatives to increase access to and awareness of fruit and vegetable consumption.	Umbrella of Community Intervention (and evaluation).
2004	<i>Choosing Health: Making Healthy Choices Easier</i>	
2008	<i>Healthy Weight, Healthy Lives</i>	
2008	<i>Food Matters: Towards a Strategy for the 21<sup>st</sup> Century</i>	
2008	5 A Day to remain as a promotion and local intervention, but to be part of a more integrated approach to the choice of healthy lifestyle, such as 'Change4Life', as advocated in 'Food Matters', and 'Healthy Weight, Healthy Lives'.	Joined-up Food Strategy of Well-Being
2010	<i>Healthy Lives, Healthy People (2010)</i>	

(Source: Author Construction)

## 2.2 Acheson Report: Independent Inquiry into Inequalities in Health (1998)

In 1997 the Labour government laid the foundation of the future framework for health policy. The first of these was set up to review evidence of health inequalities within society, chaired by Sir Donald Acheson. This was reflective of the Black Report (1980) which was authorised under the Conservative government. The Acheson Report identified inequalities relating to income and wealth, health status, and methods for 'promoting' and 'restoring' the UK public, thereby reducing social inequality (DH, 1998). In particular the report identified the need to address the social determinants of ill health and 'layers of influence', that is, community health in a wider setting (including macro factors). The report

suggested focus on interventions with mothers and young children. The report also indicated that there was a need to engage with those who had previously not taken the opportunity to interact with the health service.

The Acheson Report “acted as a prompt to new policies” (Exworthy, et al 2003). The Acheson Report provided substantial basis for ‘Saving Lives: Our Healthier Nation’ action plan, presented in July 1999 (DH, 1999) and the government’s ‘Programme for Action’. The Joseph Rowntree Foundation, focusing on the inequality aspect of the Acheson report, highlighted key methodological issues in tackling the issues outlined. One important area was geographically focused zones, thus local level targeting. This reiterates the attention drawn to policy directed at specific locality, or local ‘pools’ of deprivation. Such policy was not entirely new, and indeed mirrors previous interest in addressing health at an area level; ‘Local Agenda 21’ for example (Dooris, 1999). The report also indicated the importance of utilising evidence in the building of policy and practice.

The launching of the Health Action Zone (HAZ), “not only to improve health outcomes and reduce health inequalities, but also to act as trailblazers for new ways of local working” (HDA, 2004), focused service delivery to bring specific geographical area up to the level of others. Twenty-six areas were designated as HAZs where investment was aimed at promotion of healthy lifestyles, empowering individuals and communities, addressing economic and social determinants, and improving services (HDA, 2004). It was recommended that policy should on enablement so that individuals should have choice to consume a balanced diet, tackling issues such as retail access, transportation.

Early stages of Labour’s health policy placed significance and emphasis on poverty and social exclusion. The Acheson Report highlighted major variations in well being and identified important trends in British society relating to health; “people in lower socioeconomic groups tend to eat less fruit and vegetables...as a consequence, those in lower socio-economic groups tend to have low intakes of anti-oxidant and other vitamins” (DH, 1998, 19.1). Access to a ‘healthy’ food basket was prominent, as was a focus upon individual elements or components to the diet measured in units (latterly applied to fruits and vegetables). This component based approach to diet, with a focus upon micro nutrients, was evident in approach to reducing sodium, where lower socioeconomic groups were considered more at risk to high levels of processed foods. It was made evident that certain groups, types, and areas of people demonstrated different levels of susceptibility to the effects of poverty on health and diet, making some more at risk than others.

### *2.3 Saving Lives: Our Healthier Nation (1999)*

'Our Healthier Nation' was the government's first comprehensive strategy of action to tackle poor health. It followed from 'The Health of the Nation' (1992) in the alignment of health policy with locality, and tackling causes of ill health. However it built upon these, indicating 'connected problems' required 'joined-up solutions'. Poverty, social exclusion, unemployment, as well as physical and socio-environmental issues were deemed as undermining health. The individual, central government, and local services would play a part in reducing health inequalities. The document focused on improving general health and targeting the 'worst off in particular' (DH 1999).

Although only a very small of 'Our healthier Nation' was dedicated to diet and health, the document outlined a change in political ethos. Underpinning the document is a focus on the nature and effect of inequality. The nature of ill health and incidence of mortality had shifted significantly over the course of the century. In line with major causes of illness in any given period, the 'preventable' nature of illness in the early decades of the twentieth century was to improve personal and environmental hygiene and sanitation to prevent infectious disease e.g. tuberculosis. Similarly the Plan revealed in 1999 reflected the contemporary nature of ill-health, where 'prevention' is focused on societal structures and the high cost of diseases of the individual. Cancer, coronary heart disease, stroke, and mental illness made up the majority of mortality and ill-health figures in the late twentieth century (DH, 1999), with a massive decline in environmental/infection-related disease.

The government was blatant in their approach, stating that delivery of their plan should save 300,000 lives over the proceeding 10 years (hence the title of the report). Recognition of inequality was represented in 'narrowing the health gap'. Diet was to be a part of the health strategy. Emphasis was placed on the development of people's diet, i.e. mothers during pregnancy and children's diet, interlinked with local innovations coordinated by Sure Start. In addition a focus on food deserts as part of Social Exclusion Unit's Policy Action Team.

"Good nutrition through adult life, with plenty of fruit and vegetables, cereals, and not too much fatty and salty food, will help to protect against coronary heart disease and stroke and some cancers. Taken together with physical activity a healthy diet enhances not just the length but also the quality of life" (DH, 1999).

Key to the delivery of the action plan is the three-way partnership between individuals, communities (local services) and Government. The widening pool of responsibility and participation into tackling health concerns shows a vertical relationship. Local health improvement programmes would be vehicles for impact on health problems, not only approaching the local community for service delivery but as a way to target those most of need. HAZs and 'Healthy Living Centres' (HLCs) were integral to the delivery of these recommendations, with HLCs providing community support, such as dietary advice. Local agencies were encouraged to create organisations to deliver programmes. Gabbay (1998) warned that the policy should avoid unrealistic expectations or initiative fatigue, "those responsible for delivering them [initiatives] were too hard pressed meeting the other demands of running service" (Gabbay, 1998).

Significantly for later fruit and vegetable consumption related policy, 'Our Healthier Nation' acknowledged the role of the internet in communicating health messages. For example the website 'Wired for Health' provided information and advice for young people and schools.

The turn of the century saw a continuation of many of the thematic priorities that were expressed in the first three year period under Labour. Of particular significance to fruit and vegetable consumption strategy, two policy outlines concerned with improving health were published in 2000; The NHS Plan, and The NHS Cancer Plan. In both cases, the strategies outlined the future developments within the formal structure of the NHS to combat serious public health threats. It also saw the establishment of the Food Standards Agency (FSA) in 2000 whose role it was to feature in food policy developments, along with Public Health Observatories (mentioned in Saving Lives: Our Healthier Nation).

#### *2.4 Public Health Observatories (PHO)*

Communication and evidence in relation to health featured prominently in the justification of the Food Standards Agency, and this was echoed in the establishment of the Public Health Observatories. The PHOs were developed by Cooper and Donaldson, in line with a historical context of statistics aiding the discovery of important health related trends, and public health intelligence. The role of the PHOs was to strengthen the role and availability of information about health at a local level. According to Donaldson (2011) some local level statistics existed prior to the establishment of the PHO, but these were considered ad hoc. The creation of 9 PHOs in England, dividing the country into NHS geographic areas (and further 3 covering Scotland, Wales, NI and Ireland) provided a more robust bottom up approach in health monitoring. In so doing this would support local level initiatives; identify gaps in health

information, highlight particular health problems, improve the combination of health sources, advise on methods for impact assessment, warn of future public health issues, as well as evaluate progress on improving health/reducing inequalities (Hill et al, 2004). To aid access, The PHOs have also provided a base for utilisation of their publications online.

### *2.5 Food Standards Agency (FSA)*

Developed from the Food Standards Act (1999), the FSA was charged as an 'independent voice', to 'put the consumer first', while being 'open and accessible' with regard to the protection of food consumers (FSA, 2001). It was designed in part by the Ministry for Agriculture, Fisheries and Food (later DEFRA) and Department of Health amongst others. The general functions, according to the Act (FSA, 1999), were to develop food policy and provision of advice to public authorities. For the general public, to provide information and assistance, while acquiring and reviewing information on the topic. The Agency's remit therefore covered production, supply and consumption of food, but importantly in relation to health, not only packaging and labeling to inform consumers of healthier products, but also to support nutrition, diet and food choices.

It was deemed paramount for the FSA to address information highlighted by research programmes between nutrients in food, and food in health. In so doing the FSA would provide an evidence base for consumers and within its remit also was the dissemination of information to allow the making of healthier dietary choices. It was believed that this would aid in the overcoming of barriers, such as experienced by minority and low-income groups. The establishment of the FSA indicated the important role of informed choice in relation to health (something that would be more formally introduced in 'healthier choices' literature in future policy).

### *2.6 NHS Plan (2000)*

The NHS Plan (2000) introduced the Government's ten year modernisation of the National Health Service. It featured strongly ten core principles that were reflective of the founding values from 1948. Whitehead (2000) extrapolated that healthcare was a human right, comprehensive, should reduce health inequalities while improving health. Extending beyond the curative, the NHS is the place for

‘capacity-building for prevention and health promotion’ (ibid, pg194). The plan also set out the funding priorities for 2000-2010.

The NHS Plan iterated that its fruit and vegetable aims were congruent with the prevention of ill-health and promotion of a healthier life, based upon the need to reduce prevalent health frailties and inadequacies. This represented the first formal mention of a ‘five-a-day programme to increase fruit and vegetable consumption’ (13.21) within UK policy. One of the most prominent initiatives was the National School Fruit Scheme (NSFS) in line with a focus on children. To be piloted from 2000, with a full phased run out planned by 2004. The programme acknowledged an investment of £42 million to provide a piece of fresh fruit (or vegetable) to infant school pupils between the ages 4-6 years during the school day. This would increase daily consumption with the intention of creating a culture of consumption that would be taken into junior school. The early plans to incorporate child focused initiatives provided a basis for subsequent developments.

The majority of nutrition and fruit and vegetables focused targets were identified within a chapter entitled ‘Improving health and reducing inequality’ (DH, 2000 Chapter 13). It set out; ‘for the first time ever’ health inequality targets at a local level that would be supported by national inequality targets. These focused on the narrowing of the health gap, in particular, socioeconomic differences between most deprived and the rest of the country, and throughout people’s life course (as outlined in Our Healthier Nation). The plan set out an extension of spending on Sure Start to around £500 million by 2004, where coverage was targeted at a third of children under four living in poverty. Sure Start had been established in 1998, but in terms of tackling poverty - tackling health. The additional expenditure represented a strong belief in the causes of inequality in health, and in particular targeting children.

Fruit and vegetable consumption was highlighted further in the NHS Plan (2000) on the issue of local delivery. Themes of ‘access’ and ‘availability’ through local retail were indicated, “where necessary, to establish local food cooperatives” (DH, 2000 13.21). Though not strongly emphasized at this point, this set the foundation of what became crucially interrelated with later 5 A Day policy as an implemented pilot strategy. At the early stage of formal 5 A Day it was mentioned very much as separate to other targets and initiatives.

As was consistent with earlier developments, the implementation of the strategy and initiatives were designed to be targeted and to partner NHS with local provision and services. Examples include the National Strategy for Neighbourhood Renewal, the development of Local Strategic Partnerships, Community Collaborative, and HAZs. The early notions of a 5 A Day programme were linked with community and partnership but at this stage in its life course remained an 'aim' based upon scientific advice.

### *2.7 Cancer Plan (2000)*

The NHS Cancer Plan (DH, 2000a) was more explicit in its targeted approach towards tackling risk factors in the prevention of cancer. It was the initial illustration of the government's commitment to the focus upon prevalent illness and ill health. The Cancer Plan claimed to be the first comprehensive strategy to tackle the disease. It highlighted the prominence of research, prevention, diagnosis, treatment and care. The Cancer Plan coincides with the NHS Plan, and many key points are mirrored, such as reducing inequality and the development of local strategies. Behind smoking, increasing fruit and vegetable consumption was considered the second most effective way to decrease the risk associated with cancer. The plan highlighted the cross-interest and collaborative nature of the 5 A Day programme, working closely with the food industry, the Food Standards Agency, and other key stakeholders with the intention of increasing access to fruit and vegetables for everyone. Producers and retailers were to be worked with so as to particularly target deprived communities as well as schools and hospitals. In addition to make fruit and vegetables, as part of a healthy diet, a real choice. The Cancer Plan also announced the inclusion of communication campaign to start in 2001, as well as indicated that the 'five-a-day' pilot studies were underway. The Cancer Plan (DH, 2000a) highlighted the significance of smoking, along with diet and nutrition, as well as obesity, physical activity, sunlight and radon (HDA, *Accessed 2005*).



## 2.8 'Five-a-day' Pilot Initiatives (2000-2001)

Beyond 5 A Day merely as a target, its first application in England was as a series of five pilot studies. The localities of Sandwell, Somerset, Airedale & Craven, County Durham & Darlington, and Hastings & St Leonard's were utilised. The pilots represented a feasibility study with the intention to roll out further local food projects following the initial stage. The basis for the pilot schemes were local strategies. These were underpinned by beliefs about the causes of low or lower than recommended fruit and vegetable consumption relating to circumstantial and attitudinal barriers. The pilots ran for 12 months between 2000 and 2001, with specific aims to "improve availability of fruit and vegetables by addressing access to, and affordability, acceptability and awareness of fruit and vegetables" (Durkin et al, 2002) with special emphasis on addressing inequalities. The implementations, addressing the objectives of the pilot study areas, are illustrated Table 2.2.

The pilot schemes focused on the use of community-wide interventions and specifically encouraged community engagement and involvement in schemes, where the community consisted of partnerships between health services, food retailers, schools, workplaces and caterers, and the wider community public. At the Airedale and Craven site it was indicated that the use of multiple channels was appropriate but at the same time most effective was to focus on specific groups rather than the whole population, thereby tackling the issue of inequality 'in a more robust way' (Durkin et al, 2002).

Although more specific attention is drawn to Community Food Initiatives elsewhere, a summary of results of the pilot studies are reported (DH, 2002; DH 2002a). These suggest that the type of intervention can produce changes in knowledge, access and intake, where the interventions as a whole stemmed a fall in intake and over a sustained period could increase fruit and vegetable consumption. Similarly a positive effect was shown "in people with lowest intake – this is important for addressing inequalities in health" (DH, 2002). It was highlighted that eating more often was important in increasing total intake of individual consumers.

Table 2.2 'Five-a-day' Pilot Projects by Area

<p>Sandwell:</p> <ul style="list-style-type: none"><li>- Preparing a food map of northern Sandwell, showing the price and availability of over 70 foods in 300 shops</li><li>- Aiming to provide a community food service to 1000 residents, with free home delivery of groceries</li><li>- Promoting fruit and vegetable intake through a football coaching scheme and sponsorship of WBA's children's football teams</li><li>- A community café, with fruit tastings</li></ul> <p>Somerset:</p> <ul style="list-style-type: none"><li>- Making fruit and vegetables available from the Intervention Board to four institutions</li><li>- Developing a village shop scheme</li><li>- Developing opportunities to 'grow your own'</li><li>- Running competitions in local schools</li></ul> <p>Airedale &amp; Craven</p> <ul style="list-style-type: none"><li>- Training sessions in over 20 health centres</li><li>- Working with local supermarkets and retailers to promote fruit and vegetables</li><li>- Developing a food network in the area and map food outlets</li><li>- Developing a school food initiative to promote fruit and vegetables</li></ul> <p>County Durham &amp; Darlington:</p> <ul style="list-style-type: none"><li>- Promoting fruit and vegetable gardens and allotments</li><li>- Tasting and cooking sessions in local shops</li><li>- Pricing of fruit and vegetables in food retailing and farmers' markets</li><li>- Flyers in wage slips to employees</li><li>- Cookery demonstrations in GP surgeries and health centres</li></ul> <p>Hastings &amp; St Leonard's</p> <ul style="list-style-type: none"><li>- Setting up local food co-ops which will deliver produce to the home</li><li>- Providing training to local shop keepers</li><li>- Working with local primary care teams to promote fruit and vegetable consumption</li><li>- Setting up breakfast clubs with fruit included</li><li>- Promoting use of community allotments</li></ul>
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(Source: DH, 2000a)

Important research and method issues were also indicated. The FACET questionnaire, a food frequency survey method was developed, as well as confirming portion sizes were close to those estimated the notion of 5 A Day.

The pilots, as far as overall 5 A Day policy was concerned, demonstrated the need for community interventions to be implemented with the community needs considered. A model of development should allow community level individuality. 5 A Day had thus demonstrated itself as a target, a community intervention (as a pilot and assessment tool), but increasingly developing as a promotional device.

As an example, the Hastings & St Leonard's pilot site was supported initially with £100,000 from the Department of Health, and set up by the Health Promotion Unit. A number of activities, as was the intention, were established in the local community, with main emphasis on a fruit and vegetable co-op model, of which two were created. They opened for one day a week and were coordinated by a project worker and helped by three part time workers and volunteers. The two co-ops merged with a total of 164 members, many of which were part of local groups, e.g. crèches, play groups, nurseries. An average of more than £5 per user per week was spent on fruit and vegetables. In evaluation, those involved in the core group of co-op users increased their knowledge of benefits of eating fruit and vegetable as well as more acceptable within the diets of users. The links forged with particular play schemes proved useful both for the purpose of repeat visits but also in spreading the fruit and vegetable consumption message (avenues which allowed targeting of those who would not have deliberately sought such a service). Following the pilot, the co-op provision of fruit and vegetables was supported by Neighbourhood Renewal Funding where it was further rolled out. It was then transformed into a social enterprise as a Community Fruit and Vegetable Project (2005), linking back to provide produce for some of the other projects set up under the initial pilot study.

## 2.9 "5 A Day" Logo

Bleas, in 2002, the then Public Health Minister, indicated the expansion of the 5 A Day package, and in particular its promotional element. It would be made easy for people to make choices about their diet that were healthy, and the logo was believed to be a useful way of achieving this. Figure 2.1 presents the logo.

Figure 2.1 The 5 A Day: Just Eat More (Fruit & Veg) Logo



Just Eat More  
(fruit & veg)

(Source: [nhs.uk/livewell/5DAY](http://nhs.uk/livewell/5DAY), 2011)

Though the emphasis was upon the logo as an indicator by incorporating it into industry and retail labeling, the log was adopted for health promotion in promotion. Blears (2002) indicated that the 5 A Day logo was attached to resources distributed to the primary care setting as means of promoting fruit and vegetable consumption. The food label '5 A Day' was to aid the consumer in support of fruit and vegetable portion amounts in food (must be greater than one) so as to reduce confusion, while (in the promotion of overall healthfulness) the logo could be used on retail products where no fats, sugars, and salt were added. Director of Public Health for North Tyneside, Dr Chappel (2003) concurred, stating;

"People need accurate, consistent advice on how to reach the 5 a day target. The new logo is backed by nutritional advice so if it appears on a product, people can be confident it counts towards the recommended daily target for fruit and vegetables" (ibid, 2003).

For the first time 5 A Day represented a campaign with a trademarked food and promotion label, supported by inclusion of the visual Just Eat More (fruit & veg) message. By early 2003, the 5 A Day programme had five strands, National School Fruit Scheme, 'Five-a-day' community initiatives, communications programme, work with industry and a national/local partnership (DH, 2003). Others suggest Evaluation and Monitoring should be noted as a further strand (SACN, 2002). The Health Survey for England including questions about fruit and vegetable consumption from 2001.

### *2.10 5 A DAY: Local Community Initiatives (2003-2006)*

Further development of community 5 A Day initiatives over a two year period, based on the objective of the original pilot studies, was implemented. These were a) an increase of fruit and vegetable consumption, b) increase awareness or knowledge, c) change attitudes and beliefs, and d) increase access to fruits and vegetables. They were also tasked to provide evidence of the interventions (DH, 2003a) following a general push for evidence and evaluation (e.g. Caraher & Cowburn 2004). This was supported by the New Opportunities Fund (a national lottery organisation), an expansion to 66 PCTs (most deprived 20%) was funded to the total cost of £10 million (£150,000 from The Big Lottery Fund).

According to a process review, Dalziel et al (2004), 5 A Day Coordinator posts were commonly established to aid the development of initiatives in local areas, utilising a range of local initiatives. 'Cook & Eat' sessions, 'Sow & Grow' schemes, school specific consultations, 'Food Coops', transport and home delivery systems, 'community cafes' were created. The process suggested that initiatives were utilising the connection with local people by a "need to carefully tailor the activities to suit the target groups" (ibid, 2004). Not only did the initiatives focus on identification and targeting but a strong theme of partnerships developed. There were different levels of link implied, the formal linking with national campaigns (obesity, smoking, heart disease for example) as well as local 5 A Day initiatives linked with local strategies and messages.

The final review of the initiatives, Bremner et al (2006), highlighted important areas concerning local interventions, though not all were successful. Significant improvements had been made in the consumption of fruit and vegetables, but in general these were not significant compared with established control areas. It did show that there was enhanced improvement in certain groups, those groups that had the poorest levels of consumption of fruits and vegetables, such as those in key areas of deprivation, low income, men, and younger people (ibid, 2006). Though caution was expressed in attributing this to the initiatives alone since widespread and local messages concerning fruit and vegetables and health were being disseminated throughout.

The programme, in some agreement with the earlier pilot schemes, demonstrated certain potential for tackling some inequalities in the consumption of fruit and vegetables. It highlighted the importance of a 'multi-pronged' approach when disseminating information. It also advocated joined up organisation and partnerships, however following the funding from the initiative programme, (in 2006) less than fifteen percent of the PCTs had secured funding to continue the activities.

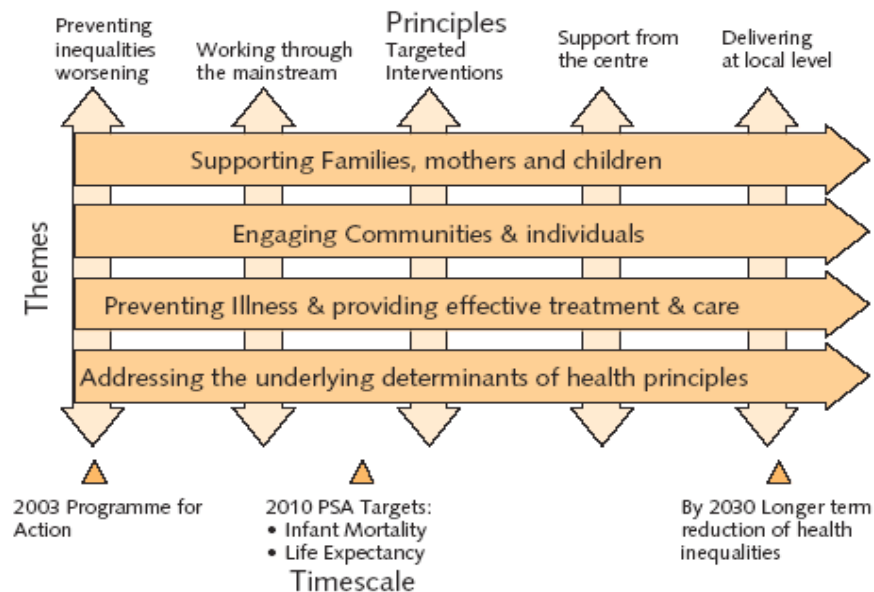
### 2.11 Tackling Health Inequalities (2003)

The ‘Tackling Health Inequalities’ report demonstrated the government’s continued support for certain key values. It set targets and strategy to deliver on its goals regarding inequality and particularly health related inequality. “This Programme for Action demonstrates our commitment to deliver long-term improvement, through investment, reform and local responsibility, in the health and healthcare of the most disadvantaged in our society” (DH, 2003b pg1).

The themes and principles featured in the strategy, outlined in Figure 2.2 (DH, 2003b), show a powerful indicator to how the research and underpinning drive manifest into the government’s delivery. The Action plan, though focusing upon certain measures of inequality (infant mortality, and life expectancy at birth), reiterated the expansion of 5 A Day along with the National Schools Fruit Scheme. Fruit and vegetables also appeared within the report as one of 12 headline indicators in tackling health problems - the consumption of 5 or more portions of fruit and vegetables per day in the lowest quintile of household income distribution, but represented part of tackling health on a ‘broad front’ as outlined by the Acheson report (1998).

The programme outlined the Public Service Agreement to reduce the inequalities in health by 10 per cent by 2010. Importantly the programme as a whole highlighted 5 A Day in line with and as part of wider health goals and strategy, as well as stressing local means and joined up strategy.

Figure 2.2 Themes and Principles of ‘Tackling Health Inequalities’



(Source: DH, 2003b pg11)

### *2.12 Food & Health Action Plan (2003)*

Around the same time as Tackling Health Inequalities (DH, 2003b) which reported the Department of Health's anti inequality plan for inequality as a whole, the Department of Health launched a two part focus upon food and health, the first was to be a consultation and discussion the second to be the creation of a plan. The problem analysis stage recognised the importance of food as part of wider inequality. It identified the cost of poor eating, in a social context as well as eating trends and dietary habits such as insufficient consumption or over consumption, for example 87 and 86 per cent of men and women respectively did not meet 5 A Day recommendations according to the National Diet Nutrition Survey 2000/01 (DH, 2003c pg26).

The Action Plan importantly shows the development of food policy/health policy context, of which fruit and vegetable consumption is incorporated. It was developed as part of the Strategy for Sustainable Farming and Food, coordinated between both DH and Department of Farming & Rural Affairs, as proposed by Curry's earlier report (2002). In particular both the report headed by Curry and the Strategy advocate a 'joined-up' approach to food at all parts of the food chain. This represented an extension to that work already linking industry, retail, and consumer, and building upon incorporation of the sustainability of such chains e.g. producers. A key principle in the government's strategy was to meet market demands, while ensuring all consumers have access to nutritious foods, and importantly also accurate information about that food (DH, 2003c).

### *2.13 Choosing Health: Making Healthy Choices Easier (2004)*

'Choosing Health' (DH, 2004) committed the government to a particular role in public health. This was underpinned by key principles outlined in the document, 'support of informed choice', 'personalisation' and 'coordination'. The first of these relates to the individual making choices about their own health, and the role of the government was to ensure that people were fully aware of the health choices they made and were enabled to make those choices. Personalisation represented the intention to tailor health towards the specific requirements and realities of individuals, with those more in need the most in mind, with a need for flexibility and convenience. The third principle outlined by Choosing Health referred to the continuation of working together, not only the individual and the government, but across communities as effective partnerships in health delivery and meeting health choices. This

included local government, NHS, business, advertisers, retailers, voluntary sector, media, communities and faith organisations. The role of the government in this was to lead, promote and coordinate between the different sectors, with the expectation that each would “engage constructively in a shared effort the building of information around people’s lives so as to fully access the health care” (DH 2004) they want/need.

Importantly for the nature of health policy, the individual was formally recognised as a consumer. Health choices were considered part of consumer choices, and therefore these health choices should be supported and made easier by the network of partnerships. This also had an impact on the perception that health should be ‘marketed’ to the consumer. Information would continue to play an important role but expanded in line with the new framing. Labeling, information for the public, and information for the media was placed at the forefront of strategy. The implication of this can be seen in relation to obesity where the 5 A Day message was to continue, along with healthy diet labeling and the development of public information via Health Direct providing advice and facilitation of support e.g. Sure Start. In summary;

“The new problems that have emerged and the old problems that have persisted are the cumulative results of thousands of choices by millions of people over decades that impact upon health. So a step change in health improvement will involve millions of people making different choices about the things in everyday life which impact on their health...We believe the right approach is to empower people, support people when they want support and foster environments in which healthy choices are easier” (DH, 2004 1.22).

Choosing Health still recognised structural concerns, this echoed earlier sentiments of stimulating demand for and availability of healthier options as well as highlighting the need to tackle health inequalities. Local services, while tailored to meet the complexity of people’s lives, would provide practical support for those who lacked basic skills. The partnerships with industry included discussions to allow easier, more accessible healthy choices. The aim to reverse portion sizes (something that would question fruit and vegetables tag line ‘just eat more’ in the spotlight as juxtaposed to other health messages), signpost health foods, reduce content of sugar/salt/fats in processed foods (also reducing portion size where necessary), and increasing availability of healthy foods generally, including fruit and vegetables.



Reiterating the change in the nature of disease from environmental factors to that of 'choice', Choosing Health prioritized six areas for specific attention. These were reducing numbers smoking, reducing obesity and improve diet and nutrition, increasing exercise, encouraging and support sensible drinking (alcohol), improving sexual health, and improving mental health. It became apparent that the issue of obesity was becoming more significant in policy strategy, recognising its 'sharp rise' in associated ill health occurrences. Where fruit and vegetable consumption as part of diet, as well as physical activity and lifestyle, was indicated as important. Choosing Health outlined that NICE (National Institute for Health & Clinical Excellence) was to compile a definitive, comprehensive guide on prevention, identification, management and treatment of the disease.

Two further emphases were found within the white paper in relation to diet and nutrition and intrinsically fruit and vegetable consumption. The first of these focused on protecting those that were unable to make healthy choices themselves, namely children. Choosing Health advocated the development of a Children Strategy by 2007, local children's trust centres by 2008, and the creation of health guides and Child Health Promotion Programme. This would include *Health Start*; a voucher system for free milk formula and fruit and vegetables, and an extension of Sure Start called Home Start volunteer visiting programme. The National Healthy Schools programme was to be half rolled out by 2006, a whole school Food In Schools package adopted, and all 4-6 year olds in Local Education Authorities (LEAs) to be eligible for free fruit and vegetables. For young people 16-30 years old, a health promoting magazine FIT was piloted to encourage take up of health services.

In line with the multiple stakeholder responsibility, emphasis surrounding delivery of the programmes was to "maximise the positive impact of the local community setting with measures that will mean successful community-based models for improving local health can be more confident of sustained support" (DH, 2004). Choosing Health (2004) advocated support of new and further 5 A Day initiatives in deprived communities, and described this within Choosing A Better Diet: a Food and Health Action Plan (2005). For example, it was planned for the Welfare Food Scheme to be reformed, improving access to fruit and vegetables in disadvantaged communities. The Plan recognised the US '5 A Day for better health' programme which indicated knowledge, taste, and self efficacy (particularly in preparation and consumption) being the strongest predictors of behaviour change.

As part of the UK 5 A Day programme, the Plan identified the need to simplify the portion message of what it means to adults and children, as well as working with creative media and other interested groups in simplifying messages to build on to existing campaigns. In line with messages of health promotion the Department of Health set up the National Consumer Council (NCC) as an independent

body to aid in the development of 'social marketing strategy' based on an intelligence of people's attitude towards health. In addition the National Centre for Media & Health was planned to investigate innovative communication to build on existing media strategies, for example 5 A Day.

#### *2.14 Healthy Weight, Healthy Lives (2008)*

Healthy Weight, Healthy Lives (DH, 2008) consolidated some of the prominent issues identified in earlier policy, with a specific focus upon tackling the increasing prominence of obesity in relation to ill health. The cross –government strategy advocated further joined up action. It drew upon the relationship of consumer health decisions, recognising that obesity was strongly linked to physical activity and diet.

“Halting the obesity epidemic is about individual behaviour and responsibility: how people choose to live their lives, what they eat and how much physical activity they do. It is about the responsibility of the private and voluntary sectors too...the Government has a significant role to play...: not in hectoring or lecturing but in expanding the opportunities people have to make the right choices for themselves and their families; in making sure that people have clear and effective information about food, exercise and their wellbeing; and in ensuring that its policies across the piece support people in their efforts to maintain a healthy weight” (DH 2008).

This formalised the links in policy between being overweight, being obese and ill health, therefore promotion and support of a 'healthy weight'. It emphasised a positive notion of choosing to live healthily, which was seen in accordance with Choosing Health framework, or to protect children who were unable to choose. This was not an original point of interest but coincided with a growing focus upon children more generally from government in line with 'Every Child Matters'; a cross departmental programme and focus upon the well-being of children and families across areas including education, justice, and health.

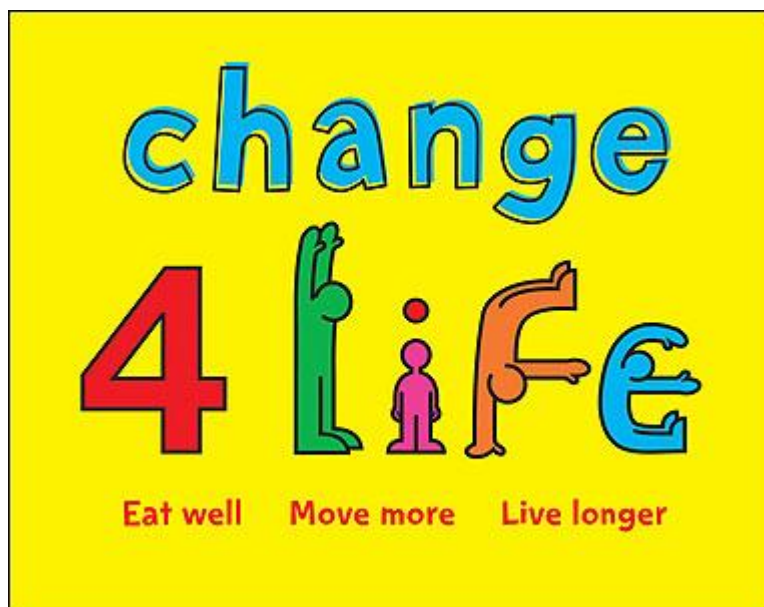
The plan identified a need to build upon existing programmes offering stronger support where required. For example a further extension of Healthy Start that utilised dedicated home visits to enhance health promotion within vulnerable families as well as providing vouchers to low income families for products including fresh fruit. The development of marketing programmes, as outlined in

Choosing Health, provided local level opportunities for families to change poor health, work with employers to create healthy work environments (such as weight loss programmes), as well as a continue the national marketing campaign. A figure of £372 million was set aside specifically for the implementation of associated strategies. The plan also highlighted the need to build upon the evidence base.

One of the products of the report was the development of the marketing campaign 'Change4Life' (£75 million set aside) which originally targeted children but had plans to extend to 'at risk' adults. This explicitly utilised promotion activity to link national campaigns with local events and activities, and binding 5 A Day as part of further campaigns. Figure 2.3 presents a Change4Life logo.

The theme of children continued throughout the stages of their lives and environments they interacted with, such as Healthy Schools Programmes, and nutritional codes of conducts for schools. What was projected once again was an integration of fruits and vegetables as part of diet, which was in turn part of healthy weight management. The 'One Year On' (DH 2009) report suggests that the joined up energy balance system, linked with intake and output of calories was perhaps more useful than a micro nutrient approach to provide meaningful weight management.

Figure 2.3 Change4Life Logo



(Source: [www.dh.gov.uk/en/PublicHealth/Obesity/index.htm](http://www.dh.gov.uk/en/PublicHealth/Obesity/index.htm))

Positive moves towards 'less energy-dense diets' (thus incorporating both the types of food, e.g. fruit and vegetables, as well as portion control) would be advantageous. 5 A Day remained an integrated promotion, and a target within dietary management strategies. It was marketed with national promotion as well as inherent in local projects, for example the purposeful extension of fruit and vegetable lines within local convenience stores in traditional low consumption areas.

The House of Lords Science and Technology Committee (2010) reflected on the government's 'marketing component' Change4Life. It was highlighted that the programme had utilised a satisfactory evidence base in its process, using segmentation for the purpose of targeting and piloting. The report however did indicate that some elements such as the 'Great Swapathon' initiative which provided vouchers for healthy food items seemed to encourage the increase in unhealthy ones. The report indicated that despite evaluation and process review, there was a lack of outcome measures of behaviour change, rather brand recognition and claimed change; calling for greater robustness in this area.

### *2.15 Food Matters: Towards a Strategy for the 21<sup>st</sup> Century (2008)*

In line with the previous policy, such as the Curry Report, 'Food Matters' outlined a joined up strategy to tackle the food issues seen as prominent. It identifies that there had been real shifts in the food system that require further attention, challenges being found in 'economics and equity', 'health', 'safety', and 'environment'.

"The future strategic policy objectives for food should be secure: fair prices, choice, access to food and food security through open and competitive markets; continuous improvement in the safety of food; a further transition to healthier diets; and more environmentally sustainable food chain" (Cabinet Office, 2008)

The white paper indicated that central government needed to better integrate aspects of the food system; working with the public, food chain businesses and other stakeholders looking towards a new framework. The intention of people to eat more healthily and their awareness of the role of food in health were indicated. It also recognised that an under representation of healthy foods such as fruits and vegetables were found in the diet, suggesting 70,000 premature

deaths per year could be prevented if health guidelines were followed. A number of key actions were addressed in relation to health and in particular the role of 5 A Day. These included 'integration' of information, 'healthy choices' when eating out, importance of community and local organisations in supporting promotional activities (encouraging debate and promoting new social norms). In addition, further 'campaigning' utilising 5 A Day while targeting groups where low consumption persists, and increase clarity of the messages given.

Food 2030 (2010) strategy, set out by Food Matters (2008) was developed as a response to the 'big food challenges', sustainability, security and health, as well as an answer to the call for more joined up food policy. In regard to health challenges, particularly obesity, it framed the theme of diet as a need to enable and encourage people to eat what was considered to be a healthy, sustainable diet. As well as Healthy Start and Change4Life, the Convenience Store Project and Healthy Towns Initiative were advocated as promoting greater fruit and vegetable consumption. The former promoted convenience stores as places of healthier consumption for fruit and vegetables. It was highlighted in Healthy Lives, Healthy People (DH, 2010) that the partnership between convenience stores and the Department of Health had led to the positioning of dedicated chiller cabinets (with Change4Life promotion) in prominent store positions. The stores, chosen because of their point of access to deprived communities reported an increase in fruit and vegetables sold (some as much as 50%) as well as an overall sales increase. 160 stores were initially set up in this fashion in four locations. The approach towards the city/townscape as a place for active healthier changes to communities incorporated schemes such as growing food.

### *2.16 Healthy Lives, Healthy People (2010)*

The Healthy Lives, Healthy People (DH, 2010) white paper sets about another new area in health policy, developing certain themes from the recent past while using a different emphasis. Healthy Lives will be briefly mentioned here as it was released under the Conservative government in November, following Labour's failure to be re-elected earlier in the year, and although not a New Labour policy as such does highlight some interest to the continuity and development of food and health policy. Healthy Lives, Healthy People (DH, 2010) reflects a number of reports; Marmot's 'Fair Society, Healthy Lives' report, for example, acknowledges a need to approach health using a life course approach while tackling wider

social determinants. Focussing from infancy (e.g. to build self esteem) and a coherent approach throughout life stages, 'rather than tackling individual risk factors in isolation'. 'A Vision for Adult Social Care: Capable Communities and Active Citizens' links the importance of local service delivery, and 'Equity and Excellence: Liberating the NHS' provides guiding principles of liberating professional leadership and importantly innovation. The White Paper recognises the 'seizing of opportunities', 'reaching across and reaching out' while being responsive (owned and shaped by communities), resourced, rigorous (professional led), and resilient (protective against future threats).

For fruit and vegetable policy Healthy Lives, Healthy People reiterates the rolling out of Change4Life branding and promotion as well as further vouchers (£250 million) to aid integration of healthy living, offering genuine partnership in the Public Health Responsibility Deal to tackle behaviour change. The Fruit and Vegetable Task Force recommendation of 5 A Day licensing to foods which are part made with fruit and vegetables was ongoing, but represented further working with industry and retail.

### *2.17 Chapter Summary*

Though the individual initiatives described the role and characteristics of fruit and vegetable policy, there are recurring themes throughout the period. Thus linking them with each other and commonality between policies and initiatives either side of this era. Health was contextualised with 'inequality', recognition that some were more at risk in society than others. On this point, Lister (1998) indicates that the change in government brought with it a paradigm shift underlying political action. The previous political value was more specifically focused on inequality, where under the new regime 'equality' was presented as key, with an increase in social inclusion and equality of opportunity (manifesting in a Social Exclusion Unit). Therefore, an emphasis on social responsibilities rather than rights.

In the earlier stages of the period this took a structural overtone such as access and availability, but importantly these were identified with local government and local services in resolving inequalities, such as reported in 'Saving Lives' and 'The NHS Plan'. Hence local responsibility, as well as central government and individuals were believed to be important for healthier lives. Hills (1998) believes the 'localisation of actions' could be seen in the development of area/geographically-based policies. Health, education and employment policies were linked and formalised within Health Action Zones (HAZs). Hills (1998) suggests the focus had shifted to health and education, representing an evolution in policies from the previous regime.

Lister (2001) indicates that the Labour Government was characterised by more populist and 'what works' (even reactionary pragmatism) in their assault on structural inequalities. Barnett (2003) links this to earned autonomy and evidenced based policy, describing the 'third way' of 'active welfare'. The chapter also points to how the adaptation of particular values, such as the integration of personal choice in relation to opportunity and provision. The policies are framed by a focus upon identifying vulnerable groups and offering access to services.

Though inequality remained important as policy developed, responsibility shifted, in line with a more complex comprehension of the role of multiple layers impacting upon the health of individuals. A greater range of stakeholders were implicated. Choosing Health (DH, 2004) shifted responsibility of ill health and inequality to making unhealthy choices, reflecting a rise in preventable diseases based on lifestyle and food based decisions. A rise in the recognition of obesity and health changed the focus of health policy to obesity and associated conditions, rather than cancers (Healthy Weight, Healthy Lives, DH, 2008 in particular). This also represented a different approach to placing fruit and vegetables with health, where the focus shifted from components within the diet to healthier diets and lifestyle, such as the Change4Life programme, and the multifaceted nature of well being.

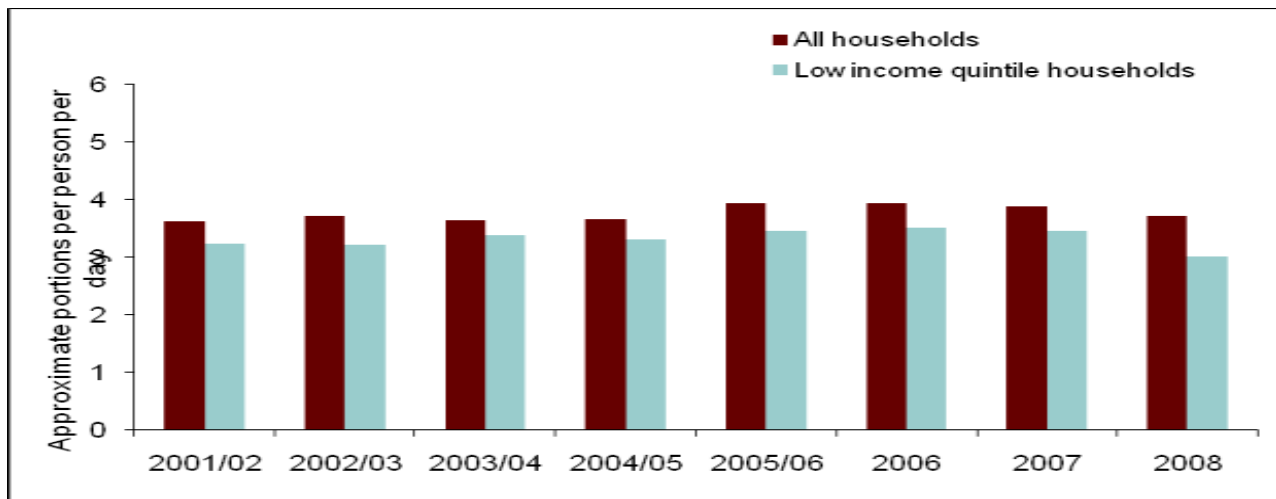
It was not only local level service delivery and inequality that featured strongly within the era, but the development of more comprehensive evidence bases (local and national) and more effective communication, e.g. Food Standards Agency and Public Health Observatories. New media was also utilised, the internet played an increasing role in service delivery and provision of information and the embracing of social marketing for promotion. Children remained of particular importance, unable to make their own choices for example in Choosing Health, and supported by a number of policies such as Sure Start. In relation to fruit and vegetable consumption, National School Fruit Scheme, School Fruit and Vegetable Scheme, National Healthy Schools Programme, and access to free fruits and vegetables were utilised. Wells & Nelson (2005) highlight that direct provision of fruits led to infant's average consumption increasing, but this did transcend to junior schools or a longer term effect.

During the era a number of fruit and vegetable specific policies for adults were observed. These were often in relation to wider aims. 5 A Day did find different guises and represented a multitude of roles, many evolutionary. The nutritional requirement of 400g, five portions of 80g each day of fruits and vegetable started as a requirement, before being defined a specific daily target in 2000. A number of manifestations of this have been prevalent, it formed the research base for the pilot studies of local food projects before being rolled out as a community action plan as an umbrella of intervention at a local level (targeting 66 most deprived Primary Care Trust areas). 5 A Day also linked with retail

provision and promotion tool, with the 5 A Day logo being utilised in its own right and as part of the promotion programme Change4Life.

Despite the strong health themes that developed and the integration of fruit and vegetable promotion, DEFRA's Fruit and Vegetable Taskforce (FVTF, 2010) highlight significant problems. It was suggested that the link with cancer was less prominent than previously thought. Statistics suggest the impact of programmes and background of substantial increases in the general awareness, are not reflected in fruit and vegetable targets being met (supported by Mintel 2011, HSE etc.). In relation to the attack on inequality represented in health policy, not only has fruit and vegetable consumption seen a decrease in recent years (following an initial rise) but more so for lower SES and income groups, those described as potentially most vulnerable. Figure 2.4 highlights this.

Figure 2.4 Average Individual Fruit and Vegetable Consumption: presenting all households and low income quintile households



(Source: Fruit and Vegetable Taskforce, 2010)

The 5 A Day message may not have been as optimally targeted. It does not necessarily meet dietary needs in only five portions, and larger amounts have been associated with a more appropriate recommendation. In meeting higher levels of fruit and vegetables it can impact upon over consumption in certain areas, fructose for example (reported by Harcome, 2011). The 'just eat more' concept has been questioned, and does not address some of the coinciding issues of giving proper advice, such as variety, or portion control. The message has also been ineffective in encapsulating advice to target behaviour change. The 5 A Day schemes have continued to be important to health policy and evaluation of 5 A Day. Local level intervention projects have described positive effects on self esteem surrounding



food and increases in consumption of those immediately involved in the local food projects while targeting the consumption of most vulnerable. However as highlighted in the House of Lords (2010) report, outcome measures should be more robust to the measure of success of fruit and vegetable policy. This coincides with a number of evaluations focusing on local partnerships, the processes of implementation, and the amount of money spent on particular ventures.

In light of this, it becomes increasingly important to address the determinants of high consumption. The following chapter examines the determinants and influences, both positive and negative associations, with fruit and vegetable consumption, as have been identified by empirical investigation and theoretical constructs.

## Chapter Three

### **Fruits and Vegetables: Determinants to Their Consumption and Influences upon Food Choice**

#### *3.1 Introduction*

This chapter examines the state of knowledge regarding factors that influence the consumption of fruit and vegetables. In doing so, the chapter provides research and results from empirical investigations as well as theoretical contexts that are important in considering effectors of intake. The nature of fruit and vegetable consumption is such that the chapter draws upon work in the areas of food, food choice, health behaviour, and lifestyle behaviour. Key topics are identified and addressed.

The following section of the literature review (3.2) indicates the existence of important reviews collating determinants of fruit and vegetable consumption by utilising specific frameworks; official government policy, environmental influences, psychosocial factors, and food choice which collectively outline the nature of the chapter. The second section (3.3) highlights demographic associations with fruit and vegetable consumption, identifying commonly utilised divisions found in literature. Section three (3.4) focuses upon literature that approaches determinants of fruit and vegetable consumption which are seen as linked to internal processes. Section four (3.5) draws attention to those influences which are seen as important environments. The section is divided into the home (and people at home), and environments outside of the home (including work, and shopping). The subsequent sections (3.6 and 3.7) highlight the importance of time in relation to consumption and the role of strategies and management in fruit and vegetable consumption. The concluding section (3.8) draws attention to the research areas that have been discussed as well as directing the conceptual aspects for the thesis.

#### *3.2 Frameworks and Reviews*

There has been significant investment into the research arena from a number of academic areas because of the positioning of the fruit and vegetable consumption topic, but also because of the importance of fruit and vegetable consumption as outlined in the introductory chapters of this thesis. The recognition of the importance of certain foods in relation to health and prevention of

chronic disease as well as an inherent inequality in health opportunities such as fruit and vegetable consumption manifested in the UK as the MAFF's research programme 'Food Acceptability and Choice' (Jardine, 1996) which began in 1991 as part of the Food Quality and Nutrition remit. The research programme was designed to aid in the fulfillment of the governments strategies proposed in 'Health of the Nation' by indentifying ways to encourage dietary change away from unhealthy foods and therefore towards the healthy such as fruit and vegetables. Though some evolution to the foci of projects under the programme, it approached the bases of food choices, the barriers that constrained or inhibited sensible food choices, and effective strategies to overcome these barriers. Woolfe (2000) reports the research programme had commissioned 24 projects, with successful identification of many factors that influence food choice, including 'sensory, physiological, psychological, and sociological' (ibid, 2000). Some of these are discussed where appropriate below. In addition Woolfe (2000) notes the importance of a greater upstanding about the inherent complexities and interactions between factors so that professionals can develop effective strategies to overcome believed barriers to a healthy diet.

The Ministry for Agriculture Fisheries and Food (MAFF) programme provides useful themes for the purpose of this chapter. It highlights that a number of influences upon food choice and fruit and vegetables consumption exist. The effects of these influences differ between groups and individuals, and adopted or implemented strategies for consumption have a greater impact on some. It recognises the role of choice, surmising that sensible choices would be made if not inhibited by a range of factors. It also represents the utilisation of a framework, in this case political, for the investigation of fruit and vegetable determinants. This is important as not all investigations of fruit and vegetable consumption examine determinants in isolation. There are those which identify a range of factors important to a particular group, or between groups (such as demographic details), but also research that is framed by examining the interaction between certain influences.

Reviews offer a further framework. A small number of reviews of the determinants and/or factors that affect food choice exist in relation to fruit and vegetables. Kamphuis et al (2006), for example, in an attempt to summarise the existing empirical evidence pertaining to the association between environmental influences and the consumption of fruits and vegetables identified twenty-four published studies. Derived from a systematic reduction of literature fifty-seven significant environmental determinants on intake were detailed and ninety-seven associations. The review focused upon 'ecological' factors relating to fruit and vegetable consumption and highlights the effects upon fruit and vegetables both separately and together. Table 3.1 demonstrates the environmental determinants identified in the reviews and the associated effect upon fruit and vegetable consumption.

Table 3.1 Associations and Significant Dietary-Determinant Outcomes for Fruits, Vegetables, and Fruit and Vegetables.

Environmental determinants	Fruit Intake	Vegetable Intake	FV Intake
<b>Accessibility factors</b>			
Availability of FV at national market	1	1	+1
Full-service restaurant in the census tract			2
Fast food restaurant in the census tract			2
Grocery store in the census tract			2
Supermarket in the census tract			+1/1
Perceived accessibility			+1
Perceived affordability			+1
Household food insecurity	-1	-1	
Car access			+1
Having a vegetable garden	+1	+1	+2
<b>Social Factors</b>			
Being Married	+1/1	+2	+2/+1
Household size	+1	+1	
Having child(ren)	+1/-2	-1/+1/-1	+1
Family functioning			1
Social support from family members			+1/+1
Social support from others			+1
<b>Cultural factors</b>			
Presence of others during mealtimes	+1	+1	
Intellect-cultural orientation of family			+1
<b>Material factors</b>			
Median income of neighbourhood	+1/+1	+2	
Neighbourhood deprivation	-1	-1	-1/1
Household income	+4/+1	+7	+1/+1/-2
Receiving benefits			-2
<b>Other factors</b>			
Living in a rural (vs urban) area			-2
Living in a northern region of Norway	1	-1	
Region of residence in Spain	1	1	
Living in the north of UK	-1	-1	-1/-2
Living in London/SE UK			+1
Residing in the USA (instead of Asia)	+1	-1	
Residing in Scotland (instead of Greece)	-1	-1/-1	-1/-1
Winter (compared with summer)	+2/-1/-1	-1/-1	+2/-1
<p><b>Bold;</b> number of significant effects found for combination determinant-dietary outcome; <b>unbold,</b> number of non-sig. effects found for the combination determinant –dietary outcome, or for which information on sig. not available; +, positive association, - negative association. Some non-sig. associations do not have a + or – as info not available.</p>			

(Source: Kamphuis et al, 2006)

The review collated factors relating to access, social surrounding (mainly in the home), culture, material influences (primarily income) and ‘other factors’ which included geographical location and season.

In a similar way, Shaikh et al (2008) conducted a review of empirical investigation pertaining to fruit and vegetable consumption, in particular a ‘systematic meta-evaluation...summarizing and identifying the most promising psychosocial constructs’ (ibid, 2008). The focus for the review was variables evident in the analysis of psychological interaction with the social environment and prominently a number of theories and constructs from where they appear.

Table 3.2 Shaikh’s et al (2008) Evidence of Effectiveness of Association between Psychosocial Predictors and Fruit and Vegetable Consumption (in Adults)

<b>Construct</b>	<b>Total Number of Studies</b>	<b>Evidence of Effectiveness</b>
Acculturation (Mexican)	1	Insufficient
Anticipated Regret	2	Sufficient
Barriers	9	Sufficient
Enabling Factors	1	Sufficient
Intentions	8	Sufficient
Knowledge	8	Strong
Meat Preference	1	Insufficient
Motivation - autonomous	4	Sufficient
Motivation - controlled	3	Insufficient
Neophobia	1	Insufficient
Norms/subjective norms	6	Insufficient
Outcome expectations	1	Insufficient
Attitudes/beliefs	7	Sufficient
Benefits	6	Sufficient
Perceived need to increase fruit and vegetables	1	Insufficient
Severity (of cancer)	1	Insufficient
Susceptibility (to cancer)	1	Insufficient
Predisposing factors	1	Sufficient
Preference for fruit and vegetables	3	Insufficient
Religiosity - extrinsic	1	Insufficient
Religiosity - intrinsic	2	Insufficient
Self efficacy/perceived control/behavioural control	13	Strong
Set examples for others	1	Insufficient
Social Support/encouragement/influence	6	Strong
Stages of Change	12	Sufficient

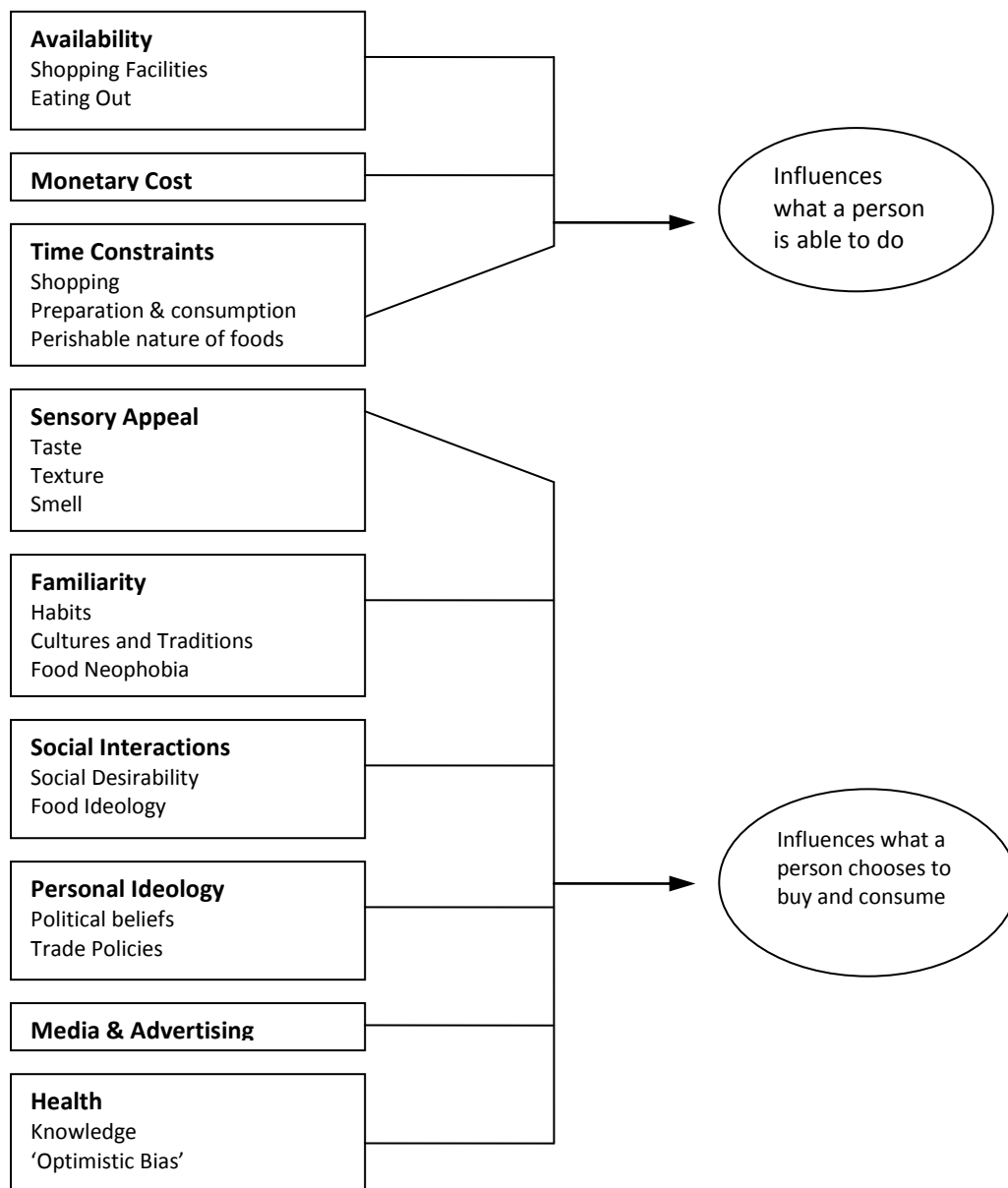
(Source: Shaikh et al, 2008)

Table 3.2 presents the constructs and the evidence of effectiveness that was reported as judged against the author's use of an adapted Guide to Community Preventive Services methodology. The range was from 'Insufficient', 'Sufficient', and 'Strong' and is linked to number of studies, quality of studies as well as strength of evidence. Importantly for this chapter the review highlights a number of influences that appear as part of theories such as the transtheoretical model (TTM), health belief model (HBM), theory of reasoned action (TRA), theory of planned behaviour (TPB), social cognitive theory (SCT), and self determination theory (SDT). The review indicates that not only are the frameworks used important in the determinants that are prevalent in fruit and vegetable consumption but that models of behaviour and food choice can be useful both for linking complexities and focusing on individual variables or constructs. As well as the collation of the information as in Table 3.2, Shaikh et al (2008) also split the studies they include within their framework into those that were 'prospective' in design, placing emphasis on a division of those studies which utilised mediating variable and those that used predictors, and those that featured 'cross-sectional' methods.

Utilising a more 'narrative tenor' (Kamphuis et al, 2006), Pollard et al (2002) collate a food choice framework based upon literature that pertains to fruit and vegetable consumption. Pollard et al (2002) categorise fruit and vegetable determinants as identified in literature into nine themes grouped under two types of influence: those factors that influence what someone is able to buy, and those that influence what the person chooses to consume. 'Availability', 'monetary cost' 'time', 'sensory appeal', 'familiarity', 'social interactions', 'personal ideology', 'media and advertising' and 'health' are the themes within the framework which effect in different ways the food choice process, presented in Figure 3.1.

Other associations, predominantly external to the individual, showing a disparity in fruit and vegetable consumption are revealed from population studies such as place and region of residence, gender and age (more prevalent in the Kamphuis et al 2006 review). These are considered "in general terms [and] although this might be important it does not allow for the complexities of human health behaviour" (Pollard et al 2002, pg3) and thus there is a split between the food choice framework and demographic information. The separation however is reintegrated as the review continues, where demographic material is deconstructed and placed within the context of culture, social interactions, cost, availability, attitude etc.

Figure 3.1 Pollards et al (2002) Framework of Food Choice for Fruit and Vegetables.



(Source: Pollard et al, 2002)

The review frameworks cited highlight the range of factors that have been investigated as influencing fruit and vegetable consumption and support the MAFF framework in that there is not a single solution behind the eating of fruit and vegetables. It also indicates that each can be important, and an understanding of how they work is as well. Some studies of fruit and vegetable consumption have identified multiple influences upon the individual or group under investigation and the food choices made in that consumption.

In addition to differing frameworks being applied to the investigation of influences upon fruit and vegetable consumption different methods are also applied. Shaikh et al (2008) indicate the importance of the use of models and mediating constructs, related to cross sectional and prospective methods. Other methods are also important, such as individual variable analysis via intervention studies, utilisation of large data sets, smaller location-specific interpretations of behaviour and meanings attached to these. The chapter draws upon information from a range of empirical investigations, from varying types of research.

### *3.3 Demographic and Social Profiles Associated With Fruit and Vegetable Consumption*

The demographic characteristics and social profiling of groups and populations has been utilised by those investigating determinants of fruit and vegetable consumption. It has been useful in highlighting associations between particular characteristics and behaviour important to certain groups and therefore useful to targeting certain populations for study or policy intervention. In this way research has been applied to often large data sets. It has also been used as a basis from which to explore the experiences of particular groups, sometimes in comparison to other groups, in their consumption and health behaviours.

Geography and location have been identified as associated with mean variation in fruit and vegetable consumption. This represents information pertaining to different levels of geography, national, regional, area, city and even districts and wards. Leather (1995) indicates a regional north/south divide in the consumption, with the Midlands, South West, Wales, London and the South East consuming generally more fruit and vegetables than the North East and Scotland. The Health Survey for England (HSE) 2009 indicates a mean fruit and vegetable consumption of 3.4 and 3.7 portions per person (male and female figures), compared to the Scottish Health Survey 2009 which indicates a mean consumption of 3.3 portions per day, 3.1 for men and 3.4 for women.

The figures also demonstrate the differences between more local areas, in particular those areas, LA and PCT, with Spearhead status (bottom fifth in a number of health inequality measures). In general the HSE 2009 indicates that a lesser percentage of people achieve the consumption of five or more portions per day in these vulnerable health areas (20% of men, and 23% of women) compared to non-Spearhead areas (27%, and 31%). In terms of portions; 3.6 and 3.9 in non-Spearhead areas compared to 3.1 and 3.4 within. This is supported by the broad differences across wards and areas of multiple deprivation are also illustrative variation in fruit and vegetable consumption based on locality (DfCLG, 2010). Investigations have often utilised particular localities to uncover the



relationship with ill health and poor health choices, including fruit and vegetables. For example research into the physical properties of areas (such as the obesogenic environments, Lake & Townshend, 2006) and issues of environmental access and availability (Kamphuis et al, 2006). Other research investigates the issues of rural and urban divisions in consumption and health behaviour (Michimi & Wimberly, 2010).

In some investigations the localities are categorised in terms of the wealth of its residents and relationship with fruits and vegetables, such as 'low income neighbourhoods' (Stephoe, 2003) whether the locality itself is a variable or a community of interest to study further variables. Income has been linked with level of fruit and vegetable consumption. Those adults in higher income quintiles were more likely to consume recommended levels of fruit and vegetables than lower quintiles, with 32% of men and 37% of women in the highest quintile consuming 5 or more portions per day compared with 18% and 19% in the lowest. The type of fruit and vegetables consumed showed little variation across quintiles for pulses and baked beans, but differences were evident for fresh fruit, fruit juice, vegetables and salad (HSE 2009).

Shepherd et al (1996) report the findings of a project looking at "the constraints on freedom of dietary choices and their implication for the adoption and maintenance of healthy diets". In particular, this explored diet, attitudes, and barriers to dietary change, with a focus upon the role of income. 400 adults from 5 income groups from England and Scotland completed a questionnaire and weekly food frequency estimates. The lowest income group spent more on food as a percentage of their income, and greater numbers in the lower income group reported needing more money 'every time' to buy basic food items. Similarly the diets between high and low income consumers differed, with the lower consumer's diet higher in items such as white bread, chips, red meat, tinned vegetables, and lower amounts in fresh fruit, fruit juice, vegetables, rice and fish amongst others. Access to a car for food shopping varied also; six percent of those in the highest group did not have access to a car, compared with over 50 percent in the lowest income group. From the data on attitudes to healthy eating; expectations of eating a healthier diet in the future and that of perceived need to change, no difference was reported between groups. A healthy diet being beneficial to the individual and enjoyable to consume were viewed similarly across the groups. Knowledge in nutritional aspects of healthy diets was also found to be similar. Where attitudinal differences did appear, greater difficulty in eating a healthier diet and greater pressure to change was shown in lower income group. The "perceived difficulty of dietary change was found to be the major predictor of expectation of eating a healthier diet in the future" (ibid, pg20).

Shepherd et al (1996) also report on the role of income change and food choices. Interviews were conducted with those with an increase in household income (averaging 74 percent), and those

who had a decrease in income (an average of 31 percent) as a result of employment change. Initially these were within 2 months of the change and then again in a follow up interview six months later. The change in income had a destabilizing effect on food habits, decreasing income led to a change in the variety and quantity of foods eaten and often a long term reduction in intake recommended foods. "An increase in income did not necessarily lead to an increased expenditure on food nor an improved diet overall" (pg21). In relation specifically to fruit and vegetables, the group who had a negative change in income showed a small increase in fruit and vegetable consumption. The positive change in income however showed a much greater (significant) increase. In part the small increase demonstrated by the former group, it is suggested, could be as a result of seasonal variation in diet.

A number of other studies found a similar pattern in relation to socioeconomic status (SES). De Irala-Estevez et al (2000) carried out statistical meta-analysis of the findings of European studies in order to form a systematic review of the socioeconomic differences in fruit and vegetable consumption. Setting the research environment with a link to inequality in the access to health, variation in quality and quantity of food, and the complex interplay of related factors, the paper identifies a focus on socio-economic status (SES) where educational and occupational levels are used as appropriate indicators. Data was abstracted from cited research by trawling research databases, but also by contact with researchers with unpublished data, and at a number of the stages assessed by a dedicated panel. Using the elements 'exposure, outcome, effect, confounders and effect modifiers' in line with meta analysis practice and appropriate weighting of size, 11 studies were included. Seven separate countries were included, Norway, Finland, Sweden, Denmark, Germany, Netherlands, and Spain. Average differences in fruit intake between men of high and low socio-economic status (SES) were 24g per person per day, and 17g in relation to vegetables. For women the respective figures were 33.6g and 17.1g. Thus a positive association between higher levels of education or occupation and higher consumption figures of fruit and vegetables were presented based on the meta-analysis. Several methodological limitations are recognised by the authors, for example, the possible effect of age being omitted, other lifestyle factors, and why education may be considered important.

Wrieden et al (2004) analysed data collected for the WHO MONICA Project looking at the geographical region of North Glasgow. Cross sectional data was collected in 1986, 1989, 1992, and 1995. The focus was to look at food lifestyles and socio-economic trends, concluding "the progress towards the target for fruit and vegetables showed widening social gradients with time" (ibid, 2004), supporting national data (Scottish Health Survey 1998) that 60 percent of adults in social class I ate fruit once or more per day, compared with 34 percent in social class V. This was significant for

progress in increasing fruit and vegetable consumption, and generates questions as to why the different groups should react differently in terms of behaviour change.

Roos et al (2000) conducted a meta-analysis of nations within Europe using large scale data sets from 15 individual countries developing a consumption 'map'. They demonstrate that high education is important. Fruit and vegetable consumption is more common with higher education particularly in Northern and Western European countries, though there were exceptions. The authors demonstrated that in Southern European countries the pattern shows those with high education tend to consume less than those with low education, in areas where fruit and vegetable consumption is more common place in everyday lives.

Dibsdall et al (2003) reported on a low income group where only 18 % ate more than 5 fruit and vegetable portions per day, with half the sample reporting consumption lower than two portions per day. The investigation constructed and interpreted factors relating to attitude which was used to conduct demographic profiling. The authors collate interesting findings to a range of demographic variables. Age was found as an important consideration of the respondents' belief in healthy eating and enjoyment derived from this, with increasing age more likely to exhibit such attitudes, when compared to younger respondents. Likewise differences were evident between men and women in their attitudes towards fruit and vegetables as either protection against disease and as a weight loss aid and more likely to increase fruit and vegetable consumption to achieve this. Women were more willing in this respect. The respondent's attitudes toward health varied along the lines of current smoking status, with current smokers agreeing more strongly that they did not consume enough fruit and vegetables.

Dibsdall et al (2003) noted that a respondent's employment status demonstrated a difference in attitude to 'health', 'affordability', 'change' and 'transport' factor constructs. Jobseekers expressed difficulty in buying more fruit and vegetables. The marital status also demonstrated variation, with married and cohabiters expressing having greater choice of fruit and vegetables and had greater level of enjoyment from fruit and vegetable consumption compared to their single counterparts. Those that were widowed showed a higher level of healthy eating and expressed the affordability of fruit and vegetables, while also being most likely to use public transport.

The research (ibid, 2003) explored the commonly held beliefs about access and affordability, and this intersected with respondent's motivation. Access issues did arise for those in rural areas, or more likely to occur if the respondent was elderly, where visiting supermarkets was more problematic. In general "very few people complained about the choice of fresh, frozen or tinned fruit and vegetables available or about the choice of shops available in their local area (pg164)...perhaps people are more likely to cite lack of money as a barrier to obtaining healthy

foods than to consider more complex explanations” (pg166). Dibsall et al (2003) further this enquiry proposing that budgets which relate to the established amounts eaten regularly by the respondents and their families are managed, and to increase fruit and vegetable consumption would be an expense extra to that which they currently budget. This is instead of perhaps viewing an increase in fruit and vegetable consumption as a trade-off with their existing consumption pattern, an addition rather than change in the food they eat as part of their diet.

Table 3.3 provides a collation of studies where fruit and vegetables have been investigated in relation to demographic and socioeconomic characteristics, often where a range of potentially divisive conditions have been approached utilising existing large data sets. An example of this; Friel et al (2005) and use of a Northern Ireland lifestyle and attitude survey. Some prominent issues included within the table are the role of gender/sex, social class, employment status, income, education, marital status, age, and some associated behaviours such as vegetarianism and other fruit and vegetable behaviours (incorporation within the diet, and home-growing). Smoking behaviour and status also feature in a number of studies, with those currently smoking generally eating less fruit and vegetables than non-smokers and ex-smokers. A further example of such as study, Agudo & Pera (1999) employ cross-sectional analysis using data compiled by the European Prospective Investigation into Cancer and Nutrition (EPIC). The authors assess the association of anthropometric, dietary, and lifestyle factors with fruit and vegetable consumption, with a focus on the Spanish cohort (just short of 40,000 people). Fruit and vegetables were dealt with in the analysis separately for part and then together relating to consumption of at least 400g per day. Factors associated with high consumption of fruit included older age, higher education, increased physical activity, and reversely for high cholesterol, saturated fatty acids, high smokers and alcohol drinkers. For vegetables, physical activity and unsaturated fatty acids were associated with high consumption, as well as those who were formerly smokers.

Gender/sex has been briefly indicated above as influential in fruit and vegetable disparities, with women more likely to consume higher levels of fruit and vegetables than men and generally a higher daily intake. Gender has also been utilised to explore shared experiences and behaviours. Pollard et al (2001) focussed on the women between the ages of 35-69 who were taking part in the UK Women’s Cohort Study and the associated behaviours and characteristics important in their fruit and vegetable consumption as cited in Table 3.3. Other investigations have Ball et al (2006) surveyed a sample of 45 neighbourhoods, totalling 1347 women, about mediating variables in fruit and vegetable intake. Using multilevel analysis methods Ball et al (2006) suggested that individual and social factors only partly mediated SES intake variation observed. Interestingly Lindstrom et al

Table 3.3 Examples of Factors effecting Fruit and Vegetable Consumption by Study

Reporting Author (s)	Focus of Study	Research Findings
Dibsdall et al (2003)	Low income FV consumers	Age was important in health belief, gender differences and smoking status also. Marital status effected derived enjoyment as did employment status.
Baker & Wardle (2003)	Sex difference in intake of FV in older adults	Men consume less than women daily, knowledge was less in men as less weight loss dieting. Pointed towards importance of nutrition knowledge in consumption.
Anderson et al (1994)	FV Intakes in West of Scotland	Early and late middle age residents. Fruit and vegetable intake higher in non-smokers, women, owner-occupiers, high income, older middle age, non-manual
Inglis et al (2008)	Focus on women's reported FV intake socioeconomic inequalities	Weak and non-significant associations between socioeconomic position (education and income) and diet, almost 'wholly explained by perceptions of food availability, accessibility and affordability'
Pollard et al (2001)	Lifestyle factors affecting FV consumption in women	Women aged 35-69, strongest predictors of high consumption of FV; vegetarianism, non-smokers, taking supplement tablets, being married, post sixteen levels of education and higher socio-economic grouping
Giske et al (2002)	FV intakes and socioeconomic differences in adults (Australian)	Lower intakes were associated with disadvantaged groups; lower income. Variation in those vitamins seen as lacking.
Moser et al (2005)	Psychosocial correlates: African American Men	Fruit is linked with importance of significant others (and their notion of standard and perceived benefits), vegetables more extrinsic rewards and preference for high calorie fatty foods
Stephoe et al (2003)	FV intake and Low-income Neighbourhood by reporting and biomarkers	FV consumption negatively affected by attitudinal barriers and low knowledge of recommendations. Self-efficacy related to reporting of consumption also.
Watters et al (2007)	Psychosocial factors among African Americans	Self efficacy important for women, seen in higher consumption generally. Predispositions; that is knowledge of recommendations etc. and social support strongest associations with FV consumption differences.
Lindestrom et al (2001)	FV consumption and socioeconomic differences; psychosocial factors	Un-skilled manual workers at higher risk of low consumption, psychosocial factors had moderate effect on socioeconomic differences.
Billson et al (1999)	Dietary and Nutrition of British Adults used to divide consumers into quartile groupings to assess socioeconomic variations	Manual social classes were negatively associated with fruit and vegetable consumption, as were smokers. The involvement in home grown produce and being married were associated with a high intake.
Hunt et al (2000)	Analysis of data British Adults, Dietary and Nutritional Survey	Disparities relating to social class, and of smoking behaviour. Implication to target young lower social class consumers in north of Scotland for FV promotion.
Friel et al (2005)	Assessed who ate 4 or more portions of FV/day in NI using tree classification on 1998 Survey of Lifestyle, Attitude and Nutrition	Gender important. Males and females displayed very different patterns, notably the complexity of male influences. Material and structural influences concern females while for males these factors are important they appear to be mediated through other more socially contextual-type factors. Highlight the important association of fruit and vegetable consumption with dairy products.
Quan et al (2000)	Behavioural associations with FV of low-income mothers	High consumption of fruit was linked with; drinking juice as beverage, snacking, fruit at lunch, fruit as a dessert, breakfast being fruit. For vegetables; eating at least two varieties at dinner, keeping them around the house, snacking, salad consumption at lunch. For fruit and vegetables combined; eating three meals a day.
Inglis et al (2005)	Behaviours associated with FV intake among women	Differences in fruit and vegetable consumption were only partly mediated by individual and social factors.

(Source: Author Construction)

(2001) indicated from their investigation that psychosocial variables mediated some socioeconomic differences for women and fruit consumption

Like gender, age is commonly approached as a variable, but unlike gender which is bivariate some investigations have shown differences across the age range. For both men and women the HSE 2009 indicates a pattern where the percentage consuming recommended levels of fruit and vegetables is lowest in the 16-24 year old age range, and generally increased up the age ranges. Differences were indicated, such as a drop in the percentage for men compared with women in the 45-54, and 55-64 range, but greater at 65-74 years.

Investigations into characteristics can be found in some cases to interlink or develop relationships between demographic characteristics. Donkin et al (1998) looked at the effects of gender and living alone in old age in Nottingham on fruit and vegetable consumption. Living status was found significant for men; those living alone consumed on average almost 2.7 portions per day compared to the overall average of over 4 portions. The authors report this potentially in relation to houses 'without women'. Single men found finding meals of correct portions and easy to open, prepare and cook more important than married men and were less likely to cook or watch cookery programmes. Single women were more interest in body image. Bove et al (2003) also identify an inequality in the pattern between men and women. They suggest that partners may affect food choices differently and in unequal measures, with accommodation, yielding and other displays of power relations within the food process, and where one main provider (the one who cooked) would make the majority of decisions, but this was based "more in the rigidity of the partner's food styles and their choice of conflict strategy than in set gender roles" (pg38).

Holmes & Gates (2003) interviewed men over 60 years (also spouses where applicable) about their perceptions of fruits and vegetables. The authors describe how participants discussed foods in relation to future reinforcements to be attained, including taste and health expectations. Environmental factors such as cost and season were also mentioned, and importantly for husbands so were the influence of wives and of health professionals. Though positive views were held, knowledge of intake and reasons for this were not always apparent. However Hendrix et al (2008) demonstrated that nutritional interventions targeting the knowledge of older people can improve their daily consumption rates.

It is also worth noting that studies have also utilised ethnicity, again both as a variable and also to investigate contexts and shared experiences that arise. Devine et al (1999) highlight from their investigation differences in important characteristics and variables for fruit and for vegetable consumption in three ethnic groups. Table 3.4 highlights the significant findings. The example of Watters et al (2007) can be used to display focussed research on a particular group, in their case

African-Americans, so as to identify the role of various psychosocial factors upon consumption within the community. Likewise Moser et al (2005) also focussed their investigation to African-Americans, in this instance narrowed to men (results in Table 3.3). Roos et al (2000) can be cited from above as highlighting disparities between European areas. Morland & Filomena (2007) investigated the disparities in fruit and vegetable availability using racially segregated neighbourhoods. The findings suggested that availability and variety was different across white, mixed and black areas.

Table 3.4 Significant Characteristics in Fruit and Vegetable Consumption for Ethnic Groups

Ethnicity of group	Fruit consumption	Vegetable consumption
Black	College education, married with young child/ single with no child (vs single with older child)	Married with no child (vs married with young child/single with older child)
Hispanic	Male, eating with others, single with older/young child (vs married with young child), liked and ate fruit in the past, made dietary change for health, food skills	Female, college education, ate from garden in the past, liked and ate vegetable in the past, made dietary changes for health, food skills
White	Eating with others, married with young children/single with child (vs married with no child), had garden as adult, made dietary changes for health	Older age, female, college education, married with young child/single with no child (vs single with child), had garden in past

(Source: Devine et al, 1999)

The importance of such studies as those outlined above is that as a body of work they identify levels of consumption difference between different groups and associations with other characteristics and behaviours. This can be carried out at more general levels or the approach utilised to focus on specific groups. Quite often there is interplay between different demographic and socioeconomic factors. Prominent variables investigated for their relationship with fruit and vegetable consumption include gender, age, locality, SES (socioeconomic status), income, education, ethnicity, and marriage status.

### 3.4 Internal Influences: Values, Attitudes and Behaviours

A large body of research investigating determinants of fruit and vegetable consumption has focused on internal stimuli (or internal reactions to external stimuli) and influences characterised by emotions, values, attitudes and corresponding behaviours. Hence this section focuses on theoretical position as well as empirical investigation. As a useful introduction to a range of attitudes and associated behaviours, Kilcast et al (1996) can be highlighted and their work on vegetable

consumption, carried out as part of MAFF programme outlined above. For the ‘practical approach to increasing vegetable consumption’ aspect of the programme two stages were used incorporating investigation and trial based research. Interviews took place followed by discussion groups with high and low vegetable consumers, high representing more than 5 portions of fruit and vegetables daily, and less than two portions being used as the lower benchmark of consumption. All of those involved were women in the ‘C2DE’ classification.

As part of the process, groups of low vegetable consumers were given practical tips and tasks to undertake for two weeks, and then a follow-up interview conducted on attitude change. A number of aspects of vegetable consumption were dealt with during the sequential research project, including attitudes and behaviours that were being enacted, with the impact on actual vegetable consumption. This was followed by an intervention with feedback looking at the process of the trial, to view the nature of change or potential change, and therefore the associated behaviours and attitudes with this. The high consumer group demonstrated a more tightly controlled eating pattern for their family, much more strictly held than the low vegetable counterparts. Likewise vegetable consumption was more considered by the high consumer group, in advance in terms of both shopping and preparation and meal construction, exemplified by the incorporation of fruits and vegetables at meal times and snacks throughout the day.

Table 3.5 Noted Attitudinal Differences between ‘High’ and ‘Low’ Vegetable Consumers

High Vegetable Consumers	Low Vegetable Consumers
Active	Passive
In Control	No Control
Positive	Negative
Experimental	Repetitive
Food Focused	Guilt Feelings
Planning Ahead	Reactive

(Source: Kilcast et al, 1996 )

Food was a strong focus within the lifestyle of the higher consumers, with experimentation and a sense of higher self esteem regarding eating habits. Many of the participants claimed they genuinely enjoyed eating vegetables. Those exhibiting lower vegetable consumption generally had a reactive response to family food requests, most commonly those for non vegetable snacks. Vegetables were bought through routine, sometimes bought as they were considered as good to eat, rather than as the high consumers demonstrated; ‘active’ consumption. “These consumers felt a strong lack of control over family feeding, only being able to cope with immediate needs...a consequence was that the family...ate different foods at different times” (Kilcast et al 1996, pg49). Thus consumption of



meals was 'coped' with, with the characteristics of guilt and low self-esteem and a high degree of post-rationalisation. The taste aspects and health were considered as overriding compensation in the high consumer group.

Pollard et al (2002) reflect upon findings of sensory appeal in relation to fruit and vegetables, citing Brug et al (1995), and Heimendinger & Van Duyn (1995) as, respectively, 'good taste' being a prerequisite of consumption, and from focus group investigation "good taste perceived as a benefit of increasing fruit intake...although taste was also thought to be a barrier for increasing intakes of cruciferous vegetables" (2002, pg5). A number of studies have found that although taste is important in consumption, taste need not necessarily be the only or dominant value as was demonstrated in the introductory chapter. Eertmans et al (2001) reviews literature on the health promotion of foods, stressing the importance of increasing the liking element of promotions, reflecting prominent theories of learning. Brug et al (1995) carried out focus group research to uncover psychosocial determinants of fruit and vegetable consumption, a number of issues were identified that support literature in this section. As well as taste (incorporated in satisfaction), perceived health consequences and lack of health awareness, and coping with barriers/abilities were indicated as important. Issues of price, seasonality, availability, habit and social influences were also noted.

Sobal & Bisogni (2009) indicate that as well as trajectories (outlined below), there are other components important to food choice decisions described by proponents of the food choice process. A further two components are important; 'influences', which incorporates personal, environmental and some social factors, and 'personal food system' which develops food choice values. Negotiations between values exist, along with balances which are instrumental to classify foods and situations, and effect the formation and revision of food choice strategies. In the context of this approach values are seen as the considerations that are weighed up as part of the food choice decision. Connors et al (2001) conducted research investigating how such values are utilised in relation to food practices especially towards fruit and vegetables. The authors, in line with other research findings, identified commonly used values as health, taste, cost, time/convenience, and managing relationships. In addition, variety, symbolism, ethics, safety, quality and limiting waste featured for some but not all participants.

Though sometimes reflective of external stimulus via influences, the values represented an internal processing. It was observed by Connors et al (2001) that participants, in order to create a workable personal food system employed processes. The categorising of food and situations was one such process, often using a continuum of most ideal to far from ideal, to position foods and related decisions. For example expressions like 'too expensive' or 'cheap', 'healthy' or 'unhealthy'

were used, or as part of multiple components such as fruit and vegetables being 'most important' and 'least expensive'. Categorisations were also addressed as a rating against another food, and in relation to taste and sensory attributes, subjective ideals were used such as 'delicious' or 'yucky'. Taste could also be compared to a memory of an ideal variant once tasted, such as 'doesn't taste right'. Similar continuums and multi value decisions were observed in relation convenience and health, or linked to traditional symbolism to describe what represented proper meals. Bisogni et al (2002) report upon interviews with participants concerning the notion of identity and food choice, including identities relating to eating itself, but also personal characteristics (health orientation, body image, control etc.), and identities relating to reference groups.

A further process concerning values (as identified in Connors et al 2001) was the prioritizing of values that conflicted. This occurred whereby in satisfying one value another would be prevented. For some within the research the value tasty would compete with the value healthy, cost would conflict with health, and often convenience conflicted with health. As a result of the conflicts priorities were often displayed, these could vary according to the situation that had arisen. Prioritisation would lead to most important values to dominate, such as health over tradition. An example was cited where a participant would always purchase fresh fruit and vegetables despite the cost, where otherwise cost would dominate the decision to purchase. Convenience as a value would dominate some consumers at points of the day where time was limited, such as morning rush. Likewise, sometimes mood, seasons, or the accommodation of other people impacted upon the prioritizing of values. Participants also displayed the elimination of all but the main values to them in some instances, thus simplifying decisions. Sometimes the dominant value would be relaxed, reported in particularly for health, where on certain occasions or scheduled occasions meals might be constructed without regards to health and instead relaxed to accommodate taste. This was also seen in relation to a sense of balance, for example the balancing of health during the week, or over longer periods such as approaching an older age.

Paisley et al (2001) researched the meaning of fruit and vegetables and their consumption to participants. A number of themes developed, like the Connors et al (2001) research one theme was 'balance' though there were many different meanings attached to the word, and the duration of the 'balance' would vary also. On some occasions balance came as part of the same meal, or the balance of gorging on season fruit in its season, and another in a different season. Balance also referred to the balancing of subjective values, balancing aesthetics, and balancing emotional issues of the food. According to the authors; "making choices that balance their lives is the substantive theory that emerged from this study" (Paisley et al, 2001 pg205).

A further theme related to the meanings of fruit and vegetables Paisley et al (2001) describe the discourse of 'should', or the 'should syndrome'. This refers to the participants' awareness of healthy eating messages surrounding fruit and vegetable consumption and that ultimately they are good for you. More than this, pressure, using the phrase 'have to' to describe it, supported by participants reference to such internalisations of the concept; '...nutrition conscience...' demonstrate the development of a 'fruit and vegetable morality'. Explanations derived from participants' discussion about life course and their relationship with fruit and vegetables suggest that vegetables were given a low status in childhood homes. Childhood reflections suggested that vegetables were generally considered of tertiary rank, with meat being the most valued, and potatoes of intermediate position. Actions that supported this role were linking vegetables verbally to 'rabbit food', allowing children to have a narrow selection because of poor acceptability, and enhanced and supported by images of plainness, boring, poorly cooked, and resulting poorly and unpalatable presentation that confirmed their position in the food status. Childhood recall also offered vegetables as a focus of 'food wars'; where they became weapons in struggles of household food rules and childhood independence, and parental 'forcing' childrens' diet. Paisley et al (2001) describe "the low status of ...vegetables set the stage for the emergence of the "should syndrome" by providing powerful images against which the new status of vegetables in participants contemporary lives was juxtaposed" (pg203). Vegetables became 'virtuous', part of the 'ideal diet', as part of the participants' changing lifestyle, contemporary trends for cooking, increased information, a desire to be healthy and look after themselves. Thus Paisley et al (2001) describe the recall of, conflict between early and contemporary life.

In addition 'choice' featured as a common theme when children were present (ibid, 2001). This was as a reflection of the participant's own childhood eating patterns and gastronomies, and ways in which they saw or felt their own parenting and family gastronomies should be constructed and conducted. Food rules were very different; choice became extremely important in the correct way to handle their children's diet, by allowing food appreciation rather than their own experience of being children which was enforced by rules. Galloway et al (2006) indicate that there are negative effects of pressurising children with respect to healthy eating in particular. Paisley et al (2001) display a temporal dimension and record the participants attaching strong importance of food as part of a kit to convey larger parental messages of open mindedness, "in their childhood homes many participants recalled vegetables as weapons in the food war; in their own homes they viewed vegetables as the tools to help their children cope in a world full of choices" (pg205).

Further analyses have been conducted using the large data sets to identify models of factors and influences (Trudeau et al 1998, Satia et al 2002) and the relationship of these factors (Nijemeijer et

al, 2004). These studies identify similar influential values. Trudeau et al (1998), utilising data from the Washington State Cancer Risk Behaviour Survey identify that there was more of an impact upon noted fruit consumption than vegetable consumption of the psychosocial factors analysed relating to health. "Intrinsic motivations for eating a healthful diet (e.g. to feel better) were strongly associated with both fruit and vegetable intakes...stronger for fruit...extrinsic motivations were not associated with either fruit or vegetable intake" (ibid pg1412). Satia et al (2002) also used the Washington based survey on attitudes and behaviour towards cancer risks for their analysis of psychosocial and dietary influences associated with vegetable consumption. A factor analysis approach was taken to selective attitude scales relating to habits from the survey so as to identify the underlying dimensions of the data; 'Importance of eating vegetables', 'health benefits', 'convenience and taste of raw vegetables' and 'taste of cooked vegetables'.

Dibsdall et al (2003), utilising tenants of a Housing Association, sought access to low-income fruit and vegetable consumers so as to assess this particular group's attitudes and behaviours, a group regularly reported as fruit and vegetable vulnerable. Following an interview phase that identified that affordability and access was not a problem to the participants; a questionnaire was implemented across all tenants. This incorporated themes of access, affordability and motivation using a short agreement scale (with a focus on both attitudes and behaviours). From the data, reduction discovered six factors; 'choice', 'health', 'affordability', 'change', 'organic', and 'transport'.

The recognition and understanding of what is meant by and understood by health notions allows a greater comprehension of the operations enacted by individuals regarding healthy lifestyles, healthy behaviours, and serves a purpose when fruit and vegetable consumption has its foundations in health. Falk, heading authorship of work conducted along with Sobal, Bisogni, Connors and Devine (2001) code the management of healthy eating using emic terminology (presented in Table 3.6).

The definitions and perceptions of particular concepts provide an insight into how many of the influences may affect certain behaviours relating to consumption as health behaviour. This in turn has an effect on the way in which practitioners can attempt to address behaviour change. Likewise it can further demonstrate the incorporation of these beliefs into practise and highlight the importance of influences upon health behaviours impacting on our knowledge of fruit and vegetable consumption.

Further related issues found to be important on diet and food choice are weight, as Dibsdall et al (2003) pointed out, and body image. A study by Nystrom et al (2005) of young adolescents' perceptions of weight, goals and behaviours found that fewer serving of fruits and vegetables were consumed by boys who thought of themselves as over or under weight compared to those who

thought themselves about right. A similar example was found with girls who thought themselves overweight. Anton et al (2000) investigated discrepancies between actual and ideal body image in college age women and associated impact upon consumption. The authors found that low levels of fruit and vegetable consumption were associated with the discrepancy between actual and ideal (high body image dissatisfaction, binge eating, and low levels of exercise were also associated with the discrepancy). Nystrom et al (2005) noted in relation to weight goals, it was boys that showed significant associations. Boys who wanted to lose weight and those that wanted to gain weight, as well as those who wanted to maintain weight consumed more servings of fruits and vegetables per day than those who did not want to do anything. Conversely, girls showed significant weight related behaviours, with those engaged in behaviours consuming more fruits and vegetables.

Table 3.6 Clustering of Consumer Health Themes by Common Terminology

Components	Balance	Low Fat	Weight Control	Nutrient Balance	Natural	Disease Management	Disease Prevention
	(n=15)	(n=13)	(n=13)	(n=13)	(n=9)	(n=9)	(n=7)
Secondary themes	No other strong themes	Weight control, balance	Low fat, balance	No other strong themes	No other strong themes	Nutrient balance, Low fat	Low fat, nutrient balance
Experiential sources	Family history, family	Family, particularly parents	Family, physical state, appearance	Society/ culture, children	Family, social	Physical state, family	Family history
Informational sources	Nutritionists, media	Family members	Health professionals, classes, reading materials	Classes, reading materials	Limited mentions	Doctors, media	Various informational sources
Healthy food classifications	"real foods", "heavier foods", variety of specific foods and general food categories	"fat free", "low fat", vegetables, fruits, poultry	"low fat", "low calorie" grains, meats, vegetables, specific low calorie foods	"fruits and vegetables", general categories,	"fresh", "organic", general categories	Lots of specific foods	"fibre", large list of specific foods
Unhealthy food classifications	Coffee/soda, lots of specific foods	"fatty foods" "red meat", "pork"	"fatty foods" sweets, "junk foods"	"junk" fat, sugar	"processed" sugar salt	Specific foods focussed on sugar	Specific foods focussed on fat, sugar, salt
Healthy situations classifications	Eating at home	Eating at home	Eating at home, getting exercise, eating on weekdays	"full meals" geographic location, with women	Eating at home, "homemade"	Limited mention	Eating at home
Unhealthy situation classifications	Limited mentions	Eating out	Eating out, eating on weekends, closet eating, seasonal eating, with family	Who you eat with	Eating out, eating too fast	With family	Eating out

(Source: Falk et al, 2007)

Self esteem has been found to be important in food choice and consumption. Schafer et al (1999) investigated 155 married couples and found that self esteem was a significant predictor of

vitamin C and folate intake among women and folate intake among men when adjusted for other demographic factors. It was also indicated that for men a trend to increase weekly servings and increase variety in vegetable choices was associated with higher self esteem. De Bruijn et al (2005) approaches the role of personality and assessed the association of the Big Five personality descriptions (extraversion, agreeableness, conscientiousness, emotional stability, openness to experience) and fruit and vegetable consumption. Agreeableness and openness to experience were positively associated with vegetable consumption, and the latter positively associated with fruit consumption. Variety and experimentation feature as part of Kilcast et al (1996) investigation as attributes important to vegetable consumption. Kilcast et al (1996) also highlighted the importance of a sense of being confident and in control of individual and family vegetable consumption in order to enact high vegetable consumption.

The notion of control and confidence in enacting a diet and food choices has been an important feature of a number of other studies and components of models of food choice. Brug et al (1995) utilise the Attitude, Social Influence and Self-Efficacy model of behaviour. Self-efficacy defines the belief a person or consumer has that they are able to perform an action or enable something to happen, and obviously this has particular emphasis when much within fruit and vegetable consumption refers to achievement in consumption. In Brug et al (1995), "self-efficacy reflected the respondent's ability to consume adequate amounts of fruit and vegetables in various situations" (pg285). Other aspects of the model examined external variables, social influences, attitudes, intentions, mediated by barriers and abilities. The results indicated self-efficacy and attitudes were associated most strongly with the consumption, the variety of vegetables and fruits under investigation, hence expectation and attitudes were crucial in achieving high consumption.

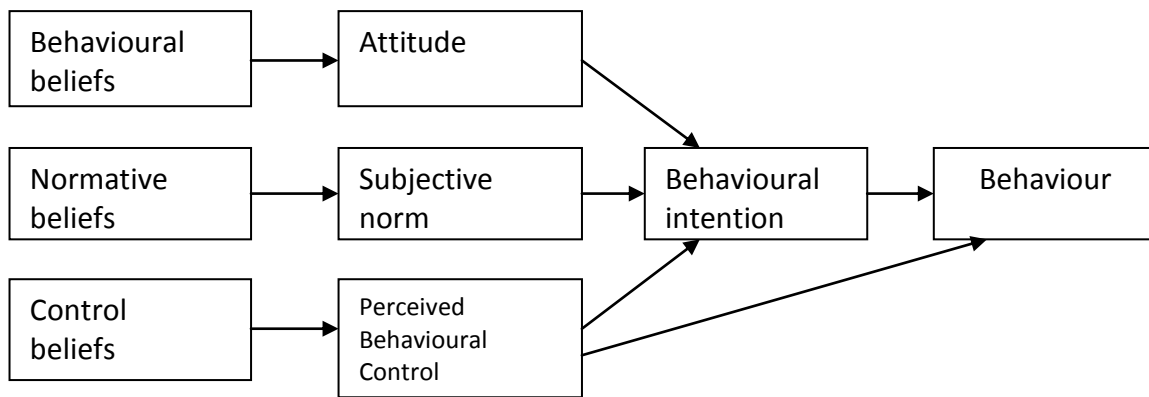
Studies, often intervention based, demonstrated that a sense of confidence was useful in the fulfilment of the associated behaviour. Luszczynska et al (2007) used interventions that targeted both self-efficacy alone and self-efficacy combined with a planning intervention, as well as a control group. The self-efficacy aspect took the form of informing participants of the necessity and importance of the concept in pursuit of goals, an individualised feedback on self-efficacy measurement compared with the average, and finally ways to increase one's self-efficacy. In addition the action plan intervention introduced participants to using action plans and completing their own plan utilising when, how and where to maintain a healthy lifestyle, then actions plans regarding healthy nutrition as well as positive support of the successfulness of action plan measures. The study was conducted in a series of waves and focussed on changing cognition towards successful consumption of fruit and vegetables. In the follow up at 6 months, both intervention groups had increased consumption equally. Steptoe et al (2003) measuring fruit and vegetable intake in low

income neighbourhoods noted positive fruit and vegetable consumption was related to individuals self-efficacy, but negatively affected by attitudinal barriers and associated low knowledge. Likewise, Green et al (2004) looked at situational self-efficacy, measuring overall confidence in the respondent's ability to consume fruit and vegetables in a range of situations. Both decisional balance and self-efficacy proved to be important for fruit and vegetable consumption by young adults.

Prochaska et al (2008) indicate that self-efficacy is a situation-specific confidence that means an individual can cope, particularly in high risk situations where it is possible for a lapse to former behaviours. In this context it is referred to as one of the constructs of the Transtheoretical Model (TTM), Stages of Change model of behaviour change, alongside 'processes of change' and 'decisional balance'. It is utilised to evaluate the confidence of performing a task and as a mediator of future success. Self-efficacy in this respect is usually low in the earlier stages towards behaviour change and more developed in later stages. In the Health Action Process Approach (Schwarzer, 1999 & Schwarzer 2001) the influence of self-efficacy is multifaceted and important at different phases of behaviour change, at a motivational phase impacting intention, and a volition phase impacting actual behaviour (as well as warding temptations). Therefore influences are described as part of processes of planning, taking initiative, maintaining behaviour change and even managing relapses.

A further useful model in the investigation of behaviour is that of the Theory of Planned Behaviour (TPB) (Ajzen, 1988). There are a number of categories of influence, or tenets. Built upon the Theory of Reasoned Action (Fishbein & Ajzen, 1975), TPB added a 'perceived behavioural control' in the mediation of control beliefs. Ajzen (2002) recognising the role of self-efficacy indicates that perceived behavioural control can be maintained as a single latent variable. As a construct, it overarches self-efficacy which relates to the ease of performing difficult tasks and controllability which relates to the influence an actor can have. This is in addition to behavioural beliefs linking to attitude, normative beliefs effecting subjective norm, the three separate chains effecting behavioural intention and then behaviour itself, though perceived behavioural control can affect behaviour more directly. Figure 3.2 offers a basic TPB diagram.

Figure 3.2 Theory of Planned Behaviour



(Source: Connor & Armitage, 2002 pg32)

Bogers et al (2004) utilise TPB in the explanation of fruit and vegetable consumption while studying also the misconception of personal intake. In line with earlier work, perceived behavioural control was indicated as the strongest predictor of intention and of behaviour (i.e. consumption of fruit and vegetables). However, unlike that of earlier works, 'intentions' of the respondents in this survey did not offer prediction of the behaviour. The research also identified that fruit, vegetables, and fruit and vegetables together had different levels of predictability within the model, as well as differences between objective and over reported fruit and vegetable methodology. Cox et al (1998) identified potential barriers to increasing fruit and vegetable consumption based upon attitudes and beliefs from a sample of UK consumers. They indicate that there was a weak relationship between intention to increase fruit and vegetable consumption and reporting that they could. Belief measures however were strongly associated with overall attitude (though varies between, fruit, vegetables, and vegetable dishes) and intention to increase consumption.

A further model which utilises self-efficacy as a construct (as of the late 1980s) is the Health Belief Model (HBM). First developed in the 1950s more recently the model has been used to explain dietary patterns and health behaviours including the likelihood of a healthy behaviour being enacted. The model could fit into the chapter section relating to 'time' (below) as the model does incorporate a sense of forethought, evaluation and reflection. The basic model is made from a number of perceptions and beliefs about a situation or behaviour; perceived susceptibility, perceived severity, perceived benefits and perceived barriers. Perceived susceptibility refers to the level of personal risk that is perceived by individuals, perceived severity or seriousness is a construct of a person's belief about the potential damage that can be caused. Perceived benefit indicates the evaluation of the value of a new behaviour, and 'perceived barriers' is a person's evaluation of potential obstacles. Barriers can be overcome when the belief in the benefits outweigh



consequences of continuing old behaviour. In addition self-efficacy is utilised as well as 'modifying variables' which highlights influence on personal perceptions. A further concept that is important is that of 'cues', the something that triggers or moves a person to action, e.g. media, family illness. The model includes those constructs important to the perception of the individual, modifying factors and likelihood of action or behaviour. (Glanz et al, 2008). Nejad et al (2005) compared the HBM, a modified HBM and TPB model in the prediction of dieting behaviour using Australian female university students. Results indicated an explanation of 35% variance in dieting (67% variance in intention) for TPB, HBM explained 29%, and the modified HBM explained 38% of variance.

Yeh et al (2008) conducted focus groups across diverse multi-ethnic groups in an attempt to understand facilitators and barriers to fruit and vegetable consumption. Despite general awareness of health benefits associated with fruit and vegetable consumption, many did not meet the recommendations. Perceived costs and perceived lack of time were mentioned, as well as perception that early food environment impacted on later consumption. Issues of access and availability were stressed amongst African American groups. Importantly Yeh et al (2008) contextualised the some of the findings in line with the HBM. The authors pointed out the "combination of low perceived threat and low perceived benefit coupled with high perceived barriers (e.g., high cost of V&F), as conceptualized by the Health Belief Model could explain why younger participants in this study did not think eating more F&V was a priority for them now" and hence suggested strategies could be utilised that aimed at enhancing individual awareness (Cues to Action) of the health benefits of fruit and vegetables consumption, as well as increasing self-efficacy and decreasing perceived barriers. Steptoe et al (2003), in an assessment of psychological factors effecting fruit and vegetable consumption utilised concepts influenced by a number of models in a consensus approach. Attitudes included belief in health benefit, perceived barriers and perceived benefits, self-efficacy, knowledge of recommended intake, and encouragement.

### *3.5 Important Environments*

#### *3.5.1 The Home*

The home is utilised here as an arena where multiple influences are exerted and food choices made. It is the arena in which much food consumption is enacted for most individuals. According to Valentine (1999), "the home offers perhaps one of the most intriguing environments to study the relationship between people and goods. It is a site of individual but also collective (household or

family) consumption, where the goods purchased and meanings and uses ascribed to them are negotiated, and sometimes contested..." (ibid, pg492).

At its least complex the home has been studied as an environment where access to fruit and vegetables, i.e. their physical availability, is important to their consumption, particularly strong among studies of children and adolescents (Cullen et al, 2003; Hearn et al 1998). Neumark-Sztainer et al (2003) conceptually modeled fruit and vegetable intake with personal, behavioural and socio-environmental factors. Amongst the associations found from the investigation of almost 4000 adolescents the availability of food in the home was found to be of most importance. Of the thirteen factors under investigation home availability and taste were found to have significant direct effect on actual intake, with home availability effecting intake even when taste preferences are low. The work of Neumark-Sztainer et al (2003) also highlights the importance of other factors upon accessibility such as attitudes towards health and nutrition, social support for healthy eating, family meal patterns, food security and self efficacy to make food choices. Brug et al (2008) also indicate that access to fruit and vegetables within the home, amongst other factors are important to a child's intake.

The more simplistic notion of access and availability of fruit and vegetables within the home for children and adolescents are approached somewhat differently for adults that have been studied. Often for adult consumption, availability has been inferred within one of two contexts rather than as direct concept. The first relates to provision itself rather than access per se, relating it to attitudinal knowledge such as nutrition and health awareness and ability to provide fruit and vegetables at home, shown by the MAFF sponsored programme of cooking tips and advice (to be dealt with in 3.7, where food strategies are considered). It has also been shown in terms of people within the home and their relationships with each other in relation to food that is consumed (as will be outlined below). As such this demonstrates a dialogue of provision also within the home environment. The second research approach to access and availability sees home provision in relation to the arena outside of the home, thus how effectively fruit and vegetables are brought into the home. The distinction of the research approaches between those that study children and adults is an important one and in part reflects the role of an individual's responsibility and control over their food environment.

### 3.5.1.1 *People at Home*

For many the home is not a place of individual consumption but rather an environment where multiple consumers exist. Therefore studies have investigated the role that this has upon food choices and potential impact upon fruit and vegetable consumption. Commonly cited actors within this environment include spouses and partners, as well as children.

Marshall & Anderson (2002) used a multi-method approach as part of 'The Nations' Diet' food choice research programme to look at the transition into joint eating patterns and behaviour. Eating together was generally a preference for respondents, though the regularity and incidences of eating together varied, with a strong factor being work commitments. Frequency of eating together was higher post marriage or cohabitation, with the private space taking over from the special event type of eating occasion. The evening meal was considered the main occasion that couple dined together, describing a need for "proper meals...Eating in the company their partner was central to the idea of eating properly...and seen by these couples as part of the transitional process in establishing their own identity as a household unit" (pg198). Similarly Marshall & Anderson (2002) are useful in providing an introduction to the dimensions and components of 'proper meals' and also an indication of the changing nature of the experience and reaction to social formations under new circumstances and pressures. The importance of the food as a focus of interactions is useful to practitioners of behaviour change looking at the dynamics of points of consumption. It is also useful in demonstrating a temporal and shifting element in relation to factors contributing to what people consume and how this manifests. Supporting this view, Paisley et al (2001) further discuss the physical activities and social opportunities to interact surrounding food preparation and consumption at mealtimes.

Interviewing spouses separately, Paisley et al (2001) refer to the participants' description about fruit and vegetable consumption and the creation of 'couple gastronomies'. This is where gastronomies; based on the interconnectivity of food meanings, practices and rules that existed for a person were recreated and developed into a couple based gastronomy. The findings identified three mediators in the way gastronomies were constructed. The first of these is 'commensality', where couples eat together. In many cases eating together resulted in an increase of the foods that couples had otherwise engaged in, although sometimes a partner's very limited preference narrowed the food range. This point of food change was sometimes a deliberate action; creating a 'unique couple identity', or less directly where this relationship allowed the support of a healthier diet, or more effort could be shown when not in the relationship. Trying new foods with little risk,

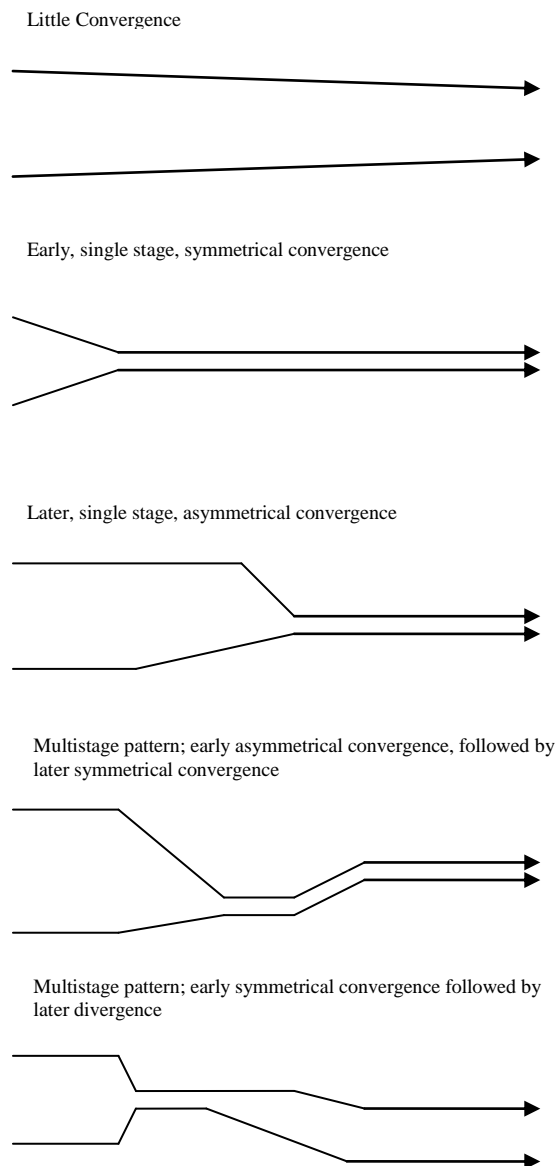
when one partner was more adventurous provided an opportunity for food patterns to be amended, built upon, and experimented with.

Bove et al (2003) propose “a crucial time to examine joint spousal food choices is during the period when individuals enter marriage and blend their two personal food choice systems into a new joint spousal pattern” (pg26), and thus a focus on the period at which there are various negotiations or reformations of food selection. Importantly for this research, it approaches an important physical or environmental change which has significant bearing in many cases to the direction taken in food consumption as a result of an important other’s influence. It does this by looking at the food system interaction during this transitional period and highlights the complexity of spousal influence, not only because of the important other, but the important other’s food system and related behaviour. Preferences for foods were part of the food merging process but certainly not exclusive. Other factors included the practicalities of the environment and other situational differences effecting joint food choices (and individual food choices). Interviews were used at the point at which food systems were in a position to merge, couples applying for marriage licences in upstate New York, and followed up by a second interview phase one year later. Commensality and dinners were of particular focus from participants in relation to food systems, and the importance of food was established quite early in relationship terms, with dietary compatibility crucial in establishing long-term relationships.

Bove et al’s (2003) analysis suggests that in most cases two people coming together within a cohabitive relationship display some form of convergence in their eating and food system. The course of this food system and the direction of its component parts have been summarised by Figure 3.3 which diagrammatically presents examples of possible convergent food systems. The study identifies a number of important elements are incorporated within the multifaceted nature of the convergence process that defines the differences between processes outlined. The first is that there are points at which a dietary movement is made, whether this is a single gradual direction towards convergence, or whether the change has a number of stages where convergence in the food system varies. These points are separate to the initial point of cohabitation (starting point). Rate and ‘equitability’ of convergence is also important. Convergence need not be passive, a ‘food project’ describes a situation where from the outset of the merging one partner attempts to alter the food system of the other and the food they eat, and become ‘food directors’. Despite this, and importantly in assessing the associated factors of consumption, Bove et al (2003) provide evidence that the food director may not necessarily be the main impetus on the movement in direction (or lack of movement) of the couples’ joint food system, and indeed the identified ‘project’s [director’s other] food choices could dominate. In summary;

“Much is at stake as couples negotiate food choices because eating, a central part of marital relationships, has the capacity to create... conflicts as well as pleasure and to influence the health of both partners...[E]ntry into marriage revealed dynamic negotiations...ideals of shared eating led to dietary convergence, which was balanced by food individualism. Negotiating joint food choices included food homogeneity and food conflicts as well as individuals seeking control over their partner as food projects” (pg37).

Figure 3.3 Possible Convergence of Diets within a Joint Food System of Cohabiting Couples



(Source: Bove et al 2003)

Ristovski-Slijepcevic & Chapman (2005) investigating the individuality and integration in healthy eating of childless couples emphasises that cohabitation has the potential to lead to positive changes in diet. The ways in which meanings of what was 'healthy', the values that were attached to making healthy food choices, as well as approaches utilised to enact consumption, were addressed by participants. Though cohabitation was important, it was in combination, balanced and mediated with further factors such as partner's knowledge of healthy eating, food costs, work schedules, issues of weight gain and lifestage.

Schafer et al (1999) develop and test a theoretical model to approach 'family food interaction' and its influence on healthy dietary components or outcomes utilising structural equation modelling. The tested measures; health concern, marital happiness, role performance, and dietary efficacy were developed and split by respondents own and partners' view of them. For this study the family interaction surrounding food was positioned as a mediating interaction which could lead to beneficial nutritional outcomes, and thus an indicator. Thus the family food interaction is hypothesised as an special arena, where "marital partners who are concerned about their health, who have a non-distressed relationship and do not feel permanently helpless regarding their own food behaviours are more likely to engage in family interactions about food activities...lead[ing] to a more healthy dietary behaviour" (pg789). More so for women (wives) than their husbands there was evidence that the model fit. Wives own variables were significantly related to their ratings of family food interaction (with the exception of marital happiness), but husband's were not. Interaction of family food was also related to dietary quality variables (including fruit and vegetables).

Importantly also, in most cases except fibre, the rating of dietary self-efficacy by wives themselves was related to the outcome components of the diet. By comparison, what predicted husbands reporting of the food interaction was the wives' view of their husbands' performance within their role, and their wives' dietary self-efficacy. The study indicated, particularly with wives, that the family food interaction affects their 'healthful diets'. It questioned why this food interaction could be important, and emphasised a gender difference concerning its usefulness for men and women. Bove et al (2003) also identify an inequality in the pattern between men and women but describe the pattern slightly differently. They suggest that partners may affect food choices differently and in unequal measures: accommodation, yielding and other displays of power relations within the food process, and where one main provider (the one who cooked) would make the majority of decisions. This was based "more in the rigidity of the partner's food styles and their choice of conflict strategy than in set gender roles" (pg38).

An investigation by Devine et al (1998) revealed the importance of the 'role' that a person had adopted (as the result of changing circumstance or family structure), such as parent, partner,

divorcee. The role change from one to another often changed their food choice by changing the expectations of the choices they made. This includes a number of relationships identified in research above and marital changes and cohabitation. To illustrate; an increase or increased regularity of fruit and vegetable consumption can be associated with ensuring children would eat fruits and vegetables consistently. Likewise the encouragement of a partner’s dietary change, or where father or mother moves in with the child would have a transitional effect on fruit and vegetable trajectory.

Stratton & Bromley (1999) approach the contextualised complexities of food choice within the family environment as a social arena is recognising that “the family is inextricably bound up with the food process and involves systems which are interactive, considerate, and progressive” (pg91). Encouraged to discuss their personal beliefs and experiences about their understanding of the families food choice (subsequently utilising the Leeds Attributional Coding System), the analytical exploration identified the frequency of family dietary priorities relating to food choice from discussion. This included ‘attention of the cooking process’ (37%), ‘wills and will nots of eating’ (36%), the ‘enjoyment, including negatives of food’ (15%) and ‘nutrition and health’ (7%). The observed summary suggests that in codings dedicated to practicalities featured most strongly in the respondents reporting of dietary action and what would be acceptable to the family. Health and nutrition feature somewhat minor to this. Likewise major influences on the food choices made by families (where food shopping and consumption appear holistically) indicate two thirds of influence verbally featured as the influence of people (mainly within the family). The remaining was made from ‘shop’ influences (or those that would feature while or thinking about shopping) and practicalities (Table 3.5).

Table 3.7 Major Influences on Family Food Choices

Influence	Percentage	Accumulative percentage
Mum	20	20
The children	13	33
Dad	12	45
Oldest Child	12	57
The Family	7	64
Friends	6	70
Youngest Child	6	76
<i>Time of Meal</i>	5	81
<i>Convenience</i>	4	85
<i>Price</i>	4	89
<i>TV advertising</i>	5	94
<i>On Pack</i>	3	97
<i>Shelf/checkout</i>	3	100

(Source: Stratton & Bromley, 1999)

Stratton & Bromley (1999) also go on to describe the patterns in relation members of the family in more detail, with the relative weighting of food choice decisions in between different family members, as well as the general theme of differentiation between 'mum' and other family members outlined above. Much of this is the influence in relation to provision. The data also indicated that most decisions about food choice were 'active' rather than 'avoidance' based, and advertising, featuring very much towards sugary sweets, could not match the strength of family members. Fruit and vegetables choices were of equal concern to advertised products.

The findings of Stratton & Bromley (1999) are useful regarding the 'space' or arena/environment that is the home and they help in indicating the relative importance of this space within the food choice decision (both in itself as a factor and as arena for complex negotiation of factors). Regarding their findings Stratton & Bromley (1999) summarise that it is parents, usually mother, who were responsible for ensuring children were getting enough to eat (dominant concern), while balancing and accepting preferences of other family members and issues such as routines and costs.

Gillespie & Johnson-Askew (2009) used a grounded theory approach to develop a model and framework to tackle the complexity of decision making within the family in regard to food choice. It was termed the family food decision making system (FDMS). The framework is based on three presuppositions; there is a shared, constructed understanding of reality, there is an interaction between people and their environment in the making of decisions based on said reality (thus have inherent reality), and that systems continually change with or without purposeful intervention.

Table 3.8 denotes the propositions of family food choice as generated for the authors' investigation. Importantly the investigation focuses on the complexities involved between family members including family priorities, balancing practical considerations, the acquisition of food, enacting roles and responsibilities, and creation of food contexts, while simultaneously suggesting that most decisions have evolved through communication and experience. The framework was developed in line with an ecological notion that there are various dynamic contexts that for food choices such as those that pertain to individual family members, those relating to the family unit, and wider contexts such as transport, health, education for example. Importantly also is the interaction between these contexts and renegotiations that occur. The framework recognises longer term evolution (and roles developed) and short term decisions, such as the verbal or non verbal communication between husbands and wives in food selection. Value and goal negotiations also feature, for example the balancing and tradeoffs of finance/resource usage, interaction between family members, and health.



Table 3.8 Propositions of the Family Food Decision Making System (FDMS).

1. The family food decision-making system encompasses interactions among family members as well as their individual predispositions.
2. Most food and eating decisions are routine and/or based on habitual behaviours and evolve over time.
3. Through family communication throughout the life course, situation-specific short-term decisions evolve into agreed-upon family food practices shaped by family food policies, roles, and interaction patterns.
4. Food decisions reflect families' values and often unarticulated goals and sometimes require negotiation among goals.
5. Thoughtful food decisions are based on situationally specific assessments of priorities, alternatives, and available resources.
6. Family decisions are made within overlapping context.
7. Family food decisions change over time because of changing contexts and changes in family members and their food roles and responsibilities

(Source: Gillespie & Johnson-Askew 2009)

Schafer et al (1999) develop and test a theoretical model to approach 'family food interaction' and its influence on healthy dietary components or outcomes utilising structural equation modelling. The tested measures, health concern, marital happiness, role performance, and dietary efficacy were developed and split by respondents own and partners' view of them. For the study the family interaction surrounding food was positioned as a mediating interaction which could lead to beneficial nutritional outcomes, and thus an indicator.

Family food interaction was hypothesised as a special arena, where "marital partners who are concerned about their health, who have a non-distressed relationship and do not feel permanently helpless regarding their own food behaviours are more likely to engage in family interactions about food activities...lead[ing] to a more healthy dietary behaviour" (pg789). None of the husband's variables were significantly related to the interaction surrounding family food, yet (with the exception of the ratings seen for marital happiness) wives' own variables were. In most cases except fibre, the rating of dietary self-efficacy by wives themselves was related to the outcome components of the diet. By comparison what predicted husbands reporting of the food interaction was the wives' view of their husbands' performance within their role, and their wives' dietary self efficacy. The study indicates, particularly with wives, that the family food interaction affects their 'healthful diets', questions why this food interaction could be important, and emphasises a gender difference

concerning its usefulness for men and women. 'Family food interaction' was significantly related to all of the dietary quality variables (including fruits and vegetables).

As was indicated by Kamphuis et al (2006) in their review, a number of studies have shown a positive effect to the consumption of fruits and vegetables associated with social interactions within households. Devine (1999), comparing influences upon consumption in different ethnic communities utilised the dimensions of marriage and with children/young children to show that parental and marital status was particularly important with respondents from the white community. Likewise Pollard et al (2001) examined results from the UK Women's Cohort Study demonstrating that those women who described themselves as married or living as married were more likely to be within the group of higher fruit and vegetable consumption than those who were divorced, widowed or single (especially single).

Being married and having children however need not necessarily indicate familial social support. It should be recognised that some studies, often at an individual level, have found that fruit and vegetable consumption can be either aided or hindered depending on specific family relationships. Consumers reporting on intervention studies have been particularly illuminating in this respect. Kilcast et al (1996) looking at practical approaches to vegetable consumption as part of the MAFF programme noted that a positive response to increasing consumption from other family members was critical to success. The study cited that low enthusiasm and acceptance from children towards vegetable based meals was detrimental to the family consumption as a whole in the long term. Anderson & Cox (2000) also found that without the involvement of the immediate household dietary change proved difficult.

John & Ziebland (2004) looked at the barriers to fruit and vegetable consumption at specific stages across a controlled trial utilising a nurse led primary care intervention. Studying the process of the intervention and impact it was noted that both children and male partners were cited as foreseeable barriers to increasing fruit and vegetable consumption for the participants. At the two follow-up phases of the research the barriers were realised. This in part was linked to the food preferences of partner and children which could disrupt attempting to amend the diet towards one higher in fruit and vegetable consumption directly, or as part of other factors. For example, the reluctance to consume from those that the individual lived with meant that issues of waste, additional cooking/ preparation/shopping time, additional expense became prominent as a barrier for the individual to increase their own consumption. Other connected barriers established, one participant cited in the pre-intervention stage that her children would not be a problem as they ate fruits and vegetables. However it was discovered in later interviews that the fruit and vegetables her children would eat were affected strongly by winter price rises which made the consumption

expensive and something her budget would not always allow (other strategies had to be adopted, though this was impacted by poor access to transport).

The authors (ibid, 2004) highlight that there is sometimes complexity of family reactions that a person attempting to change their diet may need to overcome, which may bring about further issues to be dealt with. It is not always a straightforward barrier or influence of family food preferences. It is important to recognise that family food can be a positive environment for fruit and vegetable consumption, as is associated with shared family meal times away from the TV (Thompson et al, 1999) or as Brug et al (1995) noted those living on their own may not see the effort worthwhile in provision of fruits and vegetables with 'boiled vegetables' and 'salad' being rejected as too much trouble when eating alone. There are also examples where the food environment is positively geared towards fruit and vegetable consumption (Kilcast, 1996), and those where the main provider of food will make decisions with a certain independence such as having their own separate diet, or where a partner will eat what they are given.

### *3.5.2 Outside of the Home*

The distinction between the home environment and those outside are not necessarily clear cut. There are obvious relationships linking the two such as place of production, purchase, process, provision and consumption. Influences upon one arena can affect the other, especially with food being physically mobile (whether into the home, or from the home), with fruit and vegetable consumption being influenced in this way. Environments such as the workplace, and shopping arena, and importantly access and availability in these (for example transport and costs) feature prominently as influences upon fruit and vegetable consumption and food choice.

Devine et al (2006) recognise the conflict between the roles adopted in different arenas and the impact on food choice as a result of 'spillover' from one to the other as well as practicalities that manifest. Included in this are individual aspects and conditions of work life and home life. The research with low wage employed parents identified affective, evaluative, and behavioral examples of impact. These had some positive but mainly negative experiences linked to personal characteristics, circumstances and the behaviours adopted to cope with the situation. Devine et al (2007) conducted an investigation among labourers in the construction industry and found that work family spillover was higher with certain factors relating to employment and having children. Fruit and vegetable consumption was inversely related to a high spillover. In addition, Blake et al (2009) highlighted that mothers and fathers can evaluate satisfaction of work family spillover differently and emphasize the gender division as important to understanding food choices and dietary intake.

This was of consideration to Roos et al (2007) with a sample of Finnish participants. They found that women with strong work-family conflicts were likely to follow recommended food habits, whereas family-work conflicts impacted on both women and men reducing the likelihood of either reporting consumption of recommended food habits.

### 3.5.2.1 *Work*

Research into the work family spillover outlines the relationship between arenas and how one can affect the other. However it has also illustrated issues within each of the arenas, therefore with regard to the work environment, the impact to a consumer and implications for an individual's fruit and vegetable consumption. Devine (2006) for example cites experiences of job stress and level of job satisfaction, linked with pay and job security, as well as more physical factors surrounding food choice at work. These include issues of food quality, price and the how diet is incorporated within the working role.

Jack et al (1998) approached those in a working role with high in-hour transport demands. The focus was long distance lorry drivers working for haulage firms. The sample was selected based on the nature of the employment with irregular and demanding conditions in relation to diet, but noting that this shift pattern may reflect others in a variety of positions. From the conducted research it was identified that breaks for meals could be varied also and thus no set hours while working. The authors investigated the role of fruit and its consumption as part of lorry drivers' diet as a snack item, compared to alternative snack items. Influences on food choice included convenience, where food was grabbed at where possible to do so, but price at service stations were often too expensive, and variety, quality and safety were also issues to consider. Place of consumption was therefore important and very few places they stopped at had adequate canteen facilities or in some instances no where to park their vehicles, while provision from home created issues of food management that were difficult to overcome. For the drivers fruit such as apples and bananas represented a healthy snack, along with salad and yoghurt, but did little to fill up on in the long term (fruit more likely to be a short term energy boost). Some fruit was less convenient to consume than others such as a negative association with oranges.

The Jack et al (1998) study identified the importance of roadside outlets in the provision of food for lorry drivers, and therefore access to healthy foods also (such as fruit and vegetables). In addition it highlights scheduling issues for the integration of food into the work environment. Apostolopoulos et al (2011) looking at environmental barriers and attributes for truck workers also identify 'settings' important to on- the-job consumption. Important settings include terminals,

warehouses, truck stops, highway rest areas, and truck cabs. The environments that were utilised by truck drivers were shown to be low in supporting healthful consumption, in terms of facilities available in the production of food, which was often processed when used, or lack of social support for health. Interestingly the authors also identify the areas where truckers were likely to stop or purchase food mirrored the nature of food deserts (examined further below).

John & Ziebland (2004) cite similar findings as part of their qualitative investigation of barriers to fruit and vegetable consumption. As with the experience of truckers, one participant interviewed spoke of the difficulty of fitting fruit and vegetables into their diet. In particular their job meant that meetings with clients meant a varied schedule of which to fit food around, and significantly to the interviewee a lot of driving featured as part of their job where fruit and vegetables were not readily available. Working pattern has been investigated within other work places as a barrier to healthy consumption. Lopez-Azpiazu et al (1999) conducted a Spanish study of in access of a thousand representative participants on barriers to healthy eating, where 'irregular work hours' were strongly indicated as detrimental. Similarly, Faugier et al (2001a) found shift patterns to be problematic for nursing staff in North Wales accessing healthy foods as well as working conditions such as the failure to take appropriate breaks. This was compounded in further investigation (Faugier et al, 2001b) where work issues were related to staffing levels, along with problems of the food access and variety. Reeves et al (2004) identify shift workers, in particular those that work during the night, had significantly different eating patterns on work days to none work days compared to day workers. Influenced by access issues also, night workers did not eat more but ate smaller meals and snacks over the timeframe.

For some workers the place of food purchase and consumption is provided by employers often in the form of canteens. A number of researchers have focused on canteens as potential healthy environments, often utilising intervention and trial. Lachat et al (2009) used a university based canteen in Belgium to compare the fruit and vegetable consumption of those who were given free fruit and vegetables at lunch to those who were not. A significant increase in consumption was seen by those given free items, both at the point of 'lunch' but also later in that day for dinner and evening meal. In part this was seen to be as a result of providing the items in transportable containers.

Backman et al (2011) used six worksites as intervention environments where low wage employees were recruited, most of who worked in manufacturing warehouses. The intervention worksites received deliveries of fruit three days a week for twelve weeks, enough for one serving per employee each delivery, where it was then made available for each employee during a break to access. Despite the control worksites having a higher baseline vegetable and total fruit and

vegetable consumption rates, the intervention sites displayed significant increases in fruit, vegetable and total consumption during the intervention, whereas the control group did not show increase. Self purchasing of fruit and family purchasing of variables also increased in the intervention group compared to the control, as well as an increase in the confidence of consumers to eat two servings of fruit per day (but not three servings of vegetables). Bandoni et al (2010) also found that 'availability' of fruit and vegetables in the workplace contributed most strongly to their consumption which was twice as high as the next variables (level of education, sex, and age).

Lassen et al (2003) looked at the potential for improvement of canteen staff in producing food that favours an increase in fruit and vegetable consumption i.e. more available and more appealing. Strategies were utilised across hot dishes, cold dishes, salad bar, as well as fresh fruit and vegetable snacks. The authors utilised five work site canteens and found their intervention showed increases in fruit and vegetable consumption in each case and also maintenance or increase in the follow-up. Lassen et al (2007) carried out further investigation of provision systems of food in canteens. It was found that at the selected canteen sites in Denmark the buffet style serving system was associated with an increased intake of fruit and vegetables compared to the more a la carte style.

Beresford et al (2001) carried out a study involving 28 worksites with cafeterias, where 125 workers from each were surveyed at baseline and two years, following interventions to the work environment and individual behaviour. This was in order to assess the interventions ability to increase fruit and vegetable consumption. An employee advisory board was used so as to engage the participants in the intervention process and guide activities. The intervention was designed around stages of change communication model (further discussed below) with an emphasis upon enticement, information/education, skill development and incentives. The follow-up evaluation identified a significant increase in the daily fruit and vegetable consumption for those involved in intervention worksite above that of the control group by 0.3 servings.

Sorensen et al (1999) report on the effectiveness of trial intervention approaches in the Treatwell 5-a-Day study. Twenty two worksites were randomly allocated to one of three groups. All of the groups received the same core component which reflected the exposure to the national media campaign as well as access to the hotline for the Cancer Information Service. In addition the core component also included a nutrition presentation and taste tests. Groups 2 and 3 received worker participation into the worksite based interventions that made changes to the worksite environment which started with kick-off events and then systematic education, point of purchase information and labeling as well as worksites being encouraged to offer fruit and vegetables in vending machines, events and in break rooms. Discussion series and events were also incorporated. Those who participated in group 3, worksite plus family intervention, were encouraged to help their children

devise fruit and vegetable recipe cards which were then turned into a book. They were also given a learn-at-home programme to be completed and returned, newsletters, and family festival events. Family interventions were encouraged to be targeted at home social structure (such as single parent, multiple children, two adults etc.), overall designed to assist the family in supporting the worker's dietary change. Having controlled for sociodemographic influence, the results of the 19 month intervention showed that the third group, worksite plus family, was most successful in increasing fruit and vegetable consumption by 19 percent, or 0.5 servings per day. The worksite only group increased consumption by 7 percent (0.2 servings). The authors also noted that social support was valuable in aiding fruit and vegetable consumption.

The intervention studies of Beresford et al (2001) and Sorensen et al (1999) provide useful examples of assessments based on particular models, stages of change and socioecological respectively, and advocating of particular strategies as a result. For example the socioecological approach recognises and utilises different levels of influence and thus building support to a behaviour change. Sorensen et al (2004) in a review of successful worksite-based initiatives and research in increasing fruit and vegetables consumption highlights common themes, in so doing for the purpose of this chapter illustrates important influences upon consumption within this context. The authors address the importance of environmental and informational intervention such as Jeffery et al (1994) which demonstrated a price reduction of fruit and vegetables in cafeterias increased its consumption three fold (echoed by strategies outlined above), as well as changes to meals provided to increase the availability of fruit and vegetables (such as Lassen et al, 2003). Sorensen et al (2004) also showed that it important for the organisation to be committed and supportive, and link efforts with the surrounding neighbourhoods. The authors also noted the success of comprehensive programmes that incorporated the employees as 'participatory strategy' and could be tailored towards the needs of the employees. This could be achieved by either identifying routes of information (e.g. computer based) or delivered to a specific group such as health professionals. Likewise the review recognises the role of the supporting social structures in food choice and behaviour change.

### *3.5.2.2 Shopping*

According to market analyst Mintel (2011), nine out of ten people enter the fruit and vegetable market, with a preference for fresh, loose produce. Economic and social factors since the mid 1960s have led to supermarket growth so that it represents the main site for purchase, with a current value of almost £108 billion for groceries at supermarkets/hypermarkets (i.e. larger stores) compared to

six billion pound at traditional stores and £32 billion at convenience retail outlets (IGD, 2010). Mintel (2011) estimate that the value of the fruit and vegetable market is worth £12 billion in 2010 (this includes potatoes, but excludes baked beans, mixed vegetables or pre-packed salads), and the most common place of purchase being the supermarket.

With such trends and market share, along with the rise of out of town supermarkets, access became an important issue for investigation. Researchers and policy makers (with an interest in inequalities e.g. Low Income Project Team, and Nutrition Task Force) surmised that there may be an association between certain geographic areas and poor physical access to healthy foods, with either the location having little food provision, or compared to other areas had reduced quality, variety and affordability. Fruit and vegetables were believed to be such food items, and as such availability issues could negatively influence consumption. The influence was important because it represented not only a geographic distance/space but often incorporated an area of economic disadvantage that could be geographically defined. The label 'food desert' was adopted and popularised from the 1990s (e.g. Acheson, 1998) and became part of the 'social exclusion and health inequalities debate' (Wrigley, 2002).

The original interpretation of the food desert has been heavily questioned within the UK. First, based on misrepresentation of original research by policy makers (Cummins & Macintyre 2002), second, because a number of studies have been unable to evidence the association that are described as such across a number of areas (whether effecting access or affordability, Pearson et al, 2005). Third they have been questioned for way in which their validity was accepted in the manor of a 'factoid' (Whelan et al 2002, Cummins & Macintyre 2002). However, 'shopping' and environments still hold value to researchers in the identification of influences upon consumption, despite the UK debate of food deserts. The framework has been found to fit conditions in some localities, particularly in the US (Chart 2009, Rose & Richards 2004, Zenk et al 2005), as well as development into rural food access (Morton & Blanchard, 2007). Within the UK the desert theme has led to a focus upon the impact of food outlet facilities such as movements away from and back into town/city locations (CC, 2000) and neighbourhood food environments, such as store type and quality (Cummins & Macintyre, 2009).

A further area of related study is the issues faced to access healthy foods by certain groups, above mere distance. Whelan et al (2002), with a focus upon the interlinkages of economic and physical access for a group within what could have been described as a food desert, describes the perceived difficulties for disadvantaged consumers. The work followed qualitative food desert tradition and focused on the specifics of food access for different people. For example those faced by elderly participants as opposed to women with children, and importantly the role of a car and



strategies employed to cope in accessing foods/healthy foods. Furey et al (2001) conducted research on the potential for food deserts to exist in rural and urban Northern Ireland, the importance of the results are that they focus upon vulnerable consumer and relationship with car ownership or non-ownership in the accessing of healthy aspects to their diet, such as shopping frequency. Mintel (2011) suggests, in light of economic conditions, a trend amongst some consumers towards purchasing fruit and vegetables when on promotion such as BOGOF deals or multi-buys. Likewise (ibid, 2011) there has been a noticeable shift towards frozen foods during the UK recession, with promotion of frozen foods as fresher than fresh and supermarket offers for value fruit and vegetable items.

Like the work environment, the shopping environment and place of purchase has provided an arena for researcher to look at ways to increase fruit and vegetable consumption and healthy diets. Recognising ecological approaches address multiple influences within an environment; Glanz & Yaroch (2004) identify four grocery store intervention types that feature in the research literature. The 'point-of-purchase' information type, e.g. fruit and vegetables are good food choices utilising signage, fliers, brochures etc. The authors indicate that such interventions often are more successful at increasing knowledge than impacting actual behaviour change. Glanz & Yaroch (2004) differentiate between 'point of purchase information' and 'advertising and promotion'. The latter represents advertising, games, posters, and multimedia sources which encourage the purchase of fruit and vegetable items. Buttriss et al (2004) highlight the success of such in trials, citing Connell et al 2001 and their research using audiotapes and public announcements promoting consumption; those exposed demonstrated an increase of more than half a serving over the control group. A similar increase was demonstrated by Anderson et al (2001) who used a more targeted computerised approach (based on social cognitive theory) from kiosks in supermarkets. This indicates the importance of appropriate media and communication types in influencing healthy food choice.

'Reduced prices and coupons' are a third type of grocery store intervention noted by Glanz & Yaroch (2004); believed to be effective for those who would be inclined to consume fruit and vegetables anyway. Anderson et al (2001) demonstrated a positive direct effect to consumption of fruits and vegetables in a low income population but with little change to attitude (finding a combination of education and coupon intervention to be most effective). In a similar vein, Burr et al (2007) assessed the effect on intake of providing vouchers for fruit juice as part of their investigation. The voucher could be exchanged for pure fruit juice which was delivered direct to the door (via a milk delivery service). Fruit juice intake increased substantially for the fruit juice group.

The fourth category of intervention that Glanz & Yaroch (2004) indicate is 'increased availability, variety and convenience' where in part fruit and vegetables in grocery stores are made easy to use/eat or easier locate, or are given priority positions. Related to this, Song et al (2009) focused on Korean-American store owners in urban communities reporting an increase in healthy food purchases following interventions that made store owners more aware and confident in how to stock such items. Bodor et al (2007) Interestingly as part of the Change4Life programme the Department of Health encouraged convenience stores in selected deprived areas to install chillers (by offering to pay half the costs involved) so that fruit and vegetable ranges could be expanded and could be displayed more prominently within store (DH, 2010).

Glanz & Yaroch (2004) usefully point to grocery store influences upon consumption. They also point out that other environments are useful for fruit and vegetables consumption, such as community groups, for example churches or child care centres. The environments have been subjected to interventions and trials, often where multi-component strategies have been employed. The authors identify the creativity that can be strategized utilising numerous partnerships to aid development of successful operations that show promise for increasing fruit and vegetable consumption. The environment can offer an opportunity where people gather, to disseminate nutritional knowledge, to offer support, or to deliver practical advice.

Hendrix et al (2008) carried out an evaluation of fruit and vegetable intervention that was positioned at senior centres using older adults (with a mean age of 75 years). Over a four month period eight sessions were conducted on the subject of practical approaches to increasing fruit and vegetable consumption, such as snacking, bolstering fruit and vegetables within meals and other intake advice in line with the Health Belief Model. Post trial, those who reported consuming in excess of seven servings per day had increased by over 20 percent and 57 percent showed awareness to dietary guideline (an increase from 7 percent pre intervention). In addition those reporting what they perceived as barriers to consumption had significantly decreased, such as 'too much trouble'.

Related to medical sites for intervention, Steptoe et al (2003) used a primary care centre in a deprived area as a base for their study of educational counseling and behaviour counseling which evidenced increases in fruit and vegetable consumption nearly one portion and 1.5 portions respectively. Similarly Jackson et al (2005) attached their intervention to a site of cardiac rehabilitation patients who attended secondary prevention clinics, where patients were asked to increase consumption by two portions per day over a three month period (while recording how this was achieved). Results indicated mean increases in fruit and of vegetables during the period.

An example of the UK government's belief in the importance of community sites can be found in the establishment of local level Healthy Living Centres (HSC, 1999) to mobilise community action as well as bring together health promotion. More directly fruit and vegetables can be purchased or consumed at such venues where Local Food Projects are cited (Dowler & Caraher, 2003). Projects had included mobile fruit and vegetable vans, food co-ops, community cafes, cook and eat sessions and sites of multiple partnerships in food provision (McGlone et al, 1999). Again the focus of these projects is access and availability, as well as community involvement and increasing confidence (Peters et al, 2004), often relying on volunteers to engage in the process, in a similar way to food strategies used in the work place. Blanck et al (2011) have recognised a ongoing opportunity for increased access to fruit and vegetables in the US by utilising farm-to-consumer venues such as farmers markets, pick your own, roadside stands and community-supported agriculture programmes. McCormack et al (2010) advocate that such programmes should be more thoroughly evaluated as to the potential they offer.

### *3.6 Time: Dynamism, Trajectories, Experience and Past Behaviour*

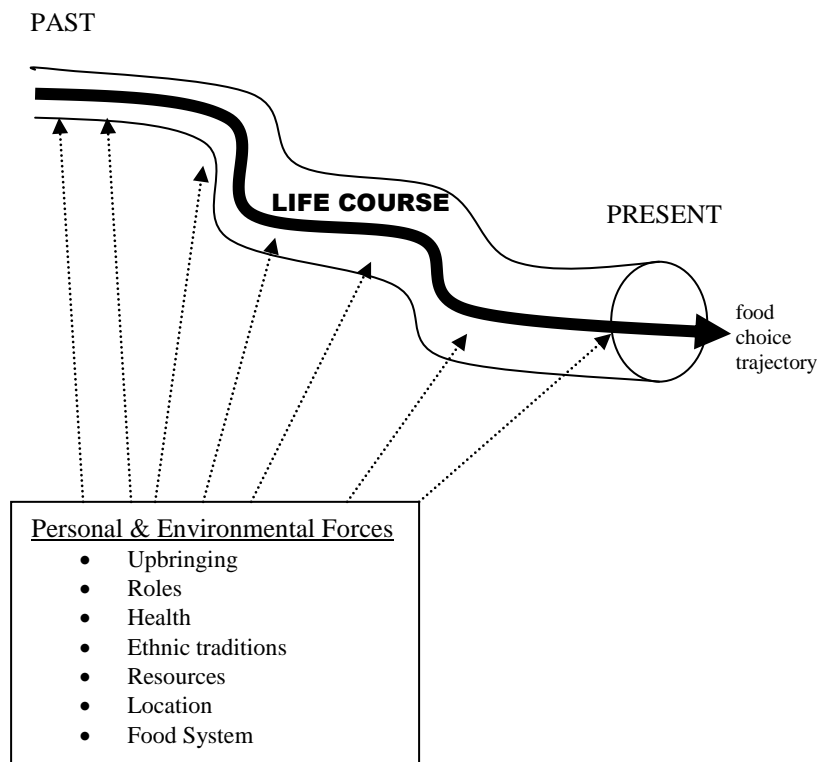
Pollard et al (2002) indicates that time is an important determinant to the consumption of fruit and vegetables, in particular the relationship with time availability and conversely the barriers and perceived barriers of time constraints. This is iterated in the investigations regarding consumers ability to fit fruit and vegetable consumption into daily lives (e.g. Anderson et al 1998), particularly within the timeframe of a busy work schedule for example. Time constraints can be subjective, linked with personal and family circumstances, affecting some consumers more than others and considered more of a cost to some. Time has presented itself as an opportunity to overcome an issue of making fruit and vegetables accessible (see above). Nothwehr & Yang (2006) approach time in respect to goal setting and in particular frequency of goal setting, finding that frequent, focused goals are indicators of the enactment of specific strategies for diet and physical activity than overall weight loss.

Time has also been presented by some researchers as an opportunity to explore the dynamics of food choice. Devine et al (1998) utilise a 'life course' approach, the Food Choice Process model, one dimension of which incorporates the notions of change, transition, experience and the past into the dynamics of fruit and vegetable trajectories.

“Most people experience a few major transitions that influenced their fruit and vegetable choices, some being more abrupt and some more gradual changes... A life course model of food choice trajectory was developed from the data to reflect how past events and experiences were operationalised in present contexts to shape food choices” (pg361).

A life course model (Figure 3.4) is useful in demonstrating the trajectory of food choice presently but also the future. Within the concept it can also illuminate the general movement or stability of consumption and food choice, as well as identify specific change points and general movements. It can also show speed of change and impact and interaction of factors along the path of the food choice trajectory along with the factors highlighted themselves.

Figure 3.4 Illustration of a Life Course Model of Food Choice Trajectory as can be applied to Fruit and Vegetable Consumption



(Source: Devine et al, 1998)

Devine et al (1998) examined the trajectories of fruit and vegetables, and identified a number of strong influences on the trajectory of fruit and vegetable food choice for the respondents in their study. The first of these is the upbringing related to the food objects, the direction of which can be both negative and positive. Food patterns, described as ‘food roots’ were considered important in

setting a reference point for later consumption and preferences and often the acceptability level of fruit and vegetables; in many cases early pleasurable memories would lead to a greater likelihood of consumption at a later stage. Negative consequences were evident and frequently used with words such as 'forced'. It was not only meals that help shape the trajectory, but family activity and rituals with fruit and vegetables, including positivity surrounding production in gardening or on farms when younger. There can be changes however and participants referred to strong shifts from 'hating' to 'loving' certain items (but in some ways still connected back to reported parental premonitions of 'you'll change in time').

Related in part to early patterns being established, the traditions and identities surrounding ethnicity could be seen as effecting trajectories. Often reinforced by festival or traditional gatherings associated with food, an ethnicity or identity can provide valuable information to a person regarding which fruit and vegetables are considered as staples within the diet. As identity need not be fixed, and influences interact with it, such as physically relocating to another area, fruit and vegetable trajectories can change as an individual moves their identity.

Stimulation to amend an individual's fruit and vegetable trajectory and the choices they made was described by the individual's health and well-being. This is related to internal drive or reinforcement, or purely external stimulus. General well being, maintenance of health, the relationship with aging were examples where fruit and vegetable consumption decisions and trajectories could alter. Weight issues and acute medical conditions were considered important drivers, and fruit and vegetable trajectories could fluctuate depending on how these influences impacted on the individual at any particular point, and how they were incorporated into food ideology. Devine et al (1998) indicated that some of the most unwavering food trajectories were guided by such food ideologies. For some participants health values impacted upon most aspects of their lives including food choices and thus consuming large amounts of fruit and vegetable was about overall healthy lifestyles.

As is consistent with food choice process, contexts were important at particular points but also in relation to time (seasonality, developed traditions, ethnicity). Location as an influence was seen as the practicalities of a particular location, but also food system variations between locations, such as self production and seasonality in more rural areas, versus more urban diets with effect upon dietary choice in relation to fruit and vegetables, connected perhaps with traditions and identity. Resources also had an effect and resources available at a particular time (representing changing values and abilities). At its simplest this groups together issues of skill ability, knowledge, access, time, social support, and monetary issues. Increased complexity of the interaction of this influence indicates the importance of management of resources. The final associated theme that Devine et al (1998)

highlight is the individuals' relationship with their own food system over the course of their food trajectory. For example instances where there is increased exposure of or change in societal information regarding food, health, cuisine; situations where individuals have to reevaluate their contemporary food systems and beliefs. The study reports respondent's discussion of food ideals based on television programmes offering the exemplar of family values relating to food at a particular time during their lives. Other examples include an increase in the availability of different fruit and vegetables during their life course. This differs from the contexts of influences that the study identifies earlier in that the expression of interaction is often placed in a historical context in relation to the food system.

Taking results drawn from the qualitative approach to life course analysis of fruit and vegetable trajectories, Devine et al (1999) report on the findings of a number of regression based analysis concerning fruit and vegetable consumption and life course experiences. The focus was three different ethnic groups. The groups differed substantially in their response to life course events, although consumption rates of fruits and of vegetables did not differ significantly between groups in most cases (except the median daily consumption of the white group). Table 3.4 above demonstrates Devine et al (1999) significant findings from regression models (including socio-demographic characteristics and event characteristics). The model applied to the groups used in the study indicates that there are key differences between groups in their life course in explanation of fruit and vegetable consumption.

Devine et al (1999) explain that these findings support the value of a life course perspective in understanding food choice as it links continuity and change to current food choice. In so doing conceptualisations of childhood influences as 'habits' are expanded to a more dynamic life course approach. Sobal & Bisgoni (2009) emphasise this, "the life course is not merely life cycle development such as growth, maturation, and aging; nor it is simply progression through life stages like childhood, adolescence, and adulthood. The life course considers several dynamic processes that transcend cycles or stage including: trajectories, transitions/turning points, timing, and contexts" (pg40). The model offers an overall positivity to proponents of health behaviour change. When used with a focus upon different groups or people with shared social systems (or experiences) the life course approach is useful in indicating similarity and difference in explanation of current consumption which can be translated into effective strategies for targeted communities. It also may help indicate important periods of effective potential behaviour change during the life course. Olsen (2005) for example, highlights the transition into motherhood is one such point of change.

Similar importance to an understanding of time and behaviour in the establishing and maintenance of healthy behaviours is indicated by Backett & Davison (1995). The authors focus on

the linking life course and lifestyle. It is important, according to the authors, to address the possible difference in the discourses between lay perceptions of life course and lifestyle and the scientific community's understanding of the concept. The importance of their work manifests in relation to respondent identification of three distinct stages of life (linked with 'physiological' time), each of which is surrounded by perceptions and notions of healthy lifestyles;

“respondents regularly accounted for health and illness and located relevant behaviours, in terms of an individual's perceived circumstances and obligations. Position in the life course was one of the structures respondents used to express and encapsulate particular constellations of socio-cultural processes and variables...there seemed to be a constant grounding and evaluation of health-relevant behaviours in terms of, for instance, 'a man of his age'... 'it's different when your single' ...etc” (pg633).

Backett & Davison (1995) explain that notions incorporating healthy and unhealthy behaviours, and understandings of the processes involved (such as active compliance to health knowledge and advice), can be seen in relation to wider 'population' behaviour and 'common knowledge'. The assessment of these by an individual often helps define whether such actions were considered good or bad, and the reasons for them being good or bad.

It has been outlined above that the Theory of Planned Behaviour (TPB) is used by researchers to look at the predictable role of key components in behaviour such as perceived behavioural control, subjective norm, attitude, behavioural intention. Researchers have further developed the model so that it incorporates past behaviour in the prediction of behaviour. Rhodes & Courneya (2003) modelled the concept of past behaviour as both a causal influence and a more novel approach which incorporated past behaviour and current behaviour along with original tenets. The investigation approached the behaviour of physical activity, it indicated that past behaviour is a useful concept when applied appropriately. Collins & Mullen (2011) apply the TPB to different behaviour scenarios or types, fruit and vegetable consumption ('distal benefit behaviour') and snacking ('immediate hedonic behaviour'). The research demonstrated that behaviours such as fruit and vegetable consumption, where it is believed to represent a habitual consumption, intention is negated by past behaviour. In line with other research, the authors suggest that for this sample fruit and vegetables represent a strong habit. It also recognises the different roles that time can have within the TPB model especially where 'different temporal gratification contingencies' are involved.

The Stages of Change model, noted also as a Transtheoretical model (TTM), features above in the role of self-efficacy in healthy behaviours and fruit and vegetable consumption, but it also can be related to the role time and contexts, in particular the state of readiness for an individual, in behaviour change. The model breaks down behaviour change to temporal developments rather than a discrete event or influence impacting an action (in this case consumption) per se. Di Clemente and associate Prochaska in the early 1980s recognised that people utilised different actions at different times when battling to change behaviour. The subsequent model was built around observations that this behaviour is part of five stages (not necessarily linear); 'precontemplation', 'contemplation', 'preparation', 'action', and 'maintenance'. To illustrate; Conner and Armitage (2002) provide these statements: 'I currently do not eat a healthy diet and am not thinking about starting', 'I currently do not eat a healthy diet but I am thinking about starting', 'I currently eat a healthy diet but not on a regular basis', 'I currently eat a healthy diet but I have only just begun to do so in the last six months', and 'I currently eat a healthy diet and I have done so for longer than six months' respectively. These statements can be amended to suit particular situations. There is also a sense of context interplay relating to the stages such as processes (consciousness raising, self re-evaluation for example), decisional balance and self efficacy (Glanz et al, 2008).

Greene et al (2004) focus upon the stages of change for fruits and vegetables in older adults, finding a linear direction from precontemplation stage through to the action and maintenance stages. They utilise stages of change questions along with dietary assessment, decisional balance (i.e. pros and cons of fruit and vegetable consumption), process-of-change instrument (behavioural and experiential strategies), and situational self-efficacy measuring overall confidence in the respondent's ability to consume fruit and vegetables in a range of situations. Both decisional balance and self-efficacy proved to be important for the stages of change fruit and vegetable consumption by young adults. Ma et al (2002) found a similar linear trend between stages and level of fruit and vegetable consumption.

The stages of change model also allows for the researcher to identify factor and cluster differences in relation to particular stages, for example the processes, pros and cons, decisional balances and self-efficacy. In line with the temporal concept it highlights the importance of context. Di Noia et al (2006) apply this to fruit and vegetable consumption amongst disadvantaged African American adolescents. Those in action-maintenance stages evidenced higher pros, self-efficacy, and fruit and vegetable consumption and significantly lower cons than did participants in precontemplation and contemplation-preparation stages. Participants in action-maintenance stages used processes of change more frequently than did those in precontemplation-contemplation-preparation stages. Experiential and behavioral processes within these stages did not differ



significantly. The authors noted that factor analysis was appropriate to most suitably fit statements for decisional balance, processes of change, and self-efficacy. Hence different stages can be assessed in terms of the importance of different aspects of stage defining characteristics not merely in the differentiation of stages.

Similarly, approaching the associations of fruit and vegetable consumption, Hildebrand et al (2010) used a transtheoretical model to differentiate attitudes and behaviours of groups at each of stages of readiness. For their study a mixed method model was adopted with survey and focus groups with African American parents of young children. Parents in action/maintenance stages served significantly more fruits and vegetables and used behavioral processes significantly more often compared to parents in precontemplation/contemplation stages. Frame et al (2003) tracked the stages of change for cardiac patients engaged in an education programme and nutrition intervention. The authors demonstrated that the intervention had different, more positive, effect upon the stages of change for fats than for fruit and vegetables. They found that the respondents achieved in greater number a change in position towards maintenance for fats, but dissimilar results with fruits and vegetables.

### *3.7 Coping, Strategies and Dietary Management*

It is important for the purpose of the thesis to include within a review of influences upon fruit and vegetable consumption the reporting of investigations that mention the management of that consumption, whether alluded to or purpose of the study. It is quite common to discuss 'weight-loss management' in reference to dieting. Importantly what this provides is a context to describe and investigate 'how' fruit and vegetable consumption is achieved in relation to influences upon its consumption. Nothwehr & Yang (2007) for example look at behavioral strategies relating to diet and physical activities, in particular setting goals.

Connors et al (2001) describe 'strategies' in relation to values within our personal food systems (food choice processes, see above). The strategies that are referred to are those processes that are utilised to make food decisions simpler, such as negotiation, simplification, prioritisation, and balancing. These represent internal strategising. Greene et al (2004) as part of their investigation into the stages of change towards fruit and vegetable consumption highlight the importance of various examples of processes of change. This can also be viewed as representation of processes involved in achieving high fruit and vegetable consumption (Table 3.9). The table is divided into what Greene et al (2004) describe as 'experiential strategies' (top six rows) and 'behavioural

strategies' (lower six rows). Some of the items described in the table appear more applied and active, i.e. used in knowledge that in so doing behaviour is more likely to be achieved, and others less so, either they are subconscious (e.g. emotional responses), or represent a behaviour that is not linked with knowledge that it is increasing likelihood fruit and vegetable consumption.

Table 3.9 Processes of Change in Older Adults.

Process of Change	Description	Examples
Consciousness raising	A cognitive process of change that involves raising awareness about the problem of eating enough vegetables and fruits.	Reading more about eating more vegetables and fruits.
Dramatic relief	An affective process that involves creating a motivating emotional experience that encourages the individual to eat enough fruits and vegetables.	Feeling worried about getting sick if you don't eat enough fruits and vegetables.
Self reevaluation	An evaluative process that involves reappraising what is thought and felt about eating fruits and vegetables	Feeling good about yourself if you eat fruits and vegetables.
Self liberation	An existential process that involves invoking will power, making a commitment, and recognizing choices with regard to eating vegetables and fruits.	Talking yourself into eating more fruits and vegetables
Environmental reevaluation	An evaluative process that involves considering the impact of one's dietary behavior on others.	Considering the idea that, in general, seniors would benefit from eating more fruits and vegetables
Social liberation	An evaluative process that involves considering the impact of the environment or others on one's ability to eat vegetables and fruits	Noticing that more and more seniors are eating vegetables and fruits these days.
Helping relationships	A humanistic process of change that involves accepting or seeking help from others.	Accepting help from others in preparing fruits and vegetables.
Reinforcement management	A behavioral process that involves providing rewards for eating vegetables and fruits.	Making use of the approval of other people as a reward to motivate one to eat more vegetables and fruits.
Interpersonal systems control	A behavioral process that involves seeking out people who promote eating vegetables and fruits or avoiding people who discourage that behavior.	Spending time with other people who encourage one to eat more vegetables and fruits.
Counter conditioning	A behavioral process that involves substituting vegetables and fruits for other foods	Snacking on vegetables and fruits instead of high fat foods.
Stimulus control	A behavioral process that involves using cues to take control and promote eating vegetables and fruits.	Keeping fruits in a bowl on the counter.
Planning ahead	A behavioral process that involves being proactive about situations to promote eating enough vegetables and fruits	Cutting up vegetables ahead of time to add to meals during the week.

(Source: Greene et al 2004)

Both the strategies described in Greene et al (2004) investigation and the Connors et al (2001) study are strongly related to particular models of behaviour and food choice. This has also been seen in a number of intervention studies, where the basis of the intervention has focused on increasing fruit and vegetable consumption in line with beliefs about what is required, for example supporting tenets of the theory of planned behaviour, or affecting the intention-behaviour gap. Thus some have focused on ‘tooling up’ consumers by increasing knowledge, cooking skill etc to affect perceived behavioural control. Stages of change interventions have also focused on increasing participants’ self-efficacy (Luszczynska et al, 2007) or targeted particular stages. Baker & Wardle (2002) used educational/motivational interventions in precontemplation and contemplation stages and skill/reinforcement techniques at the action and maintenance stages. Such studies are useful in identifying methods used to enact positive behaviour change.

Quan et al (2000) discussed behaviours relating to fruits and vegetables that were associated with higher levels of consumption for low income mothers. In so doing it allows the behaviours to be viewed as ‘how’ participants managed to consume fruit and vegetables. High consumption of fruit was linked with the drinking juice as beverage, snacking, fruit at lunch, fruit as a desert, breakfast being fruit. For vegetables patterns were also observed, eating at least two varieties at dinner, keeping them around the house, snacking, salad consumption at lunch. For fruit and vegetables combined levels could be increased/sustained by ensuring that three meals a day were consumed. Paisley & Skrzypczyk (2005) identified challenges and benefits to fruit and vegetable consumption. Of the themes that emerged from women in group interviews, 2 of the 5 (the main benefits) can be utilised as strategies of consumption. Utilising fruits to ‘fill in gaps’ between meal times (often related to health), and vegetables increased the aesthetic appeal and potential versatility of a plate of food (linked to taste, texture, and making it appealing).

Falk et al (2001) highlight a range of strategies uncovered in their investigation linked to the particular nature or purpose of their health behaviour. Table 3.10 indicates participants using ‘avoidance’, ‘preparation’, ‘substitution’, ‘limitation’, ‘comparison’, and ‘compensation’ strategies, the degree to which each is used is participant specific but some commonality was found.

Table 3.10 Strategies for different health behaviour situations

<b>Component</b>	<b>Balance</b>	<b>Low Fat</b>	<b>Weight Control</b>	<b>Nutrient Balance</b>	<b>Natural</b>	<b>Disease Management</b>	<b>Disease Prevention</b>
Strategies	Avoidance, preparation	Avoidance, substitution, preparation, limitation, comparison, compensation	Avoidance, substitution, preparation, limitation	Addition, preparation	Avoidance, preparation	Addition, preparation, avoidance, compensation, limitation	Avoidance, substitution

(Source: Falk et al, 2001)

Crawford et al (2007) also examine behaviours that are associated with healthier intakes of fruits and vegetables. Using a cross sectional survey, the authors also focus on women, in this investigation respondents were recruited from a range of socioeconomic backgrounds. The survey investigated shopping behaviour (such as shopping lists), food preparation behaviours (e.g. finding food a chore, planning), meal behaviour (e.g. regularity of where meals consumed), and eating behaviours (e.g. time influences, use of dinner table). Behaviours positively associated with health intakes included organisation and planning, such as what would be eaten well in advance of mealtime and before going shopping. Likewise those with higher intakes of fruit and vegetables as demonstrated an enjoyment and willingness to engage with foods, such as enjoying cooking and did not find food issues a chore. These results support the information gathered by Kilcast et al (1996).

Kilcast et al (1996) as part of their larger studies identified practical measures/behaviours could be utilised to aid in the consumption of fruits and vegetables. Groups of low vegetable consumers were given practical tips and tasks to undertake for two weeks, and then a follow-up interview conducted on attitude change. A short trial of 'tip' brochures to low fruit and vegetable consumers added to the information regarding vegetable consumption practice and behaviour as well as a smaller checklist and brochure. Shopping tips were also given. The measures represent an attempt to equip consumers with greater technical ability and range of behaviours to enact in a range of situations. Post purchase behaviours were also identified such as utilising storage and freezer space as well as increasing consumption. The respondents in the research had in general a diet that centered on the consumption of meat, and quite often a fixation of correctness and appropriateness of certain vegetables to be consumed. The tips brochure advised on breaking these culinary rules with increased creativity, such as including vegetables into dishes, using different vegetable mixes, and cooking suggestions other than boiling. Results indicate that this advice struck a chord with many vegetable consumers who had felt boredom with conventional eating and the associated taste. They reacted positively to suggestions of increasing the enjoyment of consumption.

An informed second intervention was conducted by Kilcast et al (1996), which approached the "use of convenience ingredients, minimum preparation and cooking times, familiar vegetables as a base; recipes that can be adapted for different dishes and the ability to demonstrate a range of cooking styles..." (ibid, 1996 pg50). Advantages became apparent to respondents, who were successful with the family, particularly snack food recipes, both physiological and practical, such as monetary savings. Meal-based recipes, rather than snack based recipes as a point of the vegetable intervention's consumption were more successful, because snack food was deemed instant and something that respondents were unwilling to spend time on. To overcome issues of taste, the

disguising of a vegetable's taste was also important. Popular recipes such as vegetable curry 'hide' the taste of vegetables, but they also incorporate convenience of cooking and low post-meal tidying are part of these recipes. Less popular were those meals where there was high carbohydrate without an increase in the amount of meat seen in the meal. Sensitivity to particular ingredients was demonstrated and sometimes off-putting to consumption of certain recipes, such as lentils within hotpot. Likewise social sensitivity with certain recipes considered as having class connections; stuffed tomatoes/peppers. Motivation to cook was aided by the demonstration element and an encouragement to trying particularly those recipes they had been privy to. A follow-up at five months demonstrated a clear change in average portions consumed daily by the respondents.

Cox & Anderson (2000) investigate further the issues of shopping and support. Practical issues emerged as important to participants, as an increase led to both size and volume becoming issues, linked with transportation. More fruit and vegetables around the home lead to an increase in its consumption, but there was a need to either increase the frequency of purchase or to increase storage. The quality of the fruit and vegetables became an issue; Cox & Anderson (2000) relate this to cost and value for money, where participants expressed a need to find good fruit and vegetables, with some having to abandon their search with a resulting barrier. This is linked to the management of the day and the availability of good fruit and vegetables being in the shops when they could shop. Important notions reflected in the Cox & Anderson (2000) and Kilcast et al (1996) research, suggest strategies developed for the consumption of fruit and vegetables within the household. Often these strategies were interwoven with the complex social networks and daily activities of people, and this illuminates possible practical solutions in relation to public health.

Devine et al (2006) while conducting interviews with low wage parents experiencing work-family spillover identified coping strategies that were utilised. Table 3.11 displays examples of particular coping strategies by category and strategy type. The interviewees indicated that five types existed, the managing of feelings of stress and fatigue, reducing time and effort for food and meals, reducing expectations, setting priorities/trade-offs, and change work and family conditions. The latter represents a long term adaptive strategy, where the others mainly deal with reduction in the stress as a result of the spillover. The example demonstrates a rather localised and specific nature of overcoming issues that arise from balancing both work and family life. Blake et al (2009) further recognise the gender division in approaches, evaluations and satisfactions of food choice coping strategies.

Table 3.11 Work-Family Spillover Coping Strategies

Category	Examples
<b>1. Manage feelings of stress and fatigue</b>	
Treat oneself or children with food after a "bad" day or week at work	"I feel like I need to be rewarded... I'll think to myself 'well I get to have this' because you know nothing else is going right and I'm tired and I just want something quick and easy" "We'll have our little family night...We'll get a movie and pizza and wings and stuff on a Friday or Saturday night. That's just their treat, you know for mommy being home at night."
Parallel eating: family eats in different places	"Usually we're all in different rooms [eating] in front of different TV programs."
Compensate by eating "better" on days off	"On my days off I usually try to cook something so that I know that they're eating...well as opposed to opening up with ...[canned ravioli]"
<b>2. Reduce time and effort for food</b>	
Skip meals	"On [stressful] days like that I don't eat at all. I just forget about eating." "I'm heading from one work to another work ...maybe I'll have some time before I fall asleep to eat"
Simplify & Speed up: take out, eat out, quick meals, drink instead of eat, rush	"I'm not a fan of fast food restaurants but ...I just gotta get them food and I just try to do the best I can." "TV dinners...an absolute blessing...they're not good for you in the slightest but they're just... when things are stressful" "[I] sip off my [cola] now and then...I just work right through it [lunch]." "Hurry up and eat, we're out the door"
Multi-task: eat while doing something else	"I'm driving and eating the slice of pizza." "Something portable that they [children] can eat in the car on the way"
Plan meals ahead; anticipate busy times	"During the week-end I do a lot of cooking." "I also will buy things...that I can cook on the stove quickly."
Get help with food from partner or child	"My husband and daughter have it [dinner] all done...prepared and ready."
<b>3. Redefine meanings and reduce expectations</b>	
Redefine family eating	"Getting together for the family meal at the pizza place, that's one of our family traditions."
Serial eating: family eating at different times	"She's (wife) already made my dinner. So when I get home (after working the late shift), I just got to throw it in the microwave."
<b>4. Set priorities and make tradeoffs</b>	
Prioritize food and eating	"I always find time to cook and give them something healthy...I like cooking for my kids."
Tradeoff nutrition vs. other demands:	
Nutrition vs. family activities	"We'll come home and eat dinner first. It'll be very rushed, very late. I may just give her a (snack) and get myself a little sandwich or something just to get food in our stomachs. Um, and then take her to the activity and all the while it's 'Come on come on come on, come on'...And we'll come home and there'll be this homework that has to be done."
Nutrition & family meals vs. quick meals	"One of the biggest compromises is nutrition definitely. It's um it's always the quick easy things that are the worst for you and high in fat and high in salt or sugar" "The tradeoff I think is definitely not having a very nutritious meal and just grabbing something."
Family meals vs. income	"Cause I'm forced to work 2 jobs with my wife being out of work. So I wish I could have more time off, more time with the family, more time to cook."
Knowing what son eats vs. income	"Ship him [son] off on the bus. He'll eat breakfast at school; he'll eat lunch at school. Then I'm at work. He gets home and 'OK what did you eat yesterday honey?'"
<b>5. Change work and family conditions – adaptive strategies</b>	
Change job or hours	"I actually switched jobs two years ago because ... I couldn't think anymore by the time I got home... I needed a little more flexibility in my schedule."
Limit outside activities	"We don't do half the activities that other people do. I don't know how other people do it."
New partner helps out	"My boyfriend just make the lasagna so I'll leave him to do all of that cause I be tired."

(Source: Devine et al, 2006)

Devine et al (2009) carried out further research with employed parents, highlighting food choice coping strategies a number of strategies (12/25) were commonly carried out by over half of the respondents, eating outside of the household, missing breakfast as well as cooking longer for on days off work. For female more than men, behaviours such as eating food in the car when rushed and keeping food on hand to eat at work. Structure and schedule of work impacted upon the necessary food coping strategies enacted.

Blake et al (2011) evaluate the behavioural contexts, dietary quality and food choice coping strategies employed by clustering employed parents into three groups, 'individualized eating', 'missing meals' and 'home cooking'. The groups displayed different food behaviour patterns and strategies. Individualized eating cluster reported different meals being made for different people as a main meal on work days. Children were more likely to be fed separately from parents (as well as the missing meal cluster), main meals were more often at fast food restaurants, packed lunches were prominent at work, food was taken to work for snacks, and something quick was often grabbed at convenient stores/ fast food outlet. The missing meal cluster were characterised by missing meals during the day, lunch, breakfast, while at work, but ate too much after missing meals. Fast food restaurant featured as a place of regular consumption. Members of the cluster worked non-standard hours, worked overtime and had employed partners (compared to the individualised eating cluster that were made up from standard day-time workers and single parents). The home cooking cluster reported the highest frequency of home cooked foods and family meals. Parents from this cluster had the highest Healthy Eating Index scores, and higher scores for dark green and orange vegetables. The study highlights the link between working conditions and home life strategies.

While investigating food vulnerable neighbourhoods Whelan et al (2002) cite a number of management issues concerning the enactment of fruit and vegetable consumption, often in relation to participant specific experiences and conditions. This also reflects the values that are prominent in a particular situation but are general in referring to overall shopping behaviour. The authors divided their participants into women with younger children, women with older school aged children and elderly participants in a comparison of how barriers manifested and how they were tackled. For women with younger children, the effect of economic access led to a preference for particular shops over others (especially when some participants required more careful budgeting than others). It was believed that some shops offered a greater range of items, but that others would have special offers on particular days, and this had an impact on the shopping pattern that was utilised. At the same time convenience would be balanced against cost and family food acceptance. Local freezer stores were visited more regularly as seen as cheaper and nearby.

For women with older children, the authors (ibid, 2002), believed a transition was occurring where more mainstream shops were more regularly frequented, having more choice under one roof; choice representing an important value for the group. They generally saw the economy stores as a false economy, buying tins not eaten or having to double up on food items. Economising was evident and many took advantage of own brand food, it was also identified as a useful budgeting aid. Quality as a value was also in evidence, with the more budget store not able to offer the same level as mainstream superstores. Convenience was also a consideration, and for some health also featured. For the elderly participant group financial constraints seemed less important, most used larger supermarkets and very rarely ate anything from local freezer stores. For this group it was more important how they got to and from the store, displaying issues of convenience and health. Access for the group often focused on personal mobility, and shopping trips utilised convenient local or supermarket free-bus services. Very few did shopping alone and would often go with others, such as relatives, with access to a car. But physical access represented a major concern and consideration of their ability. For women with children physical access was less of a consideration as travel was routine, divided into those who had unlimited access to a car, some access to a car, or no access to a car. Strategies had developed accordingly. For example those who had access to a car in the evening would choose to shop in the evening or weekend.

### *3.8 Chapter Summary*

The chapter has focused on a presentation of the determinants of fruit and vegetable consumption, and where appropriate associated diet and health behaviours. The determinants have been collated utilising the results from empirical investigations featured in literature and in some instances food choice models. The framework used within the chapter has divided the determinants of consumption and food choice into issues that relate to demographic profile, those that relate to internal factors (i.e. within the individual, though sometimes reflecting external influences), and environmental influences (including important people and places). In addition the chapter explores a temporal dimension to food choice and fruit and vegetable consumption, as well as the practical management of fruit and vegetables within the diet.

The section that dealt with demographic and socioeconomic association with fruit and vegetable consumption demonstrated the importance of categorising consumption trends by age, gender, SES, education, ethnicity for example. Indeed the geographical disparities, while intersecting with other characteristics, are utilised in the highlighting of vulnerable areas such as IMD (and Super Output



areas) as well as Spearhead areas (of which low incidences of fruit and vegetable consumption can be used as an indicator). Demographically specific and defined areas such as low income communities, associated with health research, are important for the thesis design.

Those influences of fruit and vegetable consumption described as internal to the consumer include attitudes, values and associated behaviours. In particular the way in which multiple values are apparent, relating to, for example health beliefs, taste, convenience. Prominent also is the role of personal confidence the ability to consume fruit and vegetables. This is detailed in relation to specific food choice models as well as in a more general sense, thus self- efficacy as a concept.

Environmental issues on consumption are identified in relation to the geography of the family home and neighbourhood, in particular the relationship with food shopping and bringing food into the home. The environments are also looked at in terms of determinants within particular spaces. Within the home this strongly relates to the importance of social others, such as husbands, wives, parents and children and the development of diverse family consumption patterns. The section also highlights the relationship between work life and home life and how they are affected by each other and impact food decisions. Work itself is a further consideration to fruit and vegetable consumption, for example the conduciveness of the environment for food consumption, such as the canteen can be influential. The nature of the work itself can have a bearing on consumption, work schedule for nurses, those on night shift duties, drivers' experiences of incorporating consumption around or into their role have been identified.

The chapter illustrates the variety of determinants that impact the individual in regard to their decision or ability to consume fruits and vegetable. This is supportive of the frameworks offered by the reviews mentioned earlier in the chapter, and is important to the thesis. It also highlights that the multi-faceted nature can affect groups and individuals in different ways, often context dependant. Issues such as access and availability are commonly described throughout the environments mentioned, but there are a number of complexities an individual engages with which access and availability alone do not address.

The two further sections that are identified within the review, those relating 'time' and 'management' are also important in conceptualising the approach taken within this thesis. The food choice process model has been indicated as a useful framework for addressing, not only the multiplicities of competing values and influences, but also a temporal dimension to the investigation of fruit and vegetable consumption. That is the importance of the position an individual occupies in relation to their food trajectory, being influenced by past events and experiences (internal and external). Therefore triggers, trends and longitudinal patterns become an important component in the investigation of fruit and vegetable consumption determinants, both in themselves but also in

relation to interplay with contemporary influences. The management and strategies utilised in the achievement of fruit and vegetable consumption, and therein the overcoming of barriers to consumption, has been generally implied within the literature, yet has potentially a prominent position within the literature in describing 'how' fruit and vegetable consumption can be achieved. It would be of interest for future research to develop a more thorough review on this aspect (in line with those mentioned in the opening section), and is useful in partially guiding the qualitative aspect of this thesis.

A further useful indication of the review is the range of methods utilised for the purpose of the investigating fruit and vegetable consumption. Some of which approach general associations of consumption in large scale data sets, others look more closely on individual or group experiences. Others have utilised both qualitative and quantitative components within the same study framework (e.g. Lake & Townshend, 2006). This has influenced the research approach as adopted in this thesis. As a result of the importance and widespread interest in the topic a number of approaches have been represented. Intervention studies have also featured prominently across the chapter. These have been carried out in particular locations, such as canteens or community base, and have utilised a range of theoretical positions to enact and review the effectiveness on behaviour change as a result. They highlight the importance of interaction between values, attitudes (such as knowledge and self-efficacy) and behaviour, linking in many cases access, availability and practical solutions to increasing fruit and vegetable consumption. They also indicate, for this research design, fruitfulness in community environments as an investigative setting, supporting the notions expressed in policy and health promotion.

## Chapter Four

### **The Research Design: Methods and Methodological Considerations**

#### *4.1 Introduction*

This chapter introduces the technical aspects of the investigation, outlining the procedures used to achieve the research aim, the identification and exploration of factors associated with consumption in excess of 5 or more portions per day. It presents the methods of data collection and analysis. There are a number of sections within the methodology that are used to show the overarching frame which link it to policy and literature in previous chapters.

Driving the research conceptually, derived from the policy review and empirical literature of fruit and vegetable determinants, the following areas are of particular importance to the approach utilised in the investigation:

##### *4.1.1 Health and Locality*

Health has featured heavily in the framework of the consumption of fruit and vegetables according to policy makers. The intervention point for fruit and vegetable policy has strongly featured the locality with, for example, 5 A Day promotion utilising 'local food project' frameworks. This was further targeted with the development of the 5 A Day funding for local coordinators. The health arena was further highlighted at such as level with the development of local public health observatories and the feature of Indices of Multiple Deprivation (IMD) assessing health in ward localities (and subsequent development of Spearhead areas). Community has featured as a prominent theme also within empirical investigation. From the MAFF sponsored research into health inequalities of fruit and vegetable consumption, a number of studies investigating the experiences of those in a community setting, to interventions/trials utilising a local site of interaction.

#### *4.1.2 Multiple Determinants of Food Choice/Consumption*

The review of empirical literature highlights the many different associations with, and determinants of, fruit and vegetable consumption. These have been seen across particular groups but importantly also in relation to the experience of individuals. Therefore fruit and vegetable consumption has been shown to be affected by access, availability, beliefs, values, attitudes, consequences, intentions, environment, social others, lifestyle, work schedule, for example. The multifaceted nature of the food decisions regarding fruit and vegetable consumption has featured as part of prominent models of behaviour such as HBM, TPB, and Food Choice Process model. The latter indicated as useful in describing the wide and deep interrelated nature of the experience of consumption. Linked to this a range of methods have been employed to investigate the topic, including the successful implementation of programmes incorporating multiple methods. As such it has been appropriate to use and compare both qualitative and quantitative studies, as well as integrate 'mixed methods' (such as Lake & Townshend, 2006).

#### *4.1.3 Time and Experience*

An individual's current experience with fruit and vegetable consumption is part of a developing trajectory (food process) and therefore previous contexts, influences, and values can have significant bearing upon current and future experiences of fruit and vegetable consumption. Hence points of change and triggers, as well as evolution, and non-change become important in relation to studying current attitudes and behaviour.

#### *4.1.4 Strategies and Management*

The way in which consumers achieve consumption becomes important as a determinant of that consumption. Whether this is in relation to overcoming particular perceived barriers or consumption in general the methods employed to consume fruit and vegetables feature as the experiences of 'how' they are managed within diet and lifestyle.

To reiterate the intention of the research, the techniques employed have been utilised in order to investigate and explore the relationships and experiences consumers have with fruit and vegetable consumption. In so doing the main aim of the investigation, to identify (and explore) factors important to the consumption of fruit and vegetables, particularly for those who achieve in excess of 5 portions

per day, can be achieved. In relation to certain conceptual drivers it has been proposed that there will be certain influences and triggers (probably multiple) that will impact upon the achievement of recommended levels of fruit and vegetable consumption. It is also proposed that there will be relationships between the individuals and the influences, as well as between the influences themselves. It is further proposed that the 'hows' of consumption will feature as part of these influences and relationships.

The chapter structure is as follows: the initial sections introduce the structure of the research reported by this thesis in terms of utilising a 'mixed method' theoretical framework, including the development of research models that reflect the integration of qualitative and quantitative methods. The next section presents the geographic area of interest to the study. The following sections present the methods utilised at particular stages within the research in sequential order. First the formative interviews with healthcare professionals, then the consumer interviews, followed by the sections relating to the consumer survey. The chapter then indicates ethical considerations, and is concluded in a summary of the chapter.

## *4.2 The Thesis as a Mixed Method Investigation*

### *4.2.1 Introducing Mixed Method: The Research Model*

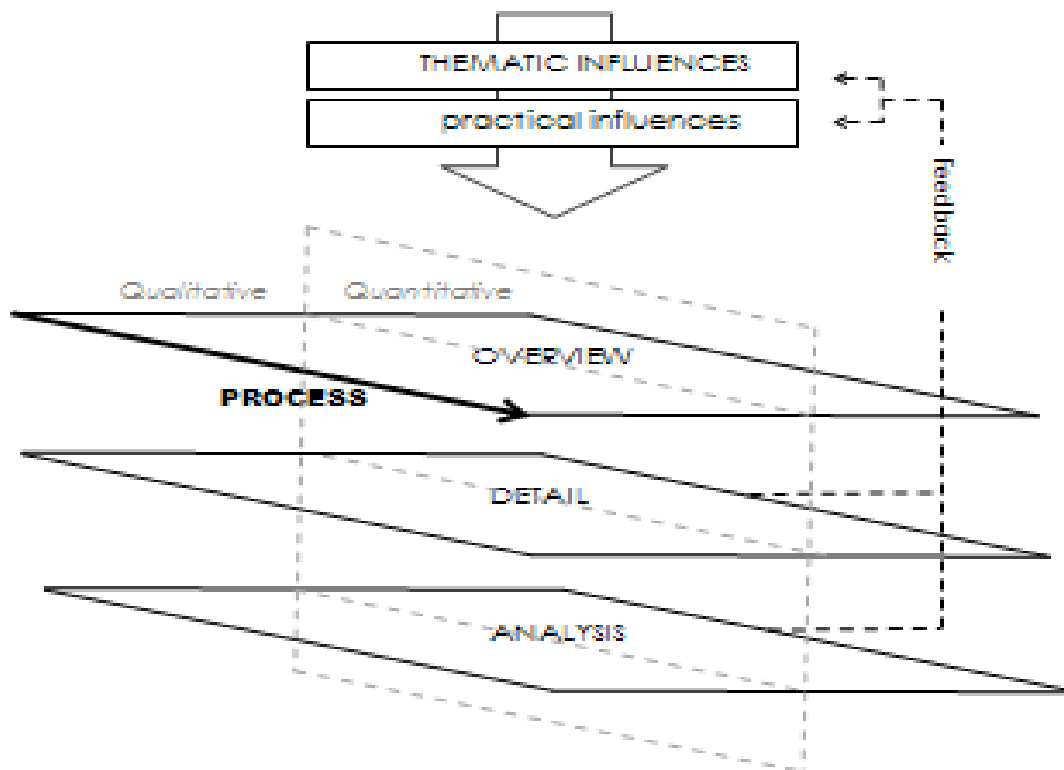
This thesis reports on the employment of a mixed methods design in the fulfillment of the research objective. As such it is important to describe the grounding it has in this approach. A useful common tool incorporated into the approach is the utilisation of a visual framework, i.e. the research model. It has become important in the description of research undertaken to attempt to illustrate the complexity associated with mixed methods (Ivonikova et al, 2006). The use of diagrammatic representation of the research has therefore become common place within the 'mixed methods' genre and prominently features the role of the quantitative and qualitative components. To show their integration, "graphical modeling of the study design might lead to better understanding of the characteristics of the design, including the sequence of the data collection, priority of the method, and connecting and mixing points of the two forms of data within the study" (Ivankova et al, 2006).

The complexity of the research summaries showing the qualitative and quantitative data and their respective particular roles within a study varies. For example some research diagrams have intricate

feedback networks, such as Johnson’s & Obnwegbuzie’s (2004) ‘Process Model’, other more broad diagrams tend to be less revealing. A need for representation of the time ordering decisions, and paradigm emphasis upon which decisions are based is evident. Concurrent or sequential studies, whether equal or dominant status between the qualitative and quantitative elements in the design and undertaking of the study is required (Creswell & Plano Clark, 2007). Ivankova et al (2006) present a useful example of a visual model for mixed methods that includes ‘phase of research’ as the vertical dimension (including the collection and analysis of data), then suitably aligned, the corresponding ‘procedure’ that is utilized and corresponding ‘product’ of that phase.

For clarification of the research undertaken as part of this thesis, and in bringing together the elements of the research data collection and analysis, the model(s) reflecting the nature of the research methodology are summarised in diagrammatical form below (Figures 4.1 and 4.2).

Figure 4.1 Holistic Representation of the Research Model



(Source: Author Construction)

Themed Structural Influences: *e.g.* Health, Health Policy, Community 'Organisations',

Practical Influences: Flexibility, usability *for example*

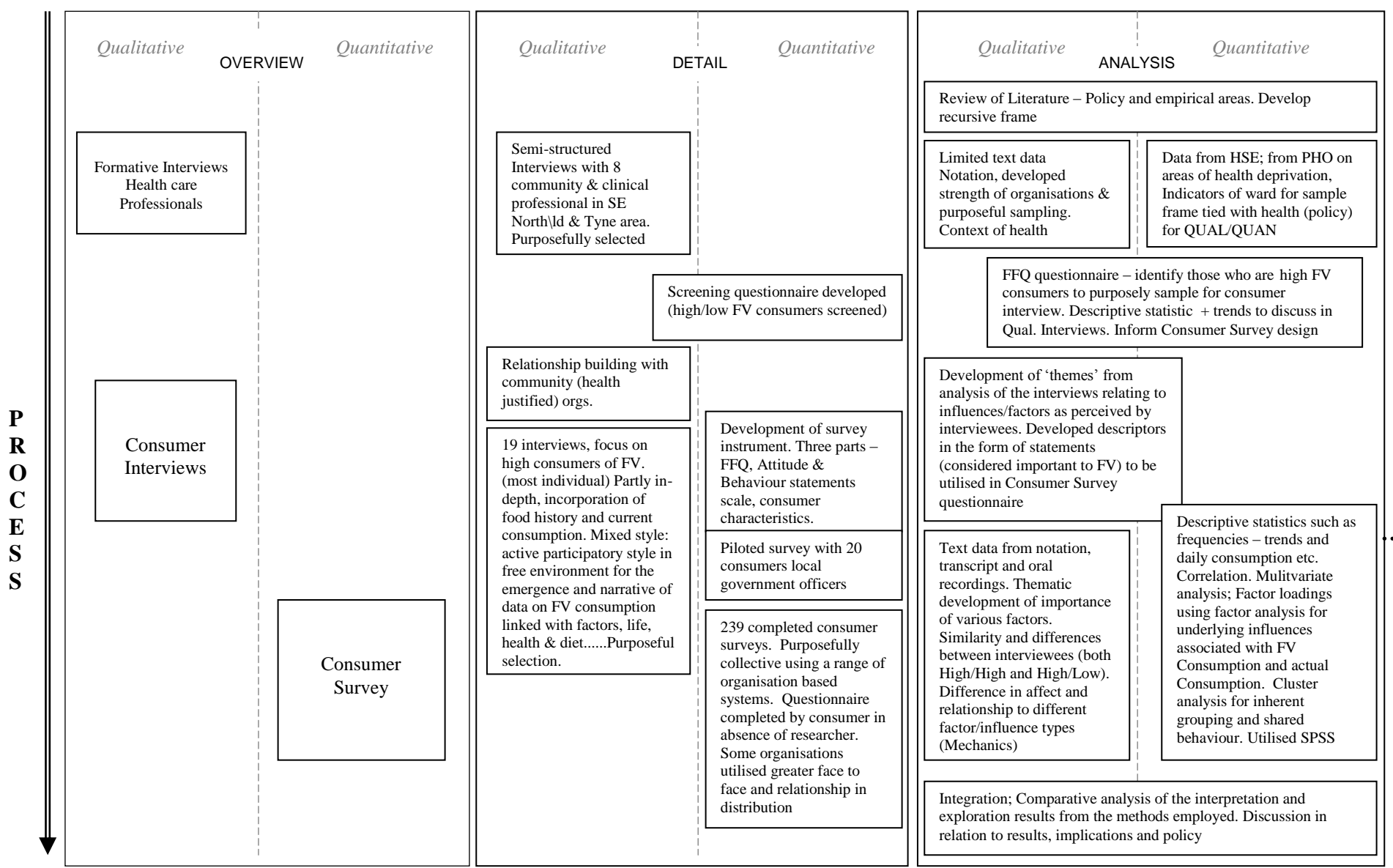
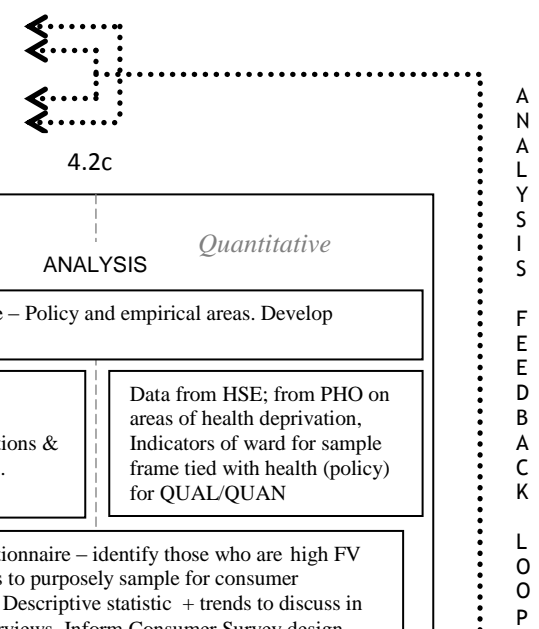


Figure 4.2 The Research Model by Layer: Featuring part a) b) and c) (On following page, Author Construction).

The diagrammatic representations in Figure 4.1 and Figure 4.2 are used within this chapter as a guide. The various aspects of the diagram are explained both holistically and in respect to its constituent parts. Briefly, the diagram is a representation of the research process, including some of the thematic influences upon decisions made within the research. Hence the diagram illustrates the purpose, position, progression and classification of the research. Although it is used to cover much of the conducted research, it is illustrative in places, and detail is elaborated upon in the appropriate sections below.

The diagram in Figure 4.2 summarises the 'overview' (4.2a), 'detail' (4.2b) and 'analysis' (4.2c) elements of the model of research. Figure 4.2 is an attempt to develop the ideas presented by other theorists within the genre and of visualizing the complex research process(es) inherent in formalized integration of different methods. It is interesting to note that often such diagrams serve the purpose of highlighting the importance of the 'qual/quant' utilization for the purpose of justifying how these were combined. More useful diagrams demonstrate not only this allegiance to mixed methods, but something of how the research was conducted. Diagram Figure 4.2 provides the greater detail, but 4.1 represents how the research was conducted and the way in which the author viewed the research as it was developing, with both concurrent and sequential aspects. It is important, as will be emphasized, to demonstrate the way in which researchers approach the process of mixed method research. It is also utilized within this chapter to aid in the telling of the story and description of the research.

The research process diagrams (Figures 4.1 and 4.2) represent three layers of concurrent process. The top layer of Figure 4.2 (4.2a) identifies the data collection method adopted at each given point and reflects the utilisation of the qualitative and quantitative designs, describing the 'overview' level design. The second layer (4.2b) illustrates the qualitative and quantitative method and integration between them at a more procedural level of implementation, and thus greater detail on the procedures, as well as practical considerations. The third layer (4.2c) illustrates the 'analysis' of the mixed method research process incorporated into the investigation, including where appropriate phases of literature collection, the stage of exploration type, and the formalisation of results as informing or strengthening the structure of the research frame. Thus the analysis feeds into and develops the themes prominent in the first and second layers, while at the same time being intrinsically linked to layers above where analysis is the product of one or more of the featured data collection methods. The diagram therefore represents a way to illustrate the exploratory approach taken within the research, while incorporating the complexities often associated with mixed method design.



#### 4.2.2 *Utilising Variety, Multiplicity, and Pluralistic Design*

This thesis incorporates a 'mixed method' framework in the research design. That is, qualitative and quantitative methods are utilised with a notion of 'integration' between the two. Mixed method research studies have a tendency to 'describe', i.e. they can often focus on the 'how' rather than the 'why'. They sometimes justify why they are mixed methods, rather than justifying why the integration of methods has been selected for the research. This section is important for the thesis in providing theoretical and methodological underpinning, while reflecting the importance and usefulness of mixed methods and associated other forms of multi methods (where either qualitative or quantitative methods are employed more than once but not from both paradigms, or where there is no integration between the two). Creswell & Plano-Clarke (2007) offer a useful history of 'mixed methods' by emphasising key historical development periods to the genre, and the contributions exemplified in each. This is summarised as far as 2004, shown in their table (Table 4.1).

Erzberger & Prein (1997) suggest that fundamental development points in linking qualitative and quantitative methods occurred somewhat earlier still; Barton & Lazarsfield (in 1950s) "formulated a strategy for defining different phases...qualitative methods should be used ...for the generation of hypotheses, while quantitative methods should be employed to test these hypotheses" (Erzberger & Prein, 1997pg 141).

The use of pluralistic methods, either as part of a programme of research, or within a single piece of research, is not a recent development. Many articles from a variety of disciplines refer to instances when more than one technique has been employed in a pluralistic fashion, whether in the collection, collation or analysis of data. In addition 'triangulation' (Webb et al, 1966), 'multimethod/multitrait and 'multiple operationism' (Campbell and Fiske, 1959), and 'within-method' and 'between- method' triangulation as proposed by Denzin (1978) have been seen as convergent and vehicles for cross-validation purposes (Jick, 1979) At its simplest, Gorard (2002) argues that using different techniques, and recognition of different techniques, can be seen in approaches that do not necessarily themselves follow a pluralistic nature. Many researchers, the author indicates, look at a range of studies prior to their own research, happily accepting the validity of research presented from different paradigmatic stances, or utilising different techniques.

Table 4.1 Historical Development of Mixed Methods

<b>Stage of Development</b>	<b>Authors (year)</b>	<b>Contribution</b>
Formative Period	Campbell & Fiske (1959)	Introduced the use of multiple quantitative methods
	Sieber (1973)	Combined surveys and interviews
	Jick (1979)	Discussed triangulating qualitative and quantitative data
	Cook & Reichardt (1979)	Presented 10 ways to combine quantitative and qualitative data
Paradigm Debate Period	Rossmann & Wilson	Discussed stances towards combining methods-purists, situationalists, pragmatists
	Bryman (1988)	Reviewed the debate and established the connections within the two traditions
	Reichardt and Rallis (1994)	Discussed the paradigm debate and reconciled two traditions
	Greene & Caracelli (1997)	Suggested we move past the paradigm debate
Procedural Development period	Greene et al (1989)	Identified a classification system of types of mixed methods designs
	Brewer & Hunter (1989)	Focused on the multimethod approach as used in the process of research
	Morse (1991)	Developed a notation system
	Creswell (1994)	Identifies three types of mixed method design
	Morgan (1998)	Developed a typology for determining design to use
	Newman and Benz (1998)	Provided an overview of procedures
	Tashakkori & Teddlie (1998)	Presented topical overview of mixed methods research
	Bamberger (2000)	Provided an international policy focus to mixed methods research
Advocacy as Separate Design period	Tashakkori & Teddlie (2003)	Provided a comprehensive treatment of many aspects of mixed methods research
	Creswell (2003)	Compared qualitative, quantitative and mixed methods approaches in the process of research
	Johnson & Onwuegbuzie (2004)	Provided mixed methods research as a natural complement to traditional qualitative and quantitative research

(Source: Creswell & Plano-Clarke, 2007 pg14)

In combining literature for review purposes on a topic, the findings from data generated by focus groups, interviews, cohort studies, surveys, ethnographies may all be used. In not knowing about them and how they are put together, it follows, a researcher cannot effectively cast a critical eye over the research.

In the field, Gorard (2002) indicates that researchers may often take a series of notes about a participant which falls outside of the structured questionnaire or reflects about the environment they are in. They do not ignore the information being presented. Theorists who identify themselves within a single paradigm may nevertheless utilise techniques from another without realising, for example, the use of a representative sampling method in the selection of participants for unstructured interviews, or a formative discussion phase in the building of concepts that define behaviours in a survey. Gorard (2002) even suggests that thought processes themselves may be in alternate qualitative or quantitative fashion to the paradigm that is being expressed in research approaches and tools.

What this represents is a pragmatic, almost natural, researcher position while in the field. It draws attention to the 'ordinary' nature of combining methods to those who believe in the adoption either of qualitative or quantitative design. The basis of this divisiveness is the 'paradigm wars' and resulting 'incompatibility thesis' as identified by Howe (Johnson & Onwuegbuzie 2004, Morgan 2007).

Oakley (1999) states, "There are...strong reasons why social scientists choose the research methods they do...underlying philosophies of social science and long-held and much cherished tenets about epistemology are prime among these" (pg247). Further to this, "because the metaphysical paradigm took a strong stance with regard to incommensurability, this meant accepting any one paradigm required rejecting all the others, while also creating major communication barriers between knowledge that was produced through each of these paradigms" (Morgan, 2007 pg62). Such themes were prominent particularly in the 1970s and 1980s and led to the development of integrating methods from different paradigms, whether 'mixed methods' represent an emerging or separate paradigm, methodology, or a provision of new tools and techniques. Some researchers in the area advocate the development of a new methodology, that is "clearly distinct from the quantitative and qualitative approaches...[and] to be accorded the separate status that it deserves as a third methodological movement" (Tashakkori & Teddlie, 2003).

An alternative approach, though sometimes incorporated into methodology, is the recognition that the research question can frame the approach taken to address the problem. This has emphasised a need for mixed methodology within research. One area addressed is the growth in academic areas with an interest in a 'practical field', often in response to the needs of that field; for example, health,

epidemiology, education, where practical research is needed to address and investigate particular problems. These topics of investigation can occur at different levels, from a classroom to an education system, or from a consulting room to the NHS, and results in a need to interact between levels. Linked with this, is the strong development of 'evaluation' as an academic tool and subject of methodological interest. Some researchers in the field, with the requirement to be more practical in the selection of appropriate techniques have moved beyond the division between paradigms, towards a greater acceptance of utilising 'what works', based upon the need of the research, the specific questions they address and the delivery of information. Brannen (2005) summarises this position; "while research practices diverge, there is considerable pressure for convergence...Externally, there is increased demand for research to inform policy and for practical rather than scientific research...there is a whole industry devoted to evaluation of policy that utilizes qualitative and quantitative techniques" (pg174).

Creswell & Tashakkori (2007) emphasise the different perspectives on such research by suggesting there are those that follow a 'methods' perspective, those that use it as a 'methodological' perspective, those who identify a 'paradigm' perspective, and those that identify a 'practice' perspective. The role of 'technique' versus 'research question' is usefully addressed by Bryman (2007) who identified both a particularistic and universalistic discourse (and some ambivalence and shifting between the two) in mixed method researchers. The former suggests a belief held in the use of mixed methods only in answer to particular research questions, and that mixed methods is appropriate to such questions in the same way as a mono-method approach. The latter suggests that the potential is for mixed methods to produce better research in general, though it often manifests itself as a belief in a non-direct way, such as linking it to ability to publish within certain fields.

Tashakkori & Creswell (2007) call for the discussion regarding mixed methods to remain firmly open; "given that mixed methods research is still evolving, [Tashakkori & Creswell] believe that it is essential to keep the discussions open about the definition of mixed methods...Often writers will say that a mixed methods project is one that includes a qualitative and quantitative sub-study. Inconsistencies and disagreements start when one considers how the two sub-studies (or strands) are related to each other" (pg3).

#### *4.2.3 Conducting Mixed Method Research*

There has been much discussion as to what mixed method research actually is, and to what extent it is distinct from other types of research. One debate is the extent to which it represents a new or

amended methodology, method, or paradigm; however equally relevant, and much more practical for consideration, is how such a strategy is employed, and in doing so what makes it different. Iterating this, Falconer & Mackay (1999) cite Guba & Lincoln stating that paradigm issues are crucial and no research should be conducted without clarity in how paradigms guide their chosen approach. Despite this the authors advocate, when asking when qualitative and quantitative research methods should be combined that “researchers should focus on the nature of the phenomenon to be investigated...and select the method that can illuminate the phenomenon” (pg293). This section will present information regarding what mixed methods investigation incorporates, for the purpose of the study, and how it has been used.

The ‘fundamental principle of mixed research’ as identified by Johnson & Turner (2003) is the “collection of multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination is likely to result in complementary strengths and non-overlapping weaknesses” (Johnson & Onwuegbuzie 2004 pg18). Likewise mixed methods research is described by the authors as a class of research which mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study.

Tashakkori & Creswell (2007) suggest in line with their belief, in a third methodology and paradigm, apply a broad approach with the utilization of;

- Two types of research questions (qual/quant approaches)
- The manner in which the research questions are developed (participatory vs. preplanned)
- Two types of sampling procedure (e.g. purposeful and probability)
- Two types of data collection procedures (e.g. focus groups and surveys)
- Two types of data (e.g. numerical and textual)
- Two types of data analysis (statistical and thematic) and
- Two types of conclusion (emic and etic representations e.g.)

or the incorporation of more than one of these approaches (ibid, 2007 pg4).

Erzberger & Prein (1997) support this position by indicating that recent methodological debate regarding qualitative and quantitative data has seen a shift in its focus to the ‘integration’ of method. Consistent themes within such debate look at using the strengths of the methods, or minimising the weaknesses of another. Although there are a number of approaches that use more than one method (defined as ‘multi-method’, Morse, 2002) it is the mixing of qualitative and quantitative that classifies

this mixed method as an approach. Thus, as Morse (2002) indicates, it is possible to triangulate data with one than one technique; it is only when these techniques are drawn from qualitative and quantitative areas respectively that mixing has occurred.

Authors suggest that mixed methods can be applied at a number of levels within a study: “by definition, ‘mixed methods’ is a procedure for collecting analyzing and ‘mixing’ or integrating both qualitative and quantitative data at some stage of the research process within a single study for the purpose of gaining a better understanding of the research problem” (Ivankova et al, 2006 pg3). The importance of ‘stages’ and ‘phases’ has been indicated; Johnson & Onwuegbuzie (2004) classify two approaches, those that show a mixed-model (within or across stages), and mixed-method (across or within phases of the overall project).

Creswell & Plano Clarke (2007) present a summarized tabular version of major design classifications throughout literature and research conducted in the mixed method approach, and highlight common themes in the classifications. They indicate ‘Triangulation’, ‘Embedded Design’, ‘Explanatory Design’, and ‘Exploratory Design’ as well as models of sub groups to each category based on the purpose, integration points and levels of data.

To outline briefly, the aim of triangulating design is to utilise complementary separate components, integrating the similarity and dissimilarity of the findings. Embedded design focuses on the utilisation of a secondary or supportive method to the primary data type where a single data set is insufficient such as examining the process of an intervention study. Explanatory approaches utilise phases, but importantly in specific order, where quantitative results are built upon or explained by qualitative means though the emphasis of each may vary. Such methods incorporate a range of possible uses including more sophisticated design; one sub group for example is ‘participant selection model’. Exploratory design utilizes the results of qualitative data/methods which are fundamental in the informing of the quantitative aspect.

Though the authors highlight common designs, they also indicate, like the model in this research, that there is the utilisation of mixed methods at different levels, from grand design to micro-analysis and opportunities to incorporate a mixing of methods can both be recognised and offer the potential of a myriad of design possibilities in meeting the research question(s). Johnson & Onwuegbuzie (2004) advocate;

“The point is for the researcher to be more creative and not limited by the designs...sometimes a design may emerge during a study in new ways. A tenet of mixed methods research is that researchers should mindfully create designs that effectively answer their research questions; ...[It] stands in stark contrast to the approach where one completely follows either the qualitative or quantitative paradigm”.

The model identified for usage the research for this thesis, a multi-layered example, offers a number of points characterised as mixing methods. The overview mixes the exploration of the sequential qualitative interviews with professionals and of consumers to inform the consumer survey stage in the design of an instrument and informing sample selection process (Figure 4.2a and 4.2c). Integration is also incorporated, with elements of triangulation, i.e. the results of both the qualitative and quantitative phases are discussed in relation to the research questions (Figure 4.2c). Another point of mixing occurs with the use of fruit and vegetable screening questionnaires in the sampling frame for the purposes of numerically identifying consumers who consume 5 or more portions of fruit and vegetables, as well as provision of points of interest to seek explanation from consumers within the interview (Figure 4.2b).

Miller & Gatta (2006) propose that the use of the mixed method is to place it superior to mono-method usage in its justification or ‘add on’. To neatly summarise, “the rationale for the mixing both kinds of data... is grounded in the fact that neither quantitative nor qualitative methods are sufficient...to capture the trends and details of a situation. When used in combination...[the] methods complement each other and allow for more robust analysis, taking advantage of the strengths of each” Ivankova et al (2006 pg3). Justification from both practitioners and theorists regarding the use of mixed methods ranges in relation to the type of perceived benefits and the strength of superiority in usage, from seeing it as the only methodology to employ, to offering advantage in relation to type of research question and opportunities that utilisation may allow.

The frame developed for the purpose of exploring fruit and vegetable consumers’ relationship with their food intake; towards identifying important factors of high consumption, has been developed and adopted to provide guiding structure while incorporating flexibility in the field (practicality), as part of an overall iterative process with a number of emergent themes. A number of themes developed, such as ‘health’, ‘5 A Day’, ‘organisations / institutions’, ‘community’ via literature and initial stages (health professional interviews) that were bound into the research. It was identified that, in line with literature, both qualitative and quantitative aspects would be useful in engaging with the main aim of the research with one stage sequentially influential upon the next. For example, such a mixed method

approach has been shown successful with studies like Lake & Townshend (2006), Brug et al (1997), as well as the MAFF programme of food choice and barriers to fruit and vegetable consumption. A need was met also by the screening questionnaire as part of the consumer interview stage, which was designed to identify high fruit and vegetable consumers in addition to inform discussion therein with participants. The framework also provided the opportunity to compare the results of methods from stages.

#### 4.3 The Geographical Research Area

The primary data collection was conducted in the North East of England. This section justifies this choice of location. It demonstrates the integration of geography with themes that emerged and were utilised in the construction of the research frame and the practical benefits and opportunities offered to the research by focusing on particular areas. For practical reasons it was decided that the research would be conducted within the North East of England.

Figure 4.3 Map of the North East with boundaries of County and Local Authority Areas



(Source: [onenortheast.co.uk/page/map\\_of\\_region.cfm](http://onenortheast.co.uk/page/map_of_region.cfm), Accessed 2008)



As reflected in literature and policy, fruit and vegetables consumption represented a political notion of health and health inequality, such as the 5 A Day concept. Areas of high health inequality were supported by significant level of funding for community based programmes, as outlined by 'local food projects' and 5 A Day coordinators. This provided a practical point for investigating fruit and vegetable consumption via a concentration of potentially useful sources in South East Northumberland, North Tyneside, and the west of Newcastle. Figure 4.3 presents a map of the north east region. For the formative interviews with health care professionals this proved useful, on a practical basis as well as integrating a health organisation theme. It also highlighted the effectiveness of 'community' and 'organisation' based settings for further stages of research.

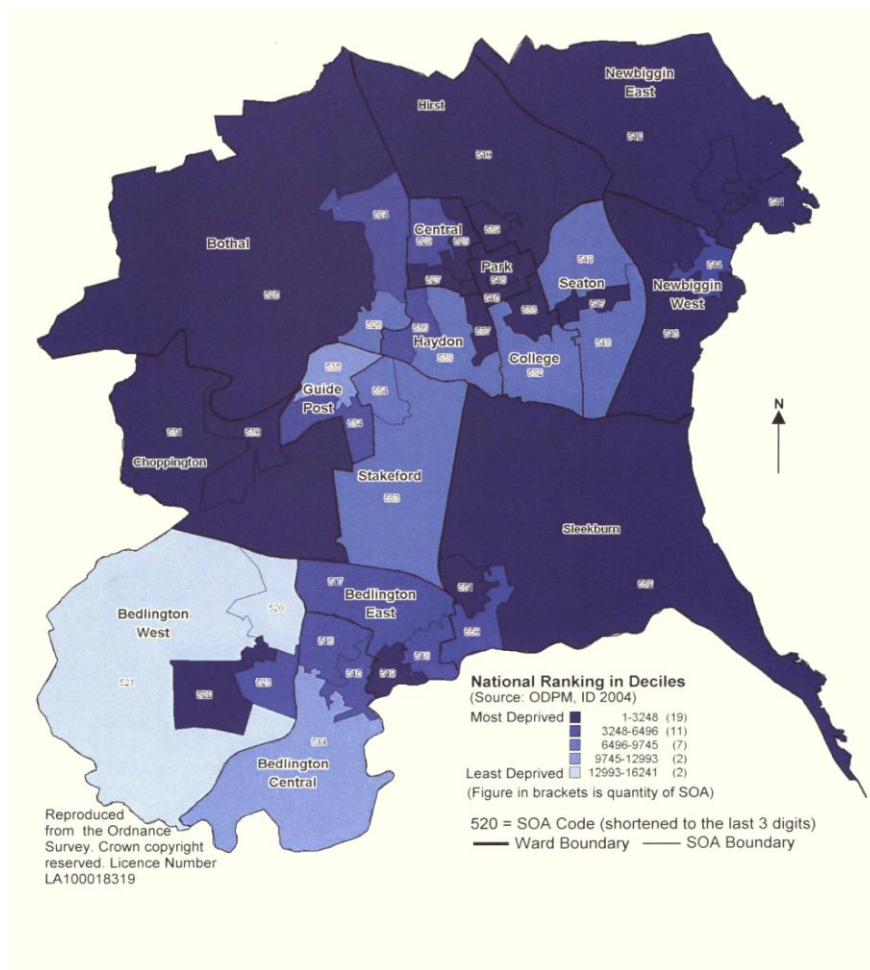
For the later stages of research, consumer interviews and consumer surveys, the geographic area was focused further; in part this reflects the political notion related to the association of fruit and vegetables to health inequality, as outlined in previous chapters, as well as practical considerations. In 2004 an updating of the 2000 Indices of deprivation led to the ID2004; "the most comprehensive mapping of deprivation across England" (ODPM, 2004). What this presented was a local-level seven-domain indices of social deprivation, totaling 37 specific indicators figured separately but also as an Index of Multiple Deprivation (IMD). This was very much in the vein of social inequality and a mapping of that inequality (including health) by ward and more specifically by Super Output Areas (areas geographically close to one another within wards representing significant similarities in deprivation). Within South East Northumberland, Wansbeck District Council (WDC) represented a local authority area that featured a number of deprived areas in this respect.

Figure 4.4 presents a section from the geographical analysis based on Health and Disability deprivation scores for Wansbeck District (and SOAs therein) (WDC, 2004 pg 15). Wansbeck's relative geographical position is shown on the map above (Figure 4.3). As noted, deprivation based on health was 'overwhelming evident' within this area. In line with the research context, the theme of health is very prominent within the geography of the area. Following this line combined with the practical considerations of the accessibility of organisations and institutions linked with health and diet within the area directed the research focus to this Wansbeck. It is not the first time dietary research has focused on parts of Wansbeck, indeed the ASH50 and ASH30 (Lake, et al 2006) study took place within Ashington, a former mining town within Wansbeck.

Health based organisations and institutions from around Wansbeck and particularly those near or within a ward considered of high level of social deprivation were utilised for the purpose of data gathering in the main qualitative phase of the research. This was made particularly viable as a result of

the connection of community regeneration and health, and thus a variety of potential participants. The literature review also highlights the importance of deprived and generally low health areas providing interesting results for researchers. For the purpose of this research, a focus on the determinants of fruit and vegetable consumption despite the participants residing or engaging within the described high IMD area.

Figure 4.4 Wansbeck; Ranked Health & Disability by SOA (ID 2004) featured in WDC (2004)



Source: WDC (2004) The English Indices of Deprivation 2004: A Wansbeck Analysis.

This approach to locality selection was reaffirmed during the study period with the publication of 'Health Profiles' as part of 'Choosing Health' (DH, 2004) in 2006, then again in 2007. The publication of the data illustrated a persistence within Wansbeck of low numbers of those achieving the recommended consumption, where a specific indicator of dietary health related to fruit and vegetables;

“About 13% of adults eat five portions of fruit and vegetables each day” (2006 & 2007). This figure compares to the national average of approximately 24 per cent, and a lowest average figure for an area being less than 12 percent achievement; Northumberland as a whole has a average consumption just below the national average at 23.3 percent. Indeed Wansbeck was regarded as a Spearhead Area as a result of the poor health status and level of health inequality as measured.

The geographical area of Wansbeck was maintained for the survey stage of the research, and the distribution to individuals as part of institutions and organisations that had a base within Wansbeck. Although the organisations themselves did not necessarily have to belong to a health related project or with health aims, it was with the health theme in mind, and to maintain consistency from the consumer interview stage that Wansbeck remained the geographical focus.

#### *4.4 Interviews with Health Care Professionals*

The primary research began with an investigative period which was designed to gather information to strengthen the development of the subsequent research phase and involved ‘Formative Interviews Health Care Professionals’ (it is referred to in Figure 4.2: 4.2.2a). The stage, in line with the overall aim of the research had three distinct objectives;

1. To understand the policy context on the provision of health, fruit and vegetable consumption, and 5 A Day; from promotion of fruit and vegetable consumption related to disease, to active preventative intervention to increase intake of fruit and vegetables. This facilitated increased awareness of organisational practice in line with high consumption of fruit and vegetables.

This relates strongly to the exploration of organisational culture in the working environment, as identified by Craigie et al (2004) within Management, and notions of awareness to the context in which the research is taking place. Although not the whole organisation and its procedures/processes were the focus of the information gathering, it was important towards the research aim to gain greater understanding of how the 5 A Day theme was utilised by each of the participants in their working experience and why this was important to developing direction for further research.

2. to understand of professionals' perceptions of how 5 A Day policy and practice related to the consumers they had come into contact with as part of their role. Likewise to identify where possible useful groups, or types of people where there may be a prevalence of high fruit and vegetable consumption.
3. to identify health professional perceptions of the main influences on the consumption of fruit and vegetables.

#### *4.4.1 The Interview Participants*

The position held by the interview participants' was deemed be crucial in the identification of those useful to the investigation. This implied a strong relationship with fruit and vegetable consumption from either i) a formal link to fruit and vegetable policy, or ii) the strong link with the 'health' theme incorporated within 5 A Day. It was important that the participants should be accessible; both geographically and in terms of availability. As a result of the coordinated nature of the professional environment concerning health and fruit and vegetable consumption, and of community based interventions, networks (such as those in similar positions elsewhere or attendees of similar meetings) were able to be utilised. Snowball sampling (where the conditions of the criteria were met) was used once individuals were purposively selected. Table 4.2 presents the roles of those who expressed their professional views upon fruit and vegetable consumers and as part of 5 A Day policy, 8 interviews were conducted.

Table 4.2 Interview Profiles for the Health Professional Phase

<b>Role/Position of Interviewee</b>	<b>Clinical/Community based position</b>	<b>Post Information</b>	<b>Relationship to fruit and vegetables</b>	<b>Geographical Area of Concern</b>
<i>SureStart &amp; 5 A Day Dietetics Worker (LH)</i>	Both	Work directly with consumer and professionals	Proactive promotion 5 A Day and public health	N. Tyneside & SE Northumberland (specific wards)
<i>5 A Day Coordinator (FR)</i>	Community	Consumers and professionals and health trusts. Training and collecting evidences	5 A Day promotion and evaluation, awareness raising, coordinate efforts.	Northumberland
<i>Community Food Worker (DM)</i>	Community	Develop food coops, develop a strong culture of healthy food including fruit and vegetables	Deals with the message and access of fruit and vegetables (5 A Day)	SE Northumberland
<i>Food Futures Officer (GL)</i>	Community	Community food development, coordinate food coops (community led). Work with consumer	5 A Day focused, local accessibility and awareness	Blyth Valley (SE North/Ld)
<i>Diabetes Community Support, for Diabetes Service (AP)</i>	Both	Community Development to promote dietary change. Informal support networks. Community led.	Fruit and vegetables as part of the diet, specialized to Diabetic needs. Awareness, such as open days	SE Northumberland
<i>Manage Health Visitors</i>	Clinical	Coordinate and manage health visitors	Health promotion	SE Northumberland
<i>5 A Day Coordinator (DS)</i>	Community	Consumers and professionals and health trusts. Training and collecting evidences	5 A Day promotion and evaluation, awareness raising, coordinate efforts. Food coops, allotments	Newcastle East
<i>General Practitioner</i>	Clinical	Consumers (Patients), general well-being and clinical ailments	Minor, where applicable to needs of the patient. More change to diet than prevention.	Ashington (SE North/Ld)

(Source: Author Construction)

#### 4.4.2 Schedule, Conduct and Process

In line with the aims of this phase of research the schedule adopted a semi-structured approach, but with an indication to probe beyond the questions and develop respondent responses. Unless answered as part of another question, all questions were asked (amended to suit the position of the interviewee), though the exact order was not fixed. The schedule had three main sections. The first concerned the

role or position of the interviewee in relation to health or fruit and vegetable consumption. The second related to 5 A Day knowledge, including the policy, how it affected the interviewee's professional role, their interpretation of the message, and as part of other health messages. The final section of the schedule focused on the experiences and insights of the interviewees towards the consumption behaviour of those that their role brought them into contact with. The section included questions that asked about 5 A Day achievements, the people that did, the reported numbers and the characteristics and conditions that influenced the amount of fruit and vegetables consumed. It also outlined questions relating to any change in food habits, linking fruit and vegetable consumption into wider diet and over time. A full version of the Interview Schedule can be found in Appendix 1.

The interviews were arranged either by email or telephone, where the purpose of the research was disclosed and the usefulness of the interview established. In most instances the interview was carried out at the place of work of the interviewee. The length of the interview ranged in time, lasting between 30-60 minutes in each case. The interviews were not audio recorded. Detailed notes were taken both during and after the interviews. The data was analysed in line with the interview schedule and in relation to the objectives, comparing similarities and differences in responses, as well as the building of themes (compounding of the usefulness of community groups and 'health' organizations for example).

#### *4.5 Consumer Interviews*

The aim of this phase of research was to explore fruit and vegetable consumption from the perspective of adults (aged over 18) who consumed more than the recommended 5 portions per day. The intention was to attempt to unravel the complexities of the achievement in fruit and vegetable consumption against a background in which the reviewed literature had identified that there were a range of factors influencing intake, and where health care and community specialists had indicated considerable negativity to fruit and vegetable consumption. The method of this phase are represented in Figure 4.2 (4.2.2a) 'Consumer Interviews' and respective layers in 4.2.2b and 4.2.2c.

A range of alternative qualitative data collection methods were considered but practical decisions led to the ultimate decision of conducting interviews with the consumer (and in some cases their partner). In the field it became apparent that, although groups often met within the institution, they met for a purpose and availability to formally establish a scenario conducive to focus groups would prove to be extremely difficult. Participants varied in their available time; to utilise this opportunity fully interviews

on an individual level or low numbered group were sought. It was believed that long periods on an individuals' line of thought, rather than that of a group was more valuable to this research. This is further highlighted in a desire for the research to take account of the role of time, and situational changes, as with a life history method. Thus, a one to one (or one to two) interview situation provided greater depth.

#### *4.5.1 The Consumer Interview Sample*

The sample for this exploratory consumer stage was drawn from organisations; centres for certain activities, where there was a health link (not necessarily a health based activity or purpose) but where participants used, attended, had contact with, or worked for a particular organisation. On fitting the location and health related criteria, the participating centres were chosen based on a snowballing from professional interviews and convenience. The benefits of such an approach are shown in Table 4.3.

Disadvantages of utilising such a sample frame include the potential for over utilising reasons relating only to health themes rather than a multitude on influences as address in literature, though the multifunctional nature of the centres would help moderate this. A further disadvantage is that to use particular centres does not infer residing in particular or neighbouring areas preventing claims of local representativeness.

The use of organisations as points for participant recruitment has been utilised in previous research. Yin (2003) for example conducted case study analysis of the cultural demonstrations within a particular environment. Likewise evaluations (prominent within public health) use organisations and agencies with a focus on evaluating the organisation's impact and the process involved. Similarly organisations are utilised for sampling purposes of people related to the function of that organisation and the research question. For example within health research, research that looks at factors that lead to drop out of a diabetes clinic focus on participants who have withdrawn from that clinic (Sharp et al, 2001). The approach adopted for the purpose of this research utilised the organisations involved on a thematic and convenience level, thereby taking advantage of the practical possibilities that arise in the non-random, purposive and targeted approach. Wilmot (2010) for example indicated that such methods of sampling are particularly appropriate where the number of people are less important than the meeting of criteria, i.e. in this case consumers with disproportionately high fruit and vegetable consumption.

Table 4.3 Evident Advantages of the Sample Frame

<b>Possible Sampling Advantages</b> (variable to structure and type of organisation selected)
There are often a number of local institutions within a given area that can be selected and approached. Particularly with the interaction of health and leisure, and funding of health policy and local agencies.
There are a variety of roles within such organisations:- <ul style="list-style-type: none"> <li>- Employee</li> <li>- Attendee (regular)</li> <li>- Visitor (irregular)</li> <li>- Member</li> </ul> Thus there are a variety of reasons why people may have contact with the centre.
The 'variety' of roles and types within the centre aids in the ability to approach people who:- <ul style="list-style-type: none"> <li>- Have similar purposes for being there</li> <li>- Have different purposes for being there</li> <li>- Likely to have varied socio-demographic backgrounds</li> <li>- A number of people who have similar socio-demographic backgrounds</li> </ul>
Effective and efficient snowballing of sample.
<b>Possible Relationship Advantages</b>
Provides a useful point of contact:- <ul style="list-style-type: none"> <li>- A single point of contact where respondents come to the researcher, single point of distribution for any information or data collection.</li> <li>- May offer suitable accommodation for conducting post research techniques and rooms for the main research.</li> <li>- Organisations with routine activities offer the opportunity for multiple contacts with individuals and groups of individuals often daily, more than once a week, or at least weekly.</li> </ul>
Can develop a relationship over time with the organisation and people who attend/work:- <ul style="list-style-type: none"> <li>- Offers an opportunity to foster relationships so that people become familiar, and you and your work become familiar to them; trustworthiness of data, increase likelihood of developing participants for the research. Less likely to be considered an outsider, but an integrated member of some activities.</li> <li>- Can develop valuable informal conversation and discussion about research topics with members etc.</li> </ul>

(Source: Author Construction)

It also was aligned with an environment type where, proposed by some of the Health Professionals interviewed in the formative stages, high levels of fruit and vegetable consumption might be more common and therefore increasing the convenience of the sampling. Dibdall et al (2002) used housing associations as routes to disseminate questionnaires to those on low incomes and in receipt of social security so as to investigate the attitudes and behaviour of low income fruit and vegetable consumers.

A number of suitable organisations within the district of Wansbeck were identified, in terms of location and people who interacted with them. One emerged particularly favourable, a local events centre which had received funding to establish it for the promotion of 'Health Living'. It therefore had administrative staff, clients of health rehabilitation and associated clinical staff. It was also a centre for exercise events and activities. Prior to this, the centre had the function of providing local activities with



no health connection and this role continued within the institution, including toddler/parent groups and other social activities. It also had the advantage of being open from 8:30am till 8:30pm, which also increased the likelihood of meeting a variety of employment types. This centre was visited regularly across a three month period (Summer 2006), with some regular timetabled activities most often visited. A small number of people were approached, as part of snowballing, who had contact with different institutions that fit the criteria; these include a local leisure centre, and a medical practice.

#### *4.5.2 Estimation of Fruit and Vegetable Consumption to Screen High Consumers as Potential Interview Participants and Develop Personalised Schedules for Interviewing*

A screening questionnaire, based on food frequency (FFQ), was developed for the purpose of identifying high fruit and vegetable consumers amongst potential participants. The position of this is demonstrated in Figure 4.2 (4.2.2b, 'Screening questionnaire'). The choices involved in the development of this estimation tool were intrinsically linked to the needs of the study. Expressed simply, the investigation required as a focal point an estimate of potential participants' daily fruit and vegetable consumption so as to measure between those who ate less than, and those that achieve more than, the public health target of 5 portions per day (considered for the purpose of the study, high levels of consumption). This allowed the selection of participants with knowledge of their fruit and vegetable consumption patterns.

The design and implementation of the screening questionnaire and the integration between it and the interview stage was important in demonstrating a formal method-based 'mixing' within the study, and incorporated for its usefulness in producing data for sampling purposes, but also developing stimulus and content for the interviews. The screening questionnaire's additional role was to coordinate and integrate with the interview stage, rather than being separate entities. In this way, the screening FFQ highlighted a number of illustrations of the participants' diet which were used to provide points to discuss in subsequent interviews. Rather than merely questioning participants at an interview stage to elaborate upon their perceived consumption, there was 'hard' information regarding their diet, and a number of questions that could be derived regarding trends and patterns within that consumption. It thus demonstrates an explanatory type relationship between quantitative and qualitative data production (Cresswell & Plano Clark, 2002).

During the discussion with the individual interviewee the screening FFQ provided a point from which to consider comparative similarities and differences of the data in relation to triggers and influences on fruit and vegetable as the FFQ presented and reflection of the past influences and likely consumption,

for example seasonality (associated interview schedule located below). This integrated well with the nature of the exploratory discussion style of interview. Similarly it allowed the interviews to more easily develop a time-based line of enquiry regarding current (as measured by the screening questionnaire) versus past diet. As well as this, trends in diet and future diet in relation to fruit and vegetables, associated with other foods consumed, and reasons for this at those particular periods could be approached. Food history research indicates that food beliefs and values, manifested behaviours are not static (Bisogni et al 1999 for example). Thus the information from the screening tool aimed to be used reflexively/comparatively of the participant's food history and relatively accuracy (from the perspective of the interviewee) of their current consumption.

The screening questionnaire is presented in Appendix 2; it formed a pre-pilot for the collection method of measuring consumption as incorporated into the larger fruit and vegetable questionnaire. The tool was developed with regular consultation with a number of consumers to assess the ease and speed of completion, as well as descriptive analysis of accuracy of the tool. The respondent details section allowed the practical details of further contact; name, address, telephone number/email; follow-up arrangements (for potential interviewees). Demographic, social, and contextual information was not considered necessary at this stage. Such information was deemed more appropriate in the context of the interview.

Following a brief introduction and interview follow-up information, the screening FFQ was made up of four sections. The first three sections incorporated utilised a series of commonly consumed fruits, vegetables, and then composite meals (containing, in part, fruit and/or vegetables), against which the respondent placed a tick in the box that the frequency of consumption was most accurately described. These range from the descriptions of 'none' consumed, to '6+ per day' via 'per week'. The scale is not continuous and allows for high levels of consumption to be recorded within the width of a single page of A4. The level of continuous measurement was not a priority at this stage, but rather estimation allowing for possible extremes in consumption. At this stage the use of a 'tick' rather than numerical recall was considered more 'user friendly'. The recall period of 7 days was used as a common food cycle, and balanced visually speed/ease of completion/ and accuracy. The total for each section (amended appropriately for composite size) is brought together then divided by the number of days that the FFQ recall took place to give a guiding figure of the participant's daily fruit and vegetable intake.

The final section of the FFQ had three XY axes, with the days of the week labeled on one, and blank on the other. The graphs allowed the respondent to draw (either by line, dot or bar) the relative amounts of consumption of fruit, vegetable, and composite meals over the seven days. This additional

information is used to develop stimulation, and to guide trends that may be established as a weekly cycle, or particular to the week the respondent recalled. In measurement terms this allowed for a summarized representation that could be completed quickly, administered quickly, and assessed quickly so that the questionnaire as a whole could be completed in a short period of time and the participant screened for an interview with little lapse in time, essential for the within field measurement.

#### *4.5.3 Administration of the Screening Food Frequency Questionnaire*

The screening questionnaire was completed by 55 consumers. Five of these were partial completions, as well as two interested consumers who completed alternate means of describing their fruit and vegetable consumption, e.g. written record of daily dietary consumption. The completed screening questionnaires indicated a range of amounts of fruit and vegetables being consumed, with a variety of types, across the recall period. Likewise for those who completed the graphical illustration of consumption within the questionnaire, a range of approximations were present in trends of consumption; from those that showed a consistency in consumption, to those that demonstrated fluctuating amounts by the day; some showed more regular consumption than others. The method had yielded an above average (certainly above the local average) number of 'high' fruit and vegetable consumers within the sample, as well as individual higher average consumption. A small number of screening FFQ's indicating extremely high recorded consumption were also returned.

Though recognising that FFQ tend to overestimate consumption (Erkkola et al, 2001), this was positive feedback for the adopted targeted approach to identifying members of a group with potentially only a small percentage of consumers (as existing in the population as a whole and especially low within the target area). This supported the sampling approach taken for consideration for the following more quantitative stage to increase the representation of high consumers within the sample.

#### *4.5.4 Conducting the Consumer Interviews*

The criterion for suitability in the interview stage was, the consumption pattern of the consumer, with an emphasis of selection of high consumers, and selective sampling aimed at (where possible) a variety displayed in consumption pattern of types and trends of foods eaten. Variety of reason for consumer participation at the organisation was also important. Practical suitability was a deciding basis of inclusion also, including the possible management of interviews, and finally the informed decision to

take part by the participant. The flexibility of management within the research frame meant that opportunities could be maximised regarding the location where the research was conducted, the timing of the interviews to suit participants (often in relation to their involvement in the centre), and the length of the interview.

19 consumer interviews were conducted, two of these were conducted with the primary participant and their spouse, and two of the separate interviews are with related people (by marriage and home sharing). The main reason for this was the participants felt more comfortable discussing diet with their spouse in situ. Two of these interviews were conducted with participants who ate low levels of fruit and vegetables, both of which were utilised as while discussing fruit and vegetable consumption they mentioned interesting standpoints, one a previous high consumer, the other actively against consumption, thereby offering interest comparison and food trajectories. The participant profile is shown in Table 4.4.

Table 4.4 Participant Profile for Consumer Interviews

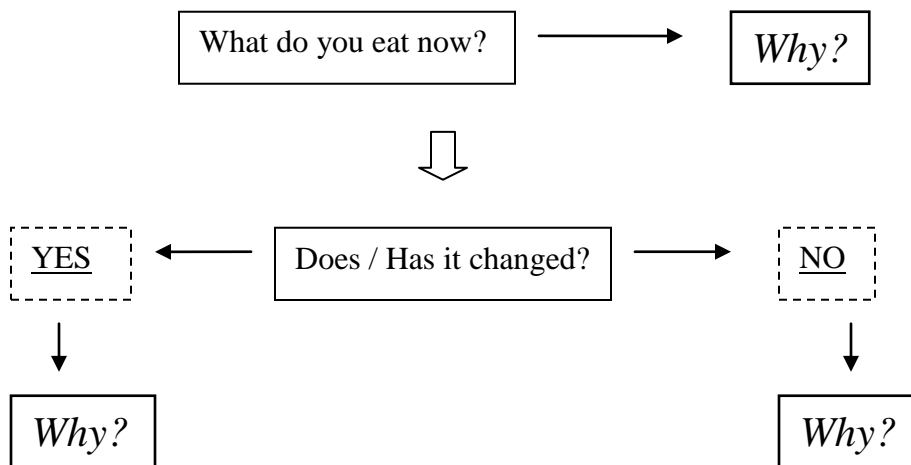
No	Identification(s)	High/Low consumer	Approx. Age	Sex	Participation Event/reason	Interview conducted	Approx. Length
1	<b>FH4</b>	High	Late 20s	F	Toddler group	Home	50 mins
2	<b>FH1 spouse MH3</b>	High	43	F	Employee	Work	40 mins
3	<b>FH2 spouse ML1</b>	High	30s	F	Toddler group	Home	40 mins
4	<b>ML1 spouse FH2</b>	Low	37	M	Toddler group	Home	50 mins
5	<b>ML2</b>	Low	25	M	Toddler group	Centre	35 mins
6	<b>MH3 spouse FH1</b>	High	53	M	Fitness Group	Work	25 mins
7	<b>FH3</b>	High	27	F	Employee	Home	50 mins
8	<b>FH7</b>	High	34	F	Toddler group	Work	35 mins
9	<b>MH4</b>	High	59	M	Fitness Consumer	Centre	50 mins
10	<b>MH1</b>	High	58	M	Employee	Work	50 mins
11	<b>MH2</b>	High	62	M	Health Recovery	Centre	40 mins
12	<b>MH7 &amp; Spouse</b>	High	Both 70s	M&F	Health Recovery	Home	75 mins
13	<b>FH9 &amp; Spouse</b>	High	67 & 65	M&F	Fitness Group	Home	135 mins
14	<b>MH6</b>	High	52	M	Health Recovery	Centre	35 mins
15	<b>FH6</b>	High	70	F	Fitness Group	Centre	30 mins
16	<b>FH5</b>	High	Mid 50s	F	Recovery/Fitness	Centre	55 mins
17	<b>FH8</b>	High	63	F	Fitness Group	Centre	40mins
18	<b>MH5</b>	High	59	M	Health Recovery	Centre	50 mins
19	<b>MH8</b>	High	78	M	Health Recovery	Centre	60 mins

(Source: Author Construction)

Interviews with spouse or partner were accepted for the purpose of the research as it had been identified (in the work of commensality) that there are both shared and individual food consumption patterns, as well as shared and individual reasons for this, and the dynamics therein had the potential to yield interesting results.

The strategy for enquiry within the interview was framed by the aims of the research, but guided and informed by the conceptual issues that emerged in earlier stages, in particular the multiple factors potentially in evidence and the role of time in food consumption, namely triggers and trajectories brought about by questioning ‘has your diet changed?’. As such the current fruit and vegetable determinants could reflect that of previous fruit and vegetable consumption. The steering questions were designed to be minimal to allow fluidity of discussion, yet focus on the main points as expressed by the consumer. Information was sought in relation to fruit and vegetable consumption and influences upon consumption. In addition, in most cases the aim was to explore why the participant a) ate the fruit and vegetables they did b) ate the amount of fruit and vegetables they did c) ‘achieved’ the consumption of the fruit and vegetables they did. The annotated Interview Schedule for this stage is presented in Appendix 3, the diagram below, Figure 4.5 is taken from this. Although the questions relate to fruit and vegetables, it has been referred to as ‘eat’, as an indicator of the link of fruit and vegetables to other foods within the diet.

Figure 4.5 Steering Questions for Consumer Interviews.



(Source: Author Construction)

An accompanying additional interview question sheet was completed with some details including age and home make-up to add further points of discussion within the interview, such as social support (Appendix 4).

Table 4.5 Summarised Key Elements and Guiding Frame for the Consumer Interviews

<p><u>Level of Structure</u> The general level of openness within the interview. The structure of the interview was open-ended, or unstructured in part. There were questions that were used to lead into the interview (regarding the main research aims), highlighting areas of the participant's consumption, and influences upon their consumption.</p>
<p><u>Use of the screening questionnaire</u> Participant's answers to the screening questionnaires were used to highlight familiar trends from which to draw questions regarding their consumption, including types of fruit and or vegetables eaten, trends and patterns, as a way of allowing discussion regarding these areas.</p>
<p><u>Roaming Topics</u> Participants were open, enabled and not discouraged to talk about non-fruit and vegetable topics. This included anything that they 'drifted' on to or deliberately led the conversation – cited examples include expected areas and unexpected areas. For example, other foods and diet, approaches to eating, other behaviours, health, family members, holidays, work (former work), sport and hobbies (details thereof), other people, social contexts amongst others. Participants who demonstrated an indifferent approach to explaining their consumption, could find representation of their reasons while on a different subject.</p>
<p><u>Interactive Discussion</u> The interview could find its own structure regarding interviewer/interviewee relationship concerning, the answering, reflection and discussion of the research topic. Participants were free to ask questions of the interviewer, answer any questions that were used to probe, allow discussion (including interviewer) regarding the topic, and thus could be reactionary and conversational. Demi – interactive, partially 'active interview'. Justifiable inclusion of own experiences. Ethical conversational partnerships. 'mutually acceptable research role' of the interviewer. Building comfortable role. Topic needed a casual approach and creation of interest in conversing about the topic.</p>
<p><u>Discussion of Interview Topics</u> Information illuminated as important to participants from other interviews conducted, as well as informing experiences could be presented to participants both in response to subjects and themes developed within the interview. Caution was taken in the management of information provided so that participants were still encouraged to discuss their own experiences and derive those themes important to themselves, but where suitable, reflected about the data provided by others.</p>
<p><u>Discussing Past Food Patterns</u> Although the screening questionnaire provided information about a single week of consumption, this allowed the discussion concerning fruit and vegetable consumption to develop into issues of trends over time, regularity and established patterns. This also allowed participants to discuss the influence of different periods and/or significant events in their life effecting the trajectory and history of fruit and vegetable consumption.</p>

(Source: Author Construction)

Although generally unstructured and open within the interview it is important to note that there was a structure to administering of the interview as a whole. The methodological considerations guiding the interviews are outlined above (Table 4.5). Comparative and progressive building upon previous interviews (with other consumers) was utilised where possible to explore common or conflicting reports. Another strategy was open exploration, including openness to move and investigate 'off topic' for periods within the research if so directed/guided by the interviewee.

The framing of the interview provided guidelines rather than presented a format for each interview, and like the framing of the research as a whole, the interviewees could develop and reflect on the consumption of fruit and vegetables by creating their own arena and context. In some cases fruit and vegetables did not feature as strongly for participants, or factors relating to the choice and reason for consumption were voiced briefly. The format allowed for participants to examine their experiences and feeling toward consumption. Participants would display a varied level of interest in their relationship with food, diet and fruit and vegetables, and demonstrate different levels of purposefulness in consumption. As a result, whereas some would clearly identify their want, reasons or drive for consumption, others would be less definitive and active involvement on and off topic induced certain reflexivity by participants, or off topic conversation brought about thoughts regarding food in their lives.

#### *4.5.5 Analysing the Consumer Interviews*

The consumer interviews were audio recorded for purposes of later analysis. The audio interview recordings were transcribed for reading/visual purposes, as well as kept in audio form for subsequent analysis. As with the research aims, the objective for the interview stage was to identify why and how high consumption of fruit and vegetables was achieved. The position of the analysis is found in Figure 4.2 (4.2.2c). The analysis of the consumer interviews, although open to the generation of emergent data followed more of a procedural format as simplistically described by Kent (2007). Kent (2007) illustrates a mechanical process which has three applicable fundamental stages, 'describing', 'commenting', 'theorizing'. However as with qualitative analysis the interaction of the theme development meant that the process was not as linear as described.

The more straightforward description relied upon the presentation of fruit and vegetable consumption, specifically focused on the 'why' and 'how'. This was carried out utilising a comparative fashion, with each subsequent interview being compared to those described previously thus building categories of 'items' and 'situations'. This led to the construction of 'themes' as well as amalgamation

of the collective thoughts and experiences, whether contrasting or supporting of earlier description. Thus the process led to labeling important influences on high consumption. This was particularly useful in the development of a list of influences upon consumption that was utilised in the questionnaire attitude and behaviour statement list.

'Commenting' upon the individual case, and in relation to the previous cases, became part of the descriptive elements during the process, rather than a distinct phase. Thus the situations and context, meanings behind the descriptions, significant persons, as well as narratives were commented upon when they emerged from the data. The analysis required a range of techniques. In such instances it would be appropriate to describe the method as 'bricolage'. Narratives for example were particularly important as part of the data sought to explore the issue of changes in the diet which lent themselves to a historical context and personal experience over time, encompassing important events, persons and trajectories. The narratives were also used in collaboration with one another to aid in the development of themes and the identification of themes. Attitudes and behaviours, though recognisable by differences, were linked together by the overarching theme.

As the themes developed, cross referencing took place between interviewees' relationship with those themes and the effects they had upon consumption. The focus upon the 'how' and the 'why' lent itself to an analysis of explicit and implicit notions of the management of consumption as well as the reasons for consumption. The 'theorizing' aspect took the form of two emergent aspects. First the shared similarities and dissimilarities emerged as potential groupings of consumers. The second theoretical position was concerned with looking at the different (and common) characteristics of the influences expressed in relation to high consumption, and the links found between them in form of a model for such behaviour. Thus the analysis uncovered three related elements; narrative commentary illuminating the relationship with identified themes; a typology of consumer; and model of reason contributing to high consumption.

#### *4.6 The Consumer Survey*

This section presents the development of the consumer survey stage in line with the main aim of the thesis. It refers to 'Consumer Survey' in the research model and linked layers (4.2a, b and c). It represents the main quantitative stage; in particular the development and conducting of the survey method as appropriate to this investigation.



The analysis from the preceding qualitative stages, in particular the consumer interviews, derived a large number, and variety, of reasons associated with high levels of fruit and vegetable consumption, these included beliefs, attitudes and behaviours in relation to personal and environmental situations. This supported the literature review which also identified the importance of a number of determinants and associations of high fruit and vegetable consumption. In addition, models and theories, such as the food choice process model, also describe that there are a number of influences and pressures on an individual's food choice. A further feature from both the literature and an examination of the interview results suggests that groups of consumers are likely to be identifiable amongst fruit and vegetable consumers in relation to the importance of these factors to their consumption.

It is hypothesized that certain attitudes and behaviours will have significant association with High fruit and vegetable consumption, i.e. in excess of 5 portions of fruit and vegetables daily. The main aim of the quantitative stage is to; examine and explore, in a wider context, the attitudes and behaviours considered important to the successful consumption of the recommended 5 or more portions of fruit and vegetables per day. Where appropriate to explore the factors in relation to the fruits and vegetables consumed.

It was decided to utilise the attitude and behaviour factors, informed by earlier research stages, for the purpose of conducting a questionnaire with a greater number of participants. Related to health research and marketing investigations the survey would require the food frequency of the consumers to be recorded to identify them as either High or Low fruit and vegetable consumer (based on an adaptation of the screening FFQ used to identify high consumers in an earlier stage). Likewise the factors, in order to utilise for exploration, would need to be represented (based on a list of attitude and behaviour statements).

As an instrument the questionnaire suited the nature of the investigation in that there were a large number of items that were to be involved in the construction of the survey, with food frequency and attitude and behaviour questions. Thus for each respondent a large amount of information could be collected in an efficient fashion. Though the approach would lose the ability to probe further, the level of data would be important in line with the intention to investigate/explore further with multivariate analysis. A further advantage was the questionnaire could be completed by a larger number of people than a direct face to face approach in a similar timeframe. As will be further illuminated, and based on the appropriateness of the sample approach for earlier stages, 'organisations' would be useful in conjunction with delivery and collection of the survey.

In line with the survey design process, as recognised in Oppenheim (1992) and Malhotra & Birks (2007), the questionnaire would need to recognise the data collection method, determine the content of the questions, determine the type of questions, determine the wording of the questions, and arrange in proper orders, before pre-testing. The data analysis included; descriptive statistics, bivariate analysis, and exploratory factor and cluster analysis. The following sections describe the methods and approaches undertaken.

#### *4.6.1 Developing the Survey Stage FFQ and Construction of a Tool to Explore Factors of Fruit and Vegetable Consumption*

##### *4.6.1.1 Recording Respondent's Average Daily Consumption*

The thesis reports on the development of a measuring tool used within the investigation to assess an individual respondent's daily consumption of fruits and vegetable, based on the screening food frequency questionnaire (reflecting those used by researchers in health and marketing). This was used to categorise respondents by High or Low fruit and vegetable consumption, as well as provide data for the purpose of further exploration using factor and cluster analysis.

There is an established tradition, based on epidemiological need and research interest, concerning the measurement of specific food groups, food types, nutrients and chemicals that enter the body. The 'assessment of habitual food intake' (Cade et al, 2004 pg5) has an extensive appeal to those who wish to collate information regarding population trends and surveillance (for example National Diet & Nutrition Survey), compare dietary consumption across different groups, or compare dietary change in an individual. This is a methodological requirement of intervention studies and in the assessment of behaviour change programmes. This interest in such measurement, particularly within public health, has evolved simultaneously with interest in the relationship between diet and prevalence of disease.

The estimation and assessment of dietary intake can take many procedural and analytical forms. There are those which identify certain biomarkers that are in existence in the body following consumption (Coyne et al, 2005) known to be associated with particular food stuffs e.g. serum carotenoids, and require physical invasion such as the taking of blood samples. Less invasive are researcher and participant reporting and self-completion instruments such as dietary recall, food records or diaries, and food frequency questionnaires (FFQs) (Thompson et al 2000, Shaha et al 2003, amongst others). Each broad group of techniques has a number of possibilities in implementation and,

importantly as will be discussed in relation to selection for this research, each with a balance of practicality, ease of completion and associated estimation accuracy. Many techniques are applicable to fruit and vegetable research. To illustrate, Table 4.6 presents examples of broad dietary information collection methods, along with advantages and disadvantages of each and their potential feasibility within this study.

Table 4.6 Measuring Dietary Intakes: Broad Techniques

Broad Method	Brief description
Food Frequencies	Retrospective method, where participants identify the amounts, or frequencies, of pre selected dietary items over a determined length. Non-invasive method that is relatively easy to complete, reliant upon participant memory of their own consumption.
Dietary Recall	Retrospective method. Participant aims to remember the amount and type of a food item(s) or foods they have eaten over a period, rather than identify the frequency of certain items as a list (as with FFQ). Advantages include being non-invasive and ease of administration. Reliant upon participant memory.
Food Diaries	Participant records the foods that they consume over a certain period in real time, for example at the end of each day or after each meal. Less reliant upon memory but more time and effort required in general as often carried out over a longer period. Non-invasive method. Can be organized so that preset format of particular items are recorded, or more generally all items and post hoc researcher frequency is calculated.
Purchase Recording	Record of all receipts of food purchases are recorded and given to the researcher. Non-invasive. More difficult to identify actual consumption due to wastage and multiple individuals consuming from the same purchases.
Chemical Biomarkers	Invasive technique which requires samples of bodily fluids, often blood, to be taken. (often used in association with physical indicators). Used to identify levels of particular chemicals present in the system. Described as more accurate indicator for nutritional purposes.

(Source: Author Construction)

Food frequency questionnaires have a popular usage within studies, comprising of foods being listed, and consumption rate over a period or frequency information for each of the foods being reported by the individual. An alternative question based method asks for a report on number of times certain foods are consumed, such as the US's 5 A Day, seven question approach (Kristal et al, 2000). The former of these approaches was adopted as part of the screening questionnaire identified above, and following successful piloting during the qualitative phase to screen for high consumers. A similar method of collecting food frequency was sought for the main quantitative stage with minor amendment as dictated by the needs of the study. See Appendix 5 for the quantitative stage survey instrument.

A non-invasive food recall method was required for the main questionnaire that would allow the amount of fruit and vegetable consumed to be measured and therefore the number of portions consumed per day (on average) with the potential to compare high and low consumers. The format would allow data useful for further multivariate analyses to be carried out. The dietary assessment tool chosen was devised to allow retrospective examination or recall of the participants' actual diet in relation to fruit and vegetables over the past seven days, where the last full day is the last of the seven. The seven day food consumption is a balance of length of time to accurately recall fruits and vegetables consumed, illustrative of a common cycle in peoples' lives, but with a sufficient number of days to minimize the possible effects of 24 hour extremes of consumption. It is also a commonly utilised period of time used by dietary research and instruments (Michels et al, 2005). Accordingly, the days of the week are presented within the questionnaire in columns, and the food type presented by row, with the participant asked to write in the appropriate box the number of portions consumed of that type/those types of fruit or vegetable.

This method captures some advantages of food diaries, and analytical advantages of comprehensive and continual recorded scales. Thus it differed from the screening questionnaire used at the interview stage. Greater accuracy was sought; it was found at the interview stages that most people using the 'tick' based completion in the screening questionnaire would calculate their consumption based upon a recall of daily consumption anyway.

The FFQ was in part informed by instruments used in the European Perspective Investigation into Cancer and Nutrition (EPIC) research, which integrates lifestyle and behaviour questionnaire data with biomarker data in a large-scale, pan European cohort study (Riboli et al, 2002), and those that subsequently used the food frequency methods therein. Though the dietary information in the larger studies covers a greater number of food types, the fruit and vegetable sections were consulted in designing the FFQ, along with paper and internet based formal health advice on fruit and vegetable consumption (e.g. National Health Service, British Heart Foundation).

The order of recall was composite meal (Fruit and Vegetable), fruits, and then vegetables. A development from the initial interview stage screening questionnaire was to bring the composite meal section forward so as to minimize composite meal items being accidentally included while completing the individual fruits and vegetables.

The choices of fruit and the choices of vegetables included as types within the questionnaire are familiar to many diets, and space had been allocated to allow for inclusion of 'other foods' not as commonly consumed to be added by the respondent. For reasons of convenient use of space, and in an

attempt to minimize size, a number of boxes contained multiple foods. These are either in relation to the serving size linked to portion description or foods that are consumed in similar circumstances. The food frequency section is “semi-quantitative as it specifies a standard serving or portion for each item” (Agudo, 2005). The portion and serving sizes were developed in line with public health guidance of standard 80g servings, and the description that this infers, whether in handfuls (grapes), tablespoons (turnip) for example. The descriptions of servings within these sections relate simply to 1 portion of fruit or vegetable, and are easily summarised with the frequency of consumption. As a guide there are limitations to the serving descriptions as they are likely to vary from the way in which certain consumers prepare and consume the fruit and vegetables, and they may not always coincide with that provided. However the descriptions do fit with public health descriptions, linking it strongly within the health framework and making for more convenient and simple analysis. Instruction on portion size, and alternative measurements were provided, including the rounding up to the nearest half portion.

The composite meal section is separate from those foods which are often as additions to a dish. This is similar to the inclusion of tomatoes as vegetables, in that they are most likely consumed in this role. The second advantage to a separate element to the FFQ is that it provides an estimate of how vegetables (in particular) are eaten within the diet. It has been argued that “composite foods are an important source of vegetables (less importantly of fruit) and should be included when estimating vegetable intakes. Failure to do so may result in bias in estimates of intakes...” (O’Brien et al, 2003 pg711). Important to the FFQ is the possible bias of those who eat little processed food being more aware of what goes into the composite foods they consume, and those who consume more processed foods neglecting this category when recalling food consumed, hence identified as a separate section.

The McCance & Widdowson’s ‘Composition of Foods’ is often used to develop composite meal value in terms of nutritional value. Similarly fruit and/or vegetables within a food product (per 100g) =  $(\text{weight of fruit, vegetable, \& nut}) / (\text{weight of fruit, vegetable, \& nut}) + (2 \times \text{weight of dried fruit, vegetable \& nut}) + (\text{weight of non-fruit, vegetable \& nut ingredient})$ , as used by British Heart Foundation (Scarborough et al, 2005). It suggests that a product of approximately 70% at least make-up of fruit or vegetables should be considered near to a portion. Thus (as operationalised in the food frequency questionnaire), per 3-4 tablespoons of a dish, a food containing a high level of fruit or vegetable, around 70-80 per cent would approximate to 1 portion of fruit or vegetable (e.g. such foods as cauliflower cheese). A food, such as meat stir fry, should have approximately a medium proportion of vegetables/fruit in its composition, around 35-70%, and as such will count towards a half portion, or for every two within this category a 1 portion is eaten. Similarly where there is a low proportion (less than

35%) made up of fruit or vegetable, such as meat Lasagna, approximately 1 third of a portion is consumed, or 3 servings to 1 portion. Like other estimates in the questionnaire, the process of creating the dish leads to variations between consumers, but this is believed to be justified because the quality of the information.

It is commonly understood that, compared with other forms of assessment such as biomarkers, summary questions, and food records/diaries food frequency questionnaires generally estimate consumption to be higher (Amanatidis et al; 2001, Michels et al; 2005); and using a summation method of calculation, where the total within a period is the sum of each of the frequencies of food consumed, is particularly prone to this (Kristal et al, 2001). However the ease of completion, compounded by a certain level of flexible administration not found in other methods made, the food frequency questionnaire, with daily recall elements the chosen option. However, the likelihood of this method leading to an over-estimate of consumption was noted.

#### *4.6.1.2 Recording Consumer Perception, Attitudes and Behaviours related to Fruit and Vegetable Consumption*

The second main section within the questionnaire was developed directly from, and informed by the interviews with fruit and vegetable consumers, and in part by appropriate literature. In particular in relation to the 'themes' identified from analysing the qualitative data. The research approach formalises this link between the research stages by mixing and integrating the findings from one method type (qualitative base) into the structure and method of a different style (quantitative).

As seen in work on food and fruit and vegetable consumption modeling, quantitative being informed by qualitative data is not in itself unusual, and indeed proponents of mixed methodology argue this point. Thus, the perceptions, attitudes and behaviours are captured in a series of questions and statements derived from the interview stages to investigate further fruit and vegetable consumption as part of the questionnaire. In line with the aim of this quantitative stage, the attitude and behaviour factors associated with fruit and vegetable consumption, were translated to a list of attitude and behaviour statements to assess their role in high consumption.

The creation of the statement list, which was to be inserted into the questionnaire design followed the design process as described in Oppenheim (1992) and Malhotra & Birks (2007). These statements would represent the content of the questions, with the type of questions, wording of the questions and arrangement of the questions to be addressed. In this regard it was decided that statements of

behaviours and attitudes would be listed within one continuous list rather than separated. For analytical purposes the questions could be looked at independently, but also as a group or construct. In maintaining a single list, in relation to the more complex food frequency questionnaire section, usability for respondents was dramatically increased. The greater number of section breaks, the larger the perception of the questionnaire.

As utilised with the interviewing technique, the questionnaire statements incorporated those that address fruits and vegetables specifically, and those that concern an activity, attitude, or context that was derived as important in relation to fruit and vegetable consumption. For example; *'I look forward to meal times'*, *'I exercise regularly'*, *'I eat the amount of fruit I do as part of reducing or controlling my weight'*. Questions also addressed food as well as fruit and vegetables, thus *'the food I eat is affected by competing in sport'* in recognition of the role of diet, food, health in fruit and vegetable consumption.

Another issue regarding the questions relate to the viability in the separation of 'amount' and 'type' of fruit and vegetables consumed. In line with the previous stages this was addressed in the informed belief that in some instances the amount consumed has different explanations to the type of fruit or vegetable consumed, but nonetheless important in the investigation of the factors relating to high consumption (as identified in interviews). Thus where appropriate (balancing overall length of the section, number of questions, and accuracy of the statement) type and amount were separated as different questions.

Added complexity to this was the separation of 'fruits' from 'vegetables' for certain questions. In particular this reflects interview participants sometimes having very different dietary patterns for fruit and for vegetables, and reasons why consumption may be higher in one area than another. This design was also to help reduce the affect of competing thoughts relating to a holistic answer on 'specific' statements. However in some instances it was noted from interviewee discussion that 'fruit and vegetables' can often be recognised as a distinct concept, particularly as a result of health promotion and awareness (even though in consumption may be divided), or reflective of a similar guiding theme. Certain questions reflect this; *'I have deliberately changed the amount and type of fruit and vegetables I eat'*. The list of questions utilises a combination of 'type', 'amount', 'fruit' and 'vegetables'.

The respondent answered the question on a seven-point Likert style agreement scale from (left to right) 'Strongly Disagree', 'Disagree', 'Partly Disagree', 'Neither Agree or Disagree' (as a mid-point), 'Partly Agree', 'Agree', and 'Strongly Agree'. The scale offered the respondent a variety of possible positions in relation to the questions to express their level of agreement with that statement.

A number of statements were particular to experiences that only certain respondents would identify with. For example having left the parental home, being in employment, having children or having had children, or having a spouse or partner, or living with other people. These conditions were confirmed as important within the interviews and preceding literature. However for analytical purposes it was important that all respondents would be able to answer the entire set of questions. To this end a separate column at the end of the agreement scale was used entitled 'Does not Apply to me' so that respondents who were not in that position could place their tick within this box, and instruction given on when the box should apply. This was used to minimise the likelihood of some respondents entering a strong disagreement to a statement as a result of not being in that position, rather than because they disagree strongly from within that position. For analytical purposes at the time of design, it was considered logically justifiable to recode the 'Does not Apply to me' respondents (when analysing all respondents) into a neutral position of 'Neither Agree or Disagree' (e.g. Corbett et al, 1981). Those statements relating to 'Does not Apply to me' were presented in a separate but closely positioned section following the other statements.

There was no particular order to the statements as such, but certain structural concerns positioned some statements together. For example, where a statement referred to amount and or type, and fruit and or vegetable it was positioned next to its similar partner, thus '*the amount and type of fruit I eat is affected by being at work*' being followed immediately by '*the amount and type of vegetables I eat is affected by being at work*'. This was to aid successful completion of separate but similar questions by respondent's recognition that they are in fact different questions. Likewise the same structure was used to position those questions that referred to fruits and to vegetables separately. Statement construction was kept relatively similar to assist the respondent in completion of the statements. A total of 130 statements were incorporated into the level of agreement list; 27 of these included the additional column.

The final sections included questions concerning within home consumption and outside of the home consumption (hot and cold basis), and finally questions relating to the demographics of the respondent as well as questions with an emphasis on household make-up, employment, and spousal employment (identified from the interviews as important to current consumption). The last question allows the respondent to indicate whether they themselves are vegetarian or anybody within their household is vegetarian.



A pilot study was conducted with twenty consumers for the final questionnaire format to make judgments about the feasibility and consumer usability. The formulation of the questionnaire was an iterative process with both consumers and appropriate professional feedback.

#### *4.6.1.3 Consumer Questionnaire Distribution*

The questionnaire was distributed to organisations and institutions within the geographical location of Wansbeck, based on the reasons presented in the sections above. The organisation and institution theme utilised in previous stages was again adopted for distributing the consumer questionnaires. This encompassed people who attended, were employed by, or consumers of a particular place for whatever usage. Where this stage differs is in the expansion to incorporate locations outside of the thematic link with health, to increase the variety of potential respondent.

The length of the questionnaire, and particularly the food frequency element meant that the questionnaire could not be completed face to face. Therefore the organisational basis for the recruitment of respondents was useful in providing a point of return for completed questionnaires. For those who did not attend regularly, or wished to return the questionnaire via post, a pre-paid addressed envelope was provided for respondent convenience.

Of benefit was the ability to distribute to groups in their entirety when situations allowed, thus building relationships with potential respondents, and increasing the enthusiasm about completing the questionnaire. This often took the form of a presentation to a group of individuals, or recurring instances of meeting an individual as part of their routine. The trade-off with the benefits of utilising organisations was often the reliance upon members and gatekeepers within the organisations to distribute on behalf of the researcher. Depending on the system, the enthusiasm of the point of contact within the organisation would affect the drive to distribute to consumers, which in some instances meant that there was no direct point of contact between the researcher and the respondent. Contact information for any queries was presented on the questionnaire. Thus the role of the researcher varied in level between a continuum of 'Active' and 'Passive' in the recruitment of participants.

Examples of employee distribution include internal distribution to employees by tray systems from a single source (with instructions on completion and returning the questionnaire) through to questionnaires being left in employee staff rooms. Distribution to members and associates of groups include researcher presentation at arranged events, to a researcher being based at a particular multi-

use venue and 'handing out' questionnaires to potential respondents. Retail approaches included the shop employees presenting the questionnaire to their customers.

Possible issues considered with the approach included; having to meet and gain permission from organisations (usually a figure-head) to distribute, or for the organisation to distribute on behalf of the researcher. Although the nature of the questionnaire was deemed appropriate and not 'too sensitive', and thus the organisations were useful in distribution to many individuals from a single point of contact.

A total of 2000 copies were printed and staggered in distributed to fifty different organisations during the summer months of 2007. An electronic version was available for the members of one organisation. Following the initial distribution it became apparent that an increase in the number of questionnaires was necessary as a result of low average response rate. A related practical advantage in such distribution was the ability to reuse any non-completed questionnaires at another organisation rather than having more printed (with appropriate amendment to the questionnaire identification number). Table 4.7 presents information regarding the nature of the organisations involved in the distribution of the consumer questionnaire. The number of questionnaires given to each organisation was dependant on the type of organisation and the number of potential respondents from each organisation, ranging from small independent businesses to large organisations, thus from 2 – 500, and included respondents who were employees, customers, consumers, patrons, members, users for example.

A flexible approach was taken towards 'incentives'. The representative with whom this was discussed was in a useful position of relative understanding of the likely effect of an incentive attached to completion and return of the questionnaire. Where an incentive was considered useful, an additional slip of paper was attached to the questionnaire with corresponding number (Appendix 6) for the respondent to retain along with instructions. A lottery was then drawn from the returned and completed questionnaires from a particular organisation where the successful number and prize given to the organization to distribute. All prizes were less than twenty pounds in value, and the decision of prize type was in consultation to fit the nature of the organization, for example a fruit and vegetable voucher at for the fruit shop, and HMV voucher at the College. Less than 250 questionnaires were returned, with 239 deemed suitable for incorporation within the analysis.

Table 4.7 Distribution Centres Utilised within the Quantitative Stage

<b>Description of organisations by type</b> (In some instances multiple organisations from a category were approached)
Garden centre
Fruit shop
Library
Health Centre
Out of Hours Health Centre
Scrabble club
Bank
Bookmaker
Hardware and supplies retailer
Voluntary Service – including virtual environment
Children’s Centre
Video rental shop
Fuel garage
Local ‘Welfare’; multi-usage community centre
Religious organisation
Charity and social group
Local council depot
Community painting group
Council Information point
Local council administrative building
Local council neighbourhood outreach centre
Allotment association
Central enterprise park - range of businesses administrative centre
Food retailer
Hairdressers
Community centre
Public house
Gym - unisex and ladies only
Card retailer
College

(Source: Author Construction)

#### 4.6.1.4 Analysing the Consumer Questionnaire

The consumer questionnaire was analysed to explore those attitude and behaviours that were deemed important to high fruit and vegetable consumption (5 or more portions per day). It was hypothesised that there would be certain characteristics that would be significantly associated. In addition it was proposed that amongst the data there would be underlying factors, and groups related them. The fruit and vegetable frequency questionnaire data would be utilised not only to identify high and low consumers, but in combination with the attitude and behaviours that are related to high and low consumption as expressed by the respondents. Multivariate analysis was applied to reduce the data by underlying construct and develop profiling of particular group data.

The two main sections of the survey instrument were analysed individually and in relation to one another utilising a range of descriptive and analytical techniques. This was to enable exploration of the data in relation to fruit and vegetable consumption and factors related to and pertaining to high consumption (i.e. in excess of 5 portions per day).

The analysis included a description of consumption of the respondents by fruit and vegetable type by day of the week in an assessment of the relative importance of particular types to the total consumption figures across the week and the trends of consumption therein. In addition the consumption variation for individual fruit and vegetable items is described in relation to high and low consumers by each day; utilising variation from total high - low ratio contributions. This section was supported by presentation of the ranked frequencies of consumption by type and day of the week.

The attitude and behaviour statement list was analysed to examine the differences reported in level of agreement by high consumers and low consumers. The 130 statements were first described by the position of the mean value for all respondents then by mean position of each group of consumers separately. To assess the significance of the positions in relation to each other a two-tailed test of mean difference (Independent t-test) was employed using SPSS v10 for each statement where normal distribution was assumed and the data at least interval level (Field, 2009). Levene's test for Equality of Variance was also conducted and substituted where appropriate (Brace et al, 2006). Thus the p value indicated when the mean difference between high and low consumers was derived with 95 percent confidence that the result was not due to chance alone (and indeed this null hypothesis testing was set at this level throughout analysis as considered appropriate with use with social science data, Bryman & Cramer 1994). It was therefore possible to rank by strength of overall agreement for all statements as well as raw statement differences between high and low consumers.

Both the fruit and vegetable consumption types and the attitude and behaviour statements were explored to identify potential underlying constructs within the data. With reference to the former the identification of common links in fruit and vegetable types consumed; and for the latter an attempt to examine common responses in themed attitude and behavior factors. In both cases a data reduction was also sought. Factor analysis has found common usage within marketing research, for example with identification of store features related to purchase, or with food types and patterns within the diet, e.g. Brantsaeter et al (2009) observing specific diet patterns and ill-health. It has also been used to devise and test instruments and scales. Another growth area where significant volume of research has been undertaken is 'Social Marketing'; where marketing and social concern have promoted the use of marketing assessment and techniques in the social world including health (Kotler et al, 2002).

“Factor analysis consists of a number of statistical techniques the aim of which is to simplify complex sets of data...usually applied to correlations between variables” (Kline, 2005) hence ‘in summarizing the data, factor analysis derives underlying dimensions that, when interpreted and understood, describe the data in a much smaller number of concepts than the original data’ (Hair et al, 1998). In so doing, the process of the factor analysis develops a construct upon which each item or statement has its relationship expressed for each component (latterly factor) as a correlation between the two, i.e. factor loadings. A factor can then be interpreted based on the strength of the factor loadings upon it. Factor analysis also allows the factors to be ordered by most variance, of overall variance, explained by each factor within the data set.

For the attitude and behaviour statements factor analysis allowed the incorporation of beliefs, intentions and actions to be incorporated in a single analysis to identify thematic links within the data and for interpretation. The fruit and vegetable items also provided a complex data set where relationships between types were sought. Suitability of the data sets for the process was examined with attention to the factorability of individual variables, overall factorability and likelihood of an underlying factor structure being present within the data. Although there were different numbers of variables included within the analysis of fruit and vegetable items, and of the attitude and behaviour statements 239 respondents were included in each, and hence advised minimum requirements were met (Kline, although not variable to participant ratio).

Like the raw data, the factor solution data were subjected to further description and analysis in regard to aggregate consumption of fruit and vegetable factors for daily consumption. More importantly in defining the important influences and positions of high consumer (as of significant different concern to low consumers) on the derived attitude and behaviour factors, the average mean was computed. This was then utilised in the same way as the full statement list, as a basis for applying independent t-tests between the relative positions of high and low consumers on each. Therefore an exploration of factors expressed as important to defining high fruit and vegetable consumption behaviour, while at the same time identifying within the sample shared behaviours and attitudes which are merely important in general fruit and vegetable consumption. The data for the derived factor solutions for both fruit and vegetable types and from the statement list were not only utilised for their own analysis but as part of the process of cluster analysis and latterly crossed analysis between the two.

Thus, the second explorative multivariate technique to be employed was cluster analysis. Factor analysis is popularly combined with clustering techniques either in comparison studies where their data reduction abilities are sought or combined where the data reduction of one is used in the segmentation

abilities of the second. 'Factor-Cluster' has become a term to refer to their joint application within studies (although it has not escaped criticism; Grun, 2008). The purpose of using cluster analysis was to identify the possibility of inherent groupings within the data upon which distinctive membership and profiling could be found, with an emphasis upon food type, behaviour and actions to identify clusters where high fruit and high vegetable consumption is prevalent. In line with data analysis from the earlier interviews, there was value to further explore the data for the presence of different high average fruit and vegetable consumer groups.

The primary purpose of cluster analysis is to "group cases who have characteristics in common...cases are placed into different clusters such that members of any cluster are more similar to each other in some way than members of other clusters" (Kent, 2007 pg422) thus exhibiting "high internal (within cluster) homogeneity and high external (between cluster) heterogeneity" (Hair et al, 1998 pg473). As with factor analysis, the two sets of data were analysed separately. For the fruit and vegetable items the factor scores derived from the factor analysis of weekly consumption were included, and for the attitude and behaviour factors the computed average factor was included and the response to the seven point Likert scale.

Two phase clustering was employed where the hierarchical methods were utilised to identify appropriate number of clusters from agglomeration schedule and with reference to contrasting derived relative evenness and sizes of clusters as well as interpretability and usefulness for subsequent profiling. A number of alternate cluster solutions were assessed in both analyses, and as with factor analysis and other multivariate 'arts' open to greater subjectivity 'instinctive sense' was employed (Hair et al 1998). The hierarchical clustering method utilising Ward's method measuring Euclidean distance was followed by the non-hierarchical method so as to maximise (via an iterative process) the definition of the predetermined number of clusters; i.e. k-means optimization technique. Having derived final cluster centres of each cluster on each on the factors, the clusters were then interpreted with introspection of relevant data. For the fruit and vegetable item factors the level and direction of concern were ranked and assessed, and for the attitude and behaviour factors cluster centres (effectively position of agreement on the seven point agreement scale) were ranked by the strength of difference from the mean position of the sample itself.

In its own right the usefulness in clustering of the attitude and behaviour factors was to look at the differences of certain attitude types and behaviours which were most agreeable and non-agreeable to each of the clusters and thus defining the relationship members have with factored statements derived in relation to fruit and vegetable consumption prominent in earlier interviews. However definition was

not the only purpose. First the profiling of the clusters using techniques to describe the clusters (averages and frequencies), assess mean differences across the clusters (Anova design) and to assess variables based on the expected number of cases to occur within each cluster compared with others (Chi-squared and Fischer's Exact). Importantly more sophisticatedly, utilising the data pertaining to derived cluster memberships the membership of one cluster, based on consumption type, compared the expected number of respondents with actual number of respondents across the attitude and behaviour clusters for significant differences. The sections of the questionnaire were then analysed to ascertain a descriptive picture of consumption preference for each cluster.

In further combinations of analysis using the multivariate stages, the attitude and behaviour clusters were also described according to actual weekly consumption of each of the aggregated fruit and vegetable factors as well as the relative percentages of the total consumption within each cluster. It was possible also to combine the derived attitude and behaviour factors position expressed by the members of the fruit and vegetable preference clusters, and assess overall and individual significant differences between the groups (via Anova design and post hoc testing). The analysis provided a building of useful data made more manageable by data reduction techniques while identifying underlying structures for interpretation for influences upon high consumption, differences between high and low consumers, and differences between associated average high clusters.

#### *4.7 Ethical Thoughts & Considerations*

In line with best practice the British Sociological Association guidelines for ethical conduct in research were read and consulted in the design and implementation of the research. The nature of the topic of research was deemed in general non-sensitive i.e. food, consumption, diet, particularly when the basis of study were adult consumers (over 18 years of age).

There were points within the research where new concerns needed to be addressed. First the topic itself. Despite non-invasive techniques being employed, an individual interviewee was quite likely to address food in relation to health problems and in relation to disorders where food represented more of a personal relationship and therefore increase in the level of sensitivity of the topic of focus in interviews, rather than a more casual encounter used in surveys. The second point; the framework for the investigation, despite not focusing on children, encountered children, both in multi-purpose institutions (HLC toddler group, and welfare centre) and at the homes of potential interviewees. It was

required in one institution to have in place a police CRB check which could be presented, which was accepted using a CRB check carried out in another employment position.

#### *4.8 Chapter Summary*

This chapter has presented the approach and methods taken in the fulfillment of the thesis aim, i.e. to explore and investigate the determinants of high fruit and vegetable consumption (5 or more portions per day). The thesis utilised a mixed method framework, the main stages of which were formative interviews, consumer interviews and consumer survey, as well as points at which further integration between methods were evident. The chapter outlined the justification, and methodological position of the research framework, including the development of the research model in line with the strengths of the individual components and integrated methodology.

The chapter addressed each section by the method adopted, including the usefulness of the approach in relation to the sampling structure and in line with themes of health and organisation. This includes the incorporation of wards within Wansbeck based on indices of multiple deprivation and the selection of participants for the formative interviews, consumer interviews and consumer survey. The formative interviews were conducted with 8 clinical and community health professionals to outline the role of 5 A Day, and to identify possible positive fruit and vegetable consumers as perceived by the interviewees. The interviews with fruit and vegetable consumers, mainly those who consume 5 or more portions a day, were conducted with 19 consumers, framed by food choice process, to explore their relationship with fruit and vegetables and identify determinants to consumption, points of change towards consumption and how the consumption was managed.

Further exploration was carried using the consumer survey, based on the previous stages, to identify important factors of fruit and vegetable consumption as well as segment the consumers. The detail of the design and administration of each of the stages is addressed. The chapter indicates the methodology, framework and methods used as part of the research process that enabled the qualitative and quantitative results to be presented in the following two chapters. Importantly also the chapter presents the analysis that led to those results (though further explanation is presented in the chapters themselves).



## Chapter Five

### Expert and Consumer Interviews

#### *5.1 Introduction*

The chapter reports the main findings of the interview stages of the research (see Figure 4.2, Chapter Four). The purpose of the stages reflects the main aim of the thesis. The interviews are utilised to explore the factors that are associated with above recommended levels of consumption of fruit and vegetables. The first section (5.2) focuses briefly on the analysis of the interviews with health care professionals and describing themes that were derived. The perceptions of the health professionals, clinical and community based, were collected and analysed to identify themes pertaining to evident associations and enablement in the high consumption of fruit and vegetables (5 or more portions per day).

Section 5.3, 5.4, and 5.5 display the results derived from the interviews conducted with fruit and vegetable consumers. Brief results regarding fruit and vegetable consumption relating to the screening food frequency questionnaire can be found in Appendix 7. Section 5.3 forms a thematic analysis of the consumer interviews utilising selective narrative raw and paraphrased data of the interviewees' relationship with fruit and vegetable consumption, and high consumption in particular. Determinants of current consumption, triggers and paths to that consumption, and maintenance of that consumption were discussed and included. It was also utilised for the purpose of informing the consumer survey stage. Section 5.4 uses the interview data to inform the categorisation of the interviewees on a basis of holistic interpretation of the consumer's actions and feelings towards their consumption of fruits and of vegetables. Likewise the analysis in section 5.5 is based upon the development of illustrative concepts that categorise the variety of potential reasons given for the consumption of 'High' levels of fruits and vegetables by the interviewees.

## 5.2 Informative Interviews with Experts: Community and Health Professionals

Table 5.1 highlights the main results to emerge from the interviews with professionals regarding their experience with fruit and vegetable consumption. These covered the factors that relate to high consumption and the groups of ‘high’ consumers that the interviewees have had dealings with. This is indicative of sections 4.2.2a/b of the research model (Figure 4.2, in Chapter Four).

Table 5.1 Themes of High Fruit and Vegetable Consumption According to Health Professionals

<p><b>Negativity</b></p> <p>The professional interviewees expressed a general low optimism regarding high levels of fruit and vegetable consumption. In their experience the figures of daily consumption (portions), as well as level of population achieving five portions per day seemed ‘optimistic’. This was particularly so when discussing passive consumption. A number of statements regarding potential achievement began with a negative statement, such as; ‘unless...[example]... is in place’ or ‘without...[example]...’ consumption would be found to be less than five portions. This negative position increased the significance of the explanations of high consumption that were suggested.</p>
<p><b>Age and Sex</b></p> <p>Most of the interviewees mentioned a link between age and level of consumption. This was often seen as a more ‘traditional’ consumption. One explanation of this was that younger people tend to be ‘time poor’ and ‘too busy’. The pressure upon the younger family was different to older consumers, with younger people not eating as a family, and consuming food at work rather than in the home. Food would be more likely ‘grazed’ upon with the young, or alternatively ‘crammed’. There was also an opinion amongst some interviewees that age was linked with a greater knowledge of food preparation and skill, whereas the young were ‘deskilled’ and less ‘food savvy’. At the same time some interviewees (and in some cases the same interviewees as had experienced older people eating greater levels of fruit and vegetables) suggested that some young women could be likely high vegetable, and particularly fruit, consumers. The interviewees highlighted the potential opportunity for increasing consumption when pregnant and with young children; the mother and toddler group being receptive. This was in part as a result of greater focus upon the welfare of the child and a greater involvement with ‘health’ at this time. Some interviewees extended this to include young parents. In general women were seen as more likely than men to consume high levels of fruit and vegetables. A number of reasons were given for this besides the role of children. Women were seen as the providers of food within relationships, and less male involvement with family food. Men, according to one interviewee, were more likely to be at work, while women were available during the day to be involved in provision.</p>
<p><b>Engagement, Enthusiasm and Taste</b></p> <p>Those with a high level of engagement with food were considered more likely to be a high fruit and vegetable consumer. Engagement was reported in a number of ways. First was production of fruit and vegetables; the most commonly expressed was access to an allotment. This highlights both those who have always done this and those who want to do it. ‘Eating out of the garden’, as described, had a gender and age bias (linked with male production and retirement), for reasons of time availability and tradition. However there was a female bias that was represented in domiciliary processes (even if a ‘husband’ had provided the home grown food). The skill level of the consumer was also considered important. Another opportunity for engagement with fruit and vegetables, leading to a higher consumption, was expressed by the professionals themselves. More specifically the very fact that they were involved in well being and healthy eating meant this was often reflected in their own diet, and quite often the high fruit and vegetable consumption of their colleagues. The level of ‘enthusiasm’ shown in the incorporating of higher amounts of fruit and vegetables in the diet was also deemed important. ‘Taste’ is part of this, where the type and amount, according to interviewees, can be affected by a consumer flavour preference; one interviewee suggesting a split in those that believe food to be fuel and those that derive enjoyment from it.</p>

### **Priorities and Income**

For some, where food decisions are linked strongly with available income, fruit and vegetables may feature as a 'risky purchase' and underutilised. Within such families, there can be concerns for potential 'food conflict' in serving disliked or unfavourable foods, and a perceived risk of wastage (food and money). However for others, those who are successful as high consumers, planning and the ability to tackle the challenges break the link between income and consumption. Thus it is the priorities placed upon high consumption linked with particular values, such as 'health', that is prevalent in this achievement. Though a link between education, income and high consumption was mentioned, so to was that 'educated people can have appalling diets too'.

### **Type of Diet, Paths to Consumption & Health**

Some of the interviewees mentioned that certain diets would be characteristically high in particular groups of fruits and vegetables. For example, the commonly described 'traditional', or '...three veg' consumption, which featured larger amounts of vegetables eaten as part of the 'traditional' diet where evening meals during the week and on a Sunday (along with some form of meat) was eaten. Thus where vegetables were an accompaniment on a plate of food. In such diets the pattern of consumption was considered 'normal' without outside influences such as illness. One interviewee described this as 'ritualistic' consumption. This is also tied in with issues of age, where a prevalence of older people were more likely to consume a diet rich in vegetables, as were those who had access to an allotment or involvement with production. It was also noted that younger people's diets were based around rice or pasta, rather than potatoes, and fruits and vegetables had a different roles within such diets.

A further situation noted for particular dietary type was mentioned by a professional involved in provision and facilitation of fruit and vegetable cooperative schemes. From their experience of orders at the group based around 'health', there was a greater amount of fruit purchased than vegetables. The food cooperative scheme delivered to, and engaged with, sites such as Healthy Living Centres and Sure Start groups. This was supported further by other interviewees who worked specifically within the health realm that, for reasons of health, people turn to fruit often as a 'substitute' or 'addition' within their diet.

Despite the overall sense of negativity regarding high consumption expressed by these professionals' useful themes emerged, in particular those relating to specific factors of consumption and associations of consumption. More importantly the themes relating to groups where potential high consumption could be unearthed, such as health motivated, reinforced the usefulness of focussing on institutions as a site of research.

### *5.3 Thematic Analysis of Consumer Interviews: Derived Reasons for Fruit and Vegetable Consumption*

This section presents an analysis of the relationship between consumers and the fruits and vegetables they eat, both why they consume in the way they do, and how fruit and vegetables are consumed. The interviews were designed to allow the consumers to discuss freely fruits and vegetables within their diet, as well as reflect upon this in relation to wider topics. The strong identifiable derivatives are thematically presented with supporting illustrative quotations and appropriate annotations. This illustrates the complexity involved, with individuals expressing throughout many differing forces behind consumption. An important feature is the cross-themed complexity: In some cases, certain main and supporting themes are simultaneously identified and explored.

Within many of the interviews, depending upon the nature of the reason for high consumption, fruit and vegetable consumption is discussed synonymously with the diet, diet within lifestyle, and diet with health/illhealth. Likewise there is an interesting relationship between the expression of an individual's diet and the diet expressed as a feature of 'our' diet, as a representative of a household consumption, e.g. 'we eat...'. Lengthier quotations are indented for the ease of identification; 'INT' is used to indicate interviewer interjection and a pairing of capitals and a number refer to an individual (e.g. MH1). Linked with above, the comments of 'low' consumers have been utilised where appropriate. As derived from the literature review, and subsequent analysis of the interview data, there are a number of features within this section which fit particular well with concepts and notions that are recognised and utilised by proponents of a life course perspective. The identified themes are utilised in further qualitative sections, such as overarching 'categories' relating to values, motivation, information, triggers and environment. Table 5.2 presents a summary of the consumers association with presented theme.

Table 5.2 Consumer Theme by Interviewee

Interviewee	Procuring Fruit & Vegetables			Worklife & Homelife				Health/III-Health		Competition & Sport	Taste, Enjoyment, Engagement	DiETING, Weight Control
	Shopping Pattern	Price, Value, Budget	Seasonal	Lifestyle, Time Availability	Dietary Availability	Work Image & Responsibility	Responsibility for Child(ren)'s Diet	Proactive Health	Reactive Health			
MH1	X	X	X	X	X	X		X	X		X	
FH1	X			X		X	X		X		X	X
MH2	X			X					X			X
MH3	X		X	X		X		X		X		
FH2	X		X	X	X		X				X	X
MH4	X				X			X		X		
FH3	X		X	X	X		X	X			X	X
FH4	X	X	X	X			X		X		X	X
FH5			X	X				X	X		X	X
MH5	X			X	X				X		X	
MH6	X	X	X		X	X			X		X	
FH6			X	X							X	
FH7	X				X						X	X
FH8	X		X		X			X			X	X
MH7	X	X	X	X	X				X		X	
FH9	X			X	X			X	X		X	X
MH8	X		X	X				X	X		X	

('X' indicates theme being evident)

### 5.3.1 *Procuring Fruit and Vegetables*

#### 5.3.1.1 *Shopping Patterns*

Many interviewees discussed some feature of the role of fruit and vegetable procurement and provision. Many comments related to the role of 'shopping' in the diet, including the practicalities of shopping. As well as this, shopping provided an environment to indicate the selection of particular foods, for example the role of taste, and seasonal variation. MH1 combined these in a display of their interest and engagement with food, shopping regularly online, but because he perceived fruit from supermarkets being lacking in taste, shopping for such items took the form of farmers markets, where fruit is perceived as tastier (this is also linked with seasonal variation).

MH4 amongst others expressed some concern over the place of his regular shop in relation to freshness of fruit and vegetables, as well as a low amount (and sold out) of some items, but continued to shop at the ASDA superstore for convenience and ability to get all items under one roof. Caution was also expressed by MH7 as one budget supermarket he uses can be a bit 'dicey' with the age and freshness of produce. Meeting the expectations for overall freshness is a concern for MH6, which supermarkets in general do not achieve. Thus interviewees place particular importance on characteristics that are of value to them, and concern arises when these are not met, and strategies implemented in some cases to meet their needs. However it is demonstrated that MH4 balances his concerns for fruit and vegetables with convenience for other food shopping.

The interviewees also discuss shopping as a strategy to incorporate fruit and vegetables into the diet, or as a way to incorporate shopping into their schedule. The importance of increasing the access and availability of fruit and vegetables was displayed. Shopping featured as a regular, routine and a conscious activity for the interviewees, with patterns that most fit their other daily activities. Fruits are a strong focus of the shopping throughout the week for FH3; she constantly refreshes the stock held at home, first a large weekend shop, then top-up when necessary throughout the week.

FH3 Well every time I go shopping a buy it [FV]. Basically every time I will go shopping, two to three times a week I will buy it. I will do a shop and then need to pop in, so will buy it then, fruit

INT Is there any sort of fruit that you particularly go for?

FH3 I always buy grapes, and the rest of its like is seasonal, I buy apples but they're like for the little'un. I like peaches, strawberries that sort of thing.

Thus for FH3, seasonal availability of some fruits make up part of the diet, but she suggests that there are some fundamental rules to her shopping behaviour.

A further important shopping factor that is illustrated is the role of time availability. FH3 mentions the top ups of fruit and vegetables, but on the weekend there is a change with an effect upon overall consumption. This is integrated with an increase of time for preparation also, 'On a Saturday that's one of the days I pop in, and obviously I'm off and have time to make a meal... I have time to cook a meal with veg on Saturdays and Sundays' (FH3). There are further concerns to the diet of FH1, a regime of eating that is in part set by a weight loss programme that she follows, and again, fitting food shopping into her weekly commitments, with a thought of planning (which is aided by her dieting);

FH1 When you are working full time, you tend to shop once a week, get everything in for that week, and then you are just popping out for the odd bits. Unless you are extremely well organised it is sometimes very difficult to plan ahead as to what you're going to have.

INT Does the diet you are on now, does that help you to plan ahead or do you know what you need to bring in?

FH1 It does. If I decide what day I am on, if am on a red day then I know I am going to have a more meat based meal, then I need to bulk that meat out with vegetables, yes so I do tend to plan what I am going to have the day before from what we've got in the freezer or the fridge.

The enthusiasm and interest in shopping is not shared by all interviewees. MH3 tries to purchase in bulk so as to minimise the number of times he has to go, '...I hate shopping' (MH3). Though recognising that fruit and vegetables have to be procured, and having a strong belief in the properties that fruit and vegetables bring to his healthy lifestyle, MH3 believes the time spent shopping could be used for more active pursuits, such as walking, cycling and being outdoors. A dislike of shopping is also stated by FH7, who like MH3 utilises bulk buying. For FH7 available time at the weekend links to having the large quantity of, particularly, vegetables at hand to process into

food for the rest of the week (using the freezer for storage). Interestingly MH3 regularly has meals prepared in advance of consumption (but this is made by his spouse).

Three of the interviewees mentioned using a food box/food coop scheme. At the same time they all mention that it does not entirely fulfil their needs for fruit and vegetables. Further variety and more 'exotic' fruit and vegetables are sought in addition. FH8 uses the food coop box as a base, but hugely increases the number of fruit that she has in the household by buying more.

### *5.3.1.2 Price, Value and Budgeting*

MH3 when discussing the price of fruit and vegetables compared to other foods describes; 'it's cheaper, I think it's far cheaper going out and buying fruit and veg than going out and buying takeaways and whatever' (MH3). Although he finds it a cheaper diet in general, he emphasises the inconvenient cost of collection. When asked about the expense of purchasing fruit and vegetables FH3 replied;

FH3 I find that it's really cheap, I always look at me receipts when I am finished. What you have spent on a few carrots is nothing it's pence. Cheap to buy and quick to cook.

FH3 links the convenience of consuming fruit and vegetables with a 'cheap' food price, and thus derives no negative influence, and indeed the price 'enables' fruit and vegetables to be consumed. MH6 highlights that he will not pay 'over the odds' for the produce he buys, believing that the price of some items increase dramatically for no good reason.

Interestingly monetary cost of fruits and vegetables do not feature strongly as a theme across the interviews, it was mainly FH4 who went into significant detail regarding the management of either budget or monetary cost, particularly in line with the balancing with other important values. Where it becomes important is as an illustration of management of fruit and vegetables within the diet. FH4 spent a great deal of the interview discussing the issue of shopping for fruit and vegetables in relation to her budget, stating 'I don't understand how it's not an issue to people' (FH3). In doing so she describes the importance of fruit and vegetables, and a number ways in which she ensures that they are available for consumption, as a priority in her family's diet, but conscious that it is a part of a wider budget, including other food, domestic items and overall budget. Hence FH4 tries to find a balance by negotiating values and the manifestation of these into solutions. She links this



temporally and situationally within the context of consumption, describing during the interview a difference since having children (a recognised transition).

FH4 I have a budget for my shopping. So I can't really spend more than that. So that does feature a lot in what I buy. I have got to make sure that I have enough to get everything else. I will buy a lot of fruit and then buy basic veg, so I buy certain stuff every week, then I will buy other things if I have got the money, if it is on offer I can afford to spend a bit more on other fruit and veg.

FH4 thus describes that she has a scheduled process involved in her shopping, balancing her priorities of fruit and vegetables, both as a necessity and extra expenditure, with other necessities and frugalities, as part of an overall budget. For example, when not purchasing toilet rolls or washing powder she might buy more luxurious purchases such as 'strawberries', wanting to offer her children a demonstration of variety. Within a context of priority change towards health and her children's diet, FH4 describes that despite having a slightly larger total budget now, to when there was just herself and her husband, it is more than ever a consideration;

FH4 When there was just me and [Husband] we did have a lot tighter budget but I think because there's not the worry of what the kids, to make sure they have what they need, like we were alright about that – so you didn't mind eating the same things, we used to eat loads of onions, tomatoes and peppers because they were cheap at the time...whereas now there's a lot more; broccoli, cauli, we eat that sort of thing as well. We probably eat much more [variety] veg now...

The price of foods at a particular shopping visit is of obvious importance to FH4, but equally are the priority she places on the features of fruit and vegetables in relation to this. Likewise, FH4 conceptualises 'basic' necessities within fruit and vegetables, at the same time as valuing 'variety' and her belief in a food environment that is not monotonous for her children, as well as valuing the 'fresh'.

FH4 I can't afford to go out and buy everything like that [organic], it is more expensive so I have to say right, what's most important things to buy that are fresh and available that I can buy and what can I compromise, like buying baked beans and whatever... I don't want the kids to think, ah that again, ah that again,

I'd like them to say we're having something different this week. [Daughter] loves pineapples but I have to buy her pineapple as a treat 'cos for me a pineapple is one, one snack whereas ninety nine pence, I can get eight apples for that which is [daughter's] packed lunch for the week.

Though shopping to a budget, FH4 identifies a number of techniques she uses to attempt to reduce the price of basic items, and incorporate variety where possible. She suggests; 'Things on offer round the shops, that makes a big difference as well', but there are more proactive ways in which she achieves improved purchasing of fruit and vegetables for the household. As FH4 makes quite specific mention to these strategies with regard to price, value, budget and cost of non-consumption:

*Seasonality and price;*

FH4 We tend to eat more like...turnip or swede ...cauli over the winter because like it's easier to get, it's not always in the shops – it's a bit more expensive in the summer, and in the summer we eat a lot more strawberries and melons and stuff like that, because they're more available and cheaper, yeah so I tend to buy what's seasonal and cheap.

*Awareness of the price of items/Avoiding waste;*

FH4 If I was going out to buy broccoli or whatever I wouldn't just pick one out, I would pick one of a certain price to what we're going to use in a week so I try not to waste stuff.

*Selecting stores for particular items;*

FH4 I shop between Nettos and ASDA, and when I go into ASDA I always, I go there first, to get what I need, and when I go through the fruit and veg I know that that's cheaper in Nettos.

*Utilising available food; not buying any additional;*

FH4 I wouldn't go out normally buy, like this is what I am going to cook for this meal, I go out and buy what I am going to need over the week... Just like what I feel like making today, what needs used in the cupboards, what haven't w' had for

a while..if we have carrots sticks and stuff and then we'll have carrots again for our tea if I have loads and they need to be used.

*Sharing Shopping with her sister;*

FH4 Because we shop together it will be like oh look the carrots are on offer, fifty percent extra free so [Sister] will buy them and I'll give her half the money, so we split them...We save each other a bit of money or it's like buy one get one free on the onions so I'll be like A put them in my trolley and give me half the money .

During the interview FH4 also comments on her sister's shopping, reflecting on her sister's strategies for accessing fruit and vegetables for her family, which has a slightly different ideal than her own, such as the buying of tinned processed meals, and frozen vegetables. FH4 sees freshness (other than frozen peas and sweetcorn) as a further value, in line with the perception of fresh as healthy for her children.

FH2 also mentions the attempt to limit waste in the household relating to fruit purchasing.

FH2 [I] try to stick to foods that everybody likes, otherwise it gets expensive...I had a fresh pineapple ... for the first time, I really loved it, but I could only eat half and nobody else would eat the rest of it, so it kind of put me off buying it again...I have been on a set income, and buying bulk goes off. Strawberries are luxuries, but in season fruit is cheaper, and I could eat loads of them.

### *5.3.1.3 Seasonality*

Seasonality as a feature has been cited above as a strategy for reducing the cost of food, therefore increasing fruit and vegetable consumption on a restricted budget (FH4), and as a preference for snacking on certain things at certain times of the year (where fruit was eaten as and when, as opposed to standard in the diet, FH1). A number of interviewees mention that there is a seasonal aspect through direct production and consumption, MH7 in the past (while shepherding) had access to land that he and his wife used to grow fruit and vegetables on. Despite no longer growing his own, MH7 continues to forage and is influenced by what happens to be available, while having familiarity with what the seasons can produce in the wild. FH6 and FH2 both have varying degrees of access to home grown fruit and vegetables. For FH2 peas from the pod featured strongly in her diet at the point of the interview from her parents back garden. For FH6, she had access to a greater

range of seasonal vegetables and fruit as a result of her husband have an allotment since retirement (some of which can preserve or freeze for later in the year). It is evident that FH6, FH2 and MH7 have demonstrated not only local availability and involvement with production, but their consumption is relevant to particular changes and pressures on their food trajectory (e.g. acquisition of an allotment, moving away from production but access to foraging).

MH3 describes a further influence of seasonal changes in the role of the vegetables. When asked about the making of the soup he had brought with him for that day's lunch;

INT There's allsorts in there. Is that something you have quite regularly?

MH3 Yes especially during the winter time. During summer time it's more based on salads, like lettuce and things like that. So obviously you base it on in summertime lettuce, tomato, cucumber, things like that. Then at winter time it will be something that you can warm up such as a vegetable soup, with leeks onions whatever.

MH3 indicates that it is more the changing of the weather type rather than scheduled date, with change between the perceived need for lighter salads in the summer, and warming vegetables in the form of soups and stews in the winter time.

### *5.3.2 Worklife & Homelife*

The interviewees described how there was often a complexity in various arenas in which they were active, and roles therein, and how these roles and arenas often impacted upon one another, and in particular the way this effected their ability to meet the requirements of the roles. Such relationships are useful in the exploration of how the diet and fruit and vegetable consumption fit such demands. Equally important is the social role and interaction with others taking place within these arenas.

#### *5.3.2.1 Lifestyle and the Time Availability: Work Commitments and Relationship with the Family*

FH3 highlights an evident theme; the relationship between family, in this case her son and the role her parents played in the provision of food, her work (which has varied shifts), and what she considered as worthwhile time in the provision of her own and family food.

FH3 I tend to have a meal a day but it depends on my shifts really. I mean today I will probably just have a quick sandwich before I go to work because I start at one o'clock and I will not get back in until six...I will not probably bother about making something tonight because there are just me and my son who live here, he will have had his tea at my mam's so I will not make a meal just for me. But if I finish at one o'clock I'll pick him up from school and try and make a meal, d'you know what a mean, just depends on lifestyle really.

FH3 identified changing consumption patterns throughout the week, and food was thus consumed based upon the spatiality of others, in particular her son. Concerning the availability of time, FH3 relates this practically with vegetables and the time to cook, despite using it 'additionally' or as an accompaniment elsewhere. On a Saturday and Sunday FH3 had the time to bring more items of fruit and vegetables into the home, by shopping on a Saturday. On a Sunday cooking was prominent and vegetables become associated with being the meal itself: 'I have time to cook a meal with veg on Saturdays and Sundays' (FH3). FH3 stresses the importance of others; her parents in direct provision in some of her and her son's diet (sharing meals), her son, and the relationship with time availability and weekly schedule.

The influence of work life and home life commitments, and importantly also people involved in each case, upon the nature and level of consumption is demonstrated also by FH4, who also is a mother with young children, and an employee.

FH4 I normally have a sandwich or something for my dinner, but it was just a bit of a hectic yesterday...I'm probably more likely to eat more on weekends because we have meals as family on weekends. As [Husband]'s off on weekends...like we'll eat dinner and tea as a family and we tend to have like, I tend to use up the fruit and veg that we have in the fridge as well...the kids probably eat about the same as during the week.... sometimes if am at work I'll not eat and take something with me. So the kids will eat, then I will eat and [husband] might have something different to everyone else.

FH4 describes how her consumption of fruit and vegetables is likely to be higher as a result of eating in a home social setting at the weekend, and how this social setting allows for higher consumption. She also links this with the integration of this influence with the practicalities of her current food

shopping pattern and weekly cycle. She also indicates the importance of children (not only in a physical/practical sense of being present) but in a protectionist way.

Interestingly a contrast develops in the role of her children and effect on her own diet and fruit and vegetable consumption. Despite creating what she perceived as a healthy environment for her children as far as fruit and vegetables are concerned, FH4 indicates that some elements of her diet and level of fruit and vegetable consumption specifically may have suffered in light of home-life and work-life as a result of having children. The interesting conflict that arises is a greater concern over the healthy household diet and well being, at the same time as a disruption to the social eating (where high fruit and vegetable consumption occurred) with her and husband. This also indicative of time pressures.

A different lifestyle fragments the eating pattern FH4 used to experience, but when with children, her thoughts and concerns are generally health focussed, but her consumption of high levels of fruit and vegetables varies with her shift work so that it is not necessarily a constant consumption. Both FH3 and FH4 exhibit the importance of eating with others within the context of variation throughout the week. A lot of ML2's recent diet away from work, for meals has been based upon feelings of tiredness and effort following work and children.

ML2 That's what my diet is run on, time, whether I can be bothered to cook, so I have been having pizzas and that lately. Hoy in the oven...by the time you have cooked the kids' dinners and that you can't be bothered, just go for the easy option. Phone the kebab shop up.

This isolation in his diet while at home is compounded further by his wife who follows a strict weight loss programme from Slimming World, which she also carries out independently within the house. When asked about whether he had intended to follow a similar programme he indicated that he would not be able to commit to it with the work he does, and the lack of freedom he has with his diet at work.

ML2 discusses the preparation of a number of different meals at different times, like FH4, and indicates this can have a detrimental effect on his own diet when at home. A variety of mealtime patterns are evident across the interviewees, and variation of mealtime patterns within the weekly diet individual interviewees, often in relation to family food diversity. FH7, like ML2's wife has a diet based on weight loss and often eats entirely different food. Whereas FH7 is very vegetable focussed, her husband will eat a lot of fruit at work as a result of a fruit access scheme. The following conversation during the interview addresses this topic of fragmented meal provision:

FM7 I do it [cooking] all. He eats different, he eats a load of rubbish, but he eats a load of fruit as well. He used to work with BT with a fruit day – and they buy fruit in... [Since having children] I still eat the same, but we never all eat the same food, we all eat at different times, have different things...[husband] likes to eat late at night...whereas I like eating as soon as I get in from work most nights, so I eat straight away. You're not supposed to eat on late on at nights anyway [for particular diet].

FH1 Integrates the role of healthy food provision with the practicalities of fulfilment of this role. Linking her child's development with a change in values and availability of time, where when young there was a focus on the health of the child, and less of her own but while not a work full time she had more time to do so. As her role changed to incorporate employment again this changed.

The evidence of an increase in the availability of time can be seen by those interviewed that had a significant lifestyle change. FH6 describes how she has always enjoyed eating fruits and vegetables. Having retired from work as a psychiatric nurse she states:

FH6 Now I finished work I think actually you do [eat more fruit and vegetables], you have more time, y'know. You have more time to cook it, to prepare your meals in advance to know what you are going to have.

FH6 initial response was that her consumption was affected by being at work, in particular notions regarding having less preparation time. However immediately after this she rethought;

FH6 But I don't know because I have always eaten loads of fruit and vegetables, a bought them then as we didn't have the allotment then, and I did buy lots of fruit and veg. No so I don't think that there is that much difference.

What FM6 did describe is that a lot of her food while at work was often brought from home, as she particularly disliked gravies and mayonnaises which would often be the options where she could have eaten. Hence she describes the bringing from home and home preparation as a management to eat what she likes; as a strategy, but not necessarily to avoid fatty or sugary foods but actively enjoying what she brought, and passively consuming high levels of fruit and vegetables. FM6 does describe a certain change in that while at work more of her vegetables and fruit were shop bought,

whereas her husband's allotment now provides a lot of her diet. Thus the effect of a lifestyle change, i.e. retirement, does demonstrate a high involvement with her fruits and vegetables, now retired she can spend more time on home food preparation, reducing the need to purchase food, such as pickling and freezing on foods, and generally enjoys this food preparation and the thought involved. She predominantly makes food used in meals from scratch, and her husband plays a strong role in meal preparation. MH1 also describes a change in eating pattern in relation to different daily activity. In a change of role to a care taker MH1 has more evening and split shift work (to that of his old position) allowing him to be more involved in the food preparation and selection process.

FH9, who now demonstrates high fruit and vegetable consumption, but has for years preceding her retirement been involved in the management of her weight emphasises the role of a significant opportunity to reflect on one's self, in relation to having the time to do so.

FH9 It's only since we retired really we looked at our intake, because we have had to think about it, when you're working, and you rush in and think what will I have to eat, something reasonably quick.

FH9 recognises that her diet was inconvenienced by the limitations placed upon it by work, and that the alleviation of this was much easier when work was less of a priority. FH9's husband also adds that resentment was built around food as a result of the work encroaching upon evenings and weekends, and thus food becomes what he describes as 'instant satisfaction' (FH9's spouse). Indeed MH2 indicates that it was only following retirement that he was more open to 'take stock' of his diet

### *5.3.2.2 Dietary Availability*

FH6, as with others that are discussed below, managed the fruit and vegetables within her diet, as this was the food that she enjoyed and made provision to consume this while at work.

MH5 was employed as a sales agent, as a result he would be away from home, and ate what was available when available. He did not consume very much in the way of fruits and vegetables.

Likewise MH2 was employed as an insurance agent which meant that for him also a considerable time spent driving. Both recognise that there was not the inclination to eat healthily (which they associate with fruits and vegetables), but also that the environment of driving was not conducive to a diet high in fruit and vegetables, with low availability, and little time to establish eating patterns.



This is different to those, where a particular management has been employed to fit the fruit and vegetable rich diets around working life. ML1 consciously avoids fruit and vegetables despite liking some of them, he too is in a position where driving is important to his employment as a bus driver. He describes, though choosing not to eat fruit and vegetables, it is very focussed on convenience, both during the shift when on a break (focussing on fatty produce such as bacon sandwiches, pasties, pizzas or kebabs, depending on shift). Being tired following a shift was also discussed as being an attribution to a convenience diet and lethargy for preparing meals where vegetables would be a part. Instead, other foods would be consumed;

ML1 Can't be bothered to make pack' lunch... Bacon, sausage. Greggs bacon and cheese wrap, for quickness. Go to Greggs every day, then change to bacon shop, depends how a felt at the time. Whenever your break is, having been up since four, on a back shift, then have a pizza or kebab at night.

Similarly FH8 recognises that her husband's diet has changed following a change in working arrangements; 'My husband now he has retired is eating more fruit 'cos I keep putting it in front of him' (FH8), emphasising the fact that it is both her provision within the new environment, and the significance of the environment that is important to her husband's change of diet. MH6 has been employed or self-employed in areas around the food, food logistics and food processing. His diet and fruit and vegetable consumption has varied in pattern and amount as a result of the work he carried out, though has always liked fruits and vegetables as foods and as part of the diet. Concerning one role in particular, like others interviewed, he drove long distances. Describing a position involving food logistics MH6 highlighted similar sentiments to the other driving position by interviewees, however, MH6 also owned and worked in a fruit and vegetable shop:

MH6 I would eat peaches, strawberries. Y'd go to the markets at five or six in the morning...and y'd be eating them in the morning...by the time you got back to the shop you would be eating half a punnet of strawberries, a handful of peas. And in the shop, you couldn't tell customers to buy it unless you knew how it tasted. Used to eat alot [fruit and vegetables].

This is a rather extreme example, but is a useful comparison of the role of availability, and echoes general availability outside of work, such as 'if the' were there' sentiment. It also highlights how work can limit availability because of the time that it consumes, showing a certain differentiation

between the active management and inclusion of fruits and vegetables at work where possible, compared with those who might eat it at work were it available, and those where work impedes consumption. The role of dietary availability intersects with other situational aspects of food procurement, such as shopping and making sure fruit and vegetables are always available (MH5 , FH3 and full fruit bowls for example), as well as the wider issue of time availability to make sure they are incorporated (hence impact of work).

### *5.3.2.3 Work Image & Responsibility*

Certain roles in employment can have an influence upon self reflection and projected image in fulfilment of that role, prominently within health and environment. FH1 works in a position in the promotion of health and as such feels it is important to validate this in her own behaviour, with an impact upon diet and the fruit and vegetables she consumes.

FH1 Because working here I feel I have to project an image to other people. How can I like hand over leaflets regarding health issues if I don't abide by the same principles myself. So, from a professional point of view yes. I think that had a bearing on it as well.

ML2's current fruit and vegetable consumption is low according to the screening FFQ. However ML2 describes variability and can include high consumption in his diet and suggests his eating pattern at his current employment is tied in part into the image of healthy eating, and may be different to his home diet, and the reasons for this also differ between the two environments. Taking into account the diets of the assisted living people he works with, and the promotion of healthy eating in that environment he is more likely to assimilate to their healthy choices. This is further enhanced by increased availability of fruit and vegetables immediately available to him at work that can be snacked upon, particularly through boredom. ML2 'I eat loads of fruit at work', preferring apples to the more fiddly oranges.

Despite ML2 always enjoying and preferring 'junk food', the need for healthy eating as part of work directly for the purpose of that work and responsibility can be seen by ML2's former career within sport [professional footballer] with effect upon fruit and vegetables. He ate much more as it was part of his defined 'goals' to be as fit as he could, which he related fruit and vegetable consumption to. Thus personal preference would be forgone and sacrificed in part (he also ate too many crisps). Part of ML2's past food trajectory, where fruit and vegetables were consciously

consumed, there was an intention and goal attached to them, and physically provided for him by others. He demonstrates less formal eating arrangements in his for himself at home, where fruit might be eaten sporadically, and vegetables when he is not eating 'crap' and inhibited by 'no time and kids'. While working there is an image to convey, and always fruit available. However this is not enough or regular enough to make him a high consumer (who generally show a greater consciousness in their diet and fruit and vegetables).

#### *5.3.2.4 High Consumption Reflected Through Responsibility of Providing a Child's Diet*

The practical nature of having children and the impact upon fruit and vegetable consumption across the interviewees has been indicated. FH3 describes the way in which her son has an impact upon the consumption of 'healthy' foods by the education he receives at school which becomes her knowledge, and his example as a reverse role model helps in making sure she eats vegetables when dining with her son; such as the addition of broccoli to the plate. A child's interest and exploration of healthy food, such as fruits and vegetables can have a direct effect upon the eating of food stuffs that otherwise FH4 would be unlikely to consume:

FH4 [Daughter] really good with the fruit and veg ...I will always put it on the plate even if they don't like it, then they get used to it being there. Like I don't like carrots but will eat them – like them raw but don't like them cooked – but I still eat them because I think it's good for the kids to see me eat them.

Not only does this reflect FH4 want to create a 'healthy' food environment, where fruit and vegetables play an important role for the children, but that she is seen to be trying different foods. This includes the exploration of healthy foods and the strength of choice. In part this reflects her own trajectory of food ideals built from the influence of her own childhood and 'forced feeding' of her and her sister by her mother whose ideals were strongly associated with 'lots of food', and 'food waste' as explained elsewhere. FH4 suggests the importance of building a healthy food environment for her children, which does have some bearing upon her own consumption of fruit and vegetables but importantly it does not exist as a single influence upon her own consumption, but more a surrounding issue.

The importance of other's associated with fruit and vegetable consumption, (integrated with fruit and vegetables as healthy foods) was demonstrated by FH3 and a turning point in her own dietary trajectory related to her son. FH3 noted '[a significant change occurred] probably, I would say,

probably about five years ago when [son]...went on to proper foods and trying to be careful to make sure he ate his fruit every day'. FH1 suggested the complexity of promoting healthy eating to her child. In her child's diet she reflected the balance and cautious expansion of choice, but where the ability to choose one's own food is important; 'she is beginning to say I don't like cauliflower' (FH1). This is not only seen in food preparation, but also in food shopping, with FH4 asking 'would you like cauliflower?' but broccoli being preferred, while also balancing variety.

Like other interviewees, FH1 demonstrates a balance in the reverse effect of direct influence upon her own diet as a result of promotion of health to her child. As FH1 is eating healthily, and incorporating her child into this pattern, she does not feel as though a child growing up in the household has had as large effect on her own diet in perhaps the same way as FH4.

FH2 and husband ML1 describe how the children in the household have very different preferences for food within their diets, including the amount of fruit and vegetables that they eat, allowing food choice rather a 'forced' diet (in reference to ML1 own childhood). For FH2 the pressure of having children has resulted in the physical availability of time being a strong influence in her diet, and thus for her fruits, rather than vegetables, are generally the prominent type within her diet.

### *5.3.3 Health & Ill-health*

All consumers interviewed mentioned health and/or ill-health. This is not to say however that all participants viewed consumption in the same way. We have briefly discussed the role in provision of a child's diet and the reflection in such provision, the following section approaches the interviewees' self- reflection based upon the goals they have and the properties that are derived from a diet proportionately high in fruits and vegetables. Thus for some fruit and vegetables become almost synonymous with health itself. A distinction is apparent in the description of the usefulness of fruits and vegetables, for some they offer a proactive healthiness, for others high fruit and vegetable consumption is very much a reactive response to ill-health.

#### *5.3.3.1 Proactive Health: Be the Best You Can Be*

FH3 demonstrates her conscious connection with fruit and vegetables, her diet, and health, stating that she has developed additions to meals or meals in themselves which she can eat easily. For example making sure she has broccoli at least once a day, using simple cooking methods.

FH3 It's really good for you and I don't eat a lot of things that are good for you so I try to eat a bit of broccoli everyday or if I have a meal I put veg on a plate, even if I'm just having fish fingers and chips I put veg on...I am conscious of the fact that you should be eating plenty fruit and veg, wherever I can I will try to.

FH3 describes the intention of ultimately gaining the health properties of, in this case broccoli, but recognition that the rest of the diet may not be as healthy. When questioned about the convenience of incorporating vegetables FH3 describes how 'It's just as quick to boil up some veg, I mean its quick... It's just like five minutes in the pan and then it's ready'. The strategies FH3 uses to incorporate high levels of fruit and vegetables in her (and her son's) diet seem to be accepted in light of other time pressures and convenience. Likewise she describes how vegetables are often placed on the side of meals that are prepared to ensure that consumption within her diet. Later within the discussion, FH3 responding to a question about the decision to change her diet stated:

FH3 To be honest I think it's to do with watching things like 'You Are What You Eat', sort of stuff like that. 'Ave got a book about it that tells you what's good for you and what it does for you if you eat all this and what rubbish does for you, so I'll have to try and not eat that. And buy more fruit n'. If am making a meal I will look in the freezer and I will think, I can't have that because you can't have veg with it, so I will try to base the meal around veg.

FH3 highlights how this information is incorporated as a strategy to increase health in relation to increasing potential higher consumption; by focussing on meals that vegetables can be part of. It places vegetables at the focal centre of the meal as an accompaniment or addition strategy. By doing so FH3 describes how she has been influenced by health related media and literature, a theme which is echoed with others, both in health and sport related motivations. FH3 believed that she had changed outlook within the last couple of years as a result of feeling as though she was aging and information around her was showing she could be healthier and happier.

Describing points important to her current consumption, FH3 explains that prior to the birth of her son, her lifestyle was different and she was living with her parents. There was not the necessity to cook for herself or take an interest in food. When she first moved out she considered convenience to be most paramount to determining her diet, with 'quick fill ups' and grazing on chocolate and crisps. Her son provided an opportunity and point of change, but in terms of health it also provided a source of information related to her child's diet, as her son grew up more and more

information came home with him from playgroups and schools. FH3 describes how time and space, with the influence of homelife and her child are very much incorporated with the driver and intention of providing healthier food. To say it was only 'health' would be too simplistic, therefore it is important to think of it in terms of the way influences, triggers, and other associations are in evidence.

MH3 also expresses that healthiness is one of the fundamental values to his diet and deliberately so. MH3 stated 'I would say the main factor is choice, it is the choice we have made. To try and live a reasonably healthy lifestyle by eating sensibly'. Reflecting a more general belief about health above, MH3 has another use for fruits and vegetables, and it is because being healthy is at the heart of his sport and activity motivated goals (discussed below).

### *5.3.3.2 Reactive Health: in Response to Ill-Health*

Sometimes the 'healthiness' displayed by interviewees is the product of a battle over negative pressures on food trajectories. Unlike proactive healthy eating, fruit and vegetables have been consumed for the purpose of reacting to ill-health. For some this represents a turning point in their diet, for others a transition in diet.

FH5 indicates how issues of weight and issues of not being healthy can be thought of holistically as part of the journey towards healthiness, rather than the influence of each component as a factor themselves. This healthiness can go beyond diet and health and become lifestyle, where diet is fundamental in the achieving and maintaining this, and fruit and vegetables are significant variables and indicators within.

FH5 I did the Food4Thought course at the hospital. You have to be referred, but its linked to a life changing thing, and they want to get you on to the healthy eating and healthy exercise. For a long time I couldn't go out on me own. I just used to eat things, then I got bigger and bigger and certainly didn't want to go out on me own. I thought well just try it, it is your last chance so a thought, hurl yourself into it with as much enthusiasm as you can.

FH5 describes how her life was in a negative cycle concerning mental health and the role that food played in her example. When asked what made her get involved she stated that a lot happened to be circumstance and good fortune of looking through a file when delayed at an appointment, but at the point she felt really down about her lifestyle. Following the course which provided direct advice

and influence, there was a significant change in the perceived role of food, now as a positive force within life, and not a constant guilt reaffirming negative eating. FM5 indicates that in the past she would eat some food that she should not have, but deny to herself that she had eaten it. Rather than feeling guilty about it, following the course, she allowed herself to be happy that she has enjoyed it, and as she recorded her food in a food diary format, she was happy to write down what she has eaten accurately. Demonstrating more effective management of her diet and its meaning to healthy living. This makes her very aware of the fruit and vegetables she consumes, exhibiting a very deliberate and monitored strategy for high consumption.

For FH5 weight was only part of her ill health which she considered almost a symptom, and was part of her unhealthy life. She did not consider dieting for the purpose weight loss itself, but has found as a result of her new relationship with food (and exercise) weight loss has occurred, and she was now beginning to take advantage of greater mobility and self esteem. FM5 believed that her fruit and vegetable consumption integrated as part of her diet and exercise was part of a healthy lifestyle, linking mental and physical health. Fruit and vegetable consumption was tied into the more positive cycle of feeling better and in particular a feeling of being able to manage her diet and lifestyle.

Where for some, the contribution of fruit and vegetables to the diet were linked with a continuous/ongoing, long-term expression of being 'healthy', others demonstrated a sudden reactive function in their consumption. Certain characteristics are similar to that featured in dieting and weight-loss, less so weight management, in that the fruit and vegetable consumption within the diet are specific to an acute health influence; the recovery from physical health related problems. MH5 stated 'I have a healthy diet, I had bowel cancer you see. I had a heart problem after that. That's why am here [HLC]. I am trying to recover from two major operations'. Prior to this 'unless it happened to be in a side salad, fruit and veg might have been once a week...Sunday dinner' (MH5). He had a preference for 'tasty' unhealthy foods. Which was reinforced (poor access to healthy foods) by his work in sales and service engineer, travelling by car a lot supported his indulgence for eating his description of 'tasty' eating and general unhealthy lifestyle such as smoking and fatty foods and alcohol.

Following at least two serious health incidents MH5 described that his diet had changed substantially.

MH5 Lettuce, bean sprouts and that... salad or salad sandwich. There's always a portion of some veg with whatever we're having... If am not having a fruit salad I might have a couple of kiwi fruit. A fruit that we buy in bulk, like strawberries at

the moment...It seems pretty boring, 'cos it's perfect. It's too good to be true really... The only things I won't eat off your list [food frequency questionnaire] are the things I don't like.

The issue of his ill-health has a positive effect upon an increase in his fruit and vegetable consumption within his diet, as well as a decrease in other food types. His link with unhealthy tastiness has now been adopted by his healthy tastiness, i.e. he will only eat those things that he has a preference for. However what is interesting regarding his individual level of responsibility, and that of his wife. For MH5 it is his wife that supports and pushes his new diet and lifestyle. For example his wife and he will go through recipes and health literature, but his wife has control over his fruit and vegetable consumption. The influence from this source on his diet is extremely strong, and is not merely in support of his achieving a healthy, high fruit and vegetable diet.

MH5 It's all to do with being really poorly, 'ave been at deaths door twice now, probably three if you include the heart, and she's not happy about it... I'm pretty much a healthy eater. It's forced upon me of course. It's not because I am consciously... If I was to try it me self I would be like I should be having, I should be doing but probably wouldn't. .. I would probably be further back if it wasn't for her, feeding this stuff into me... So I suppose she is my driving force... I don't think she wants me to be ill anymore.

As MH5 continues it becomes apparent that the influence upon his diet is related to ill-health, recovery, and wanting to be healthier in the future, but much of this is not his commitment or motivation but rather his wife's commitment to his health. In this instance MH5's wife is more than support and more than a strategy of high consumption. The dietary path MH5 exhibits the linking of lives with his wife following ill-health as a trigger, while social support is derived from his wife.

MH2 displays a similar pattern, and effect of ill-health. He had a heart problem, and was looking towards a hip replacement. He used the goal of a hip replacement to help motivated his weight loss His recent medical conditions have occurred simultaneously, influencing a higher fruit and vegetable consumption, while losing weight he is aiding in the health of his heart. MH2's wife changed her diet to be more like that which MH2 needed, and thus they linked lives in relation to food. MH2 highlights his wife as instrumental in supporting and driver his consumption, as well as for him being alive. MH2 and MH5 had similar roles in employment and both described how being out on the roads all day had a detrimental effect on their consumption of healthy food. Whereas MH5 would



go back to the food he used to eat, MH2 is more regretful about the effect his diet has had, and is positive about the way that he feels, 'fitter' and 'healthier'. At the same time he still considers what he used to eat 'tasty'. His diet and fruit and vegetable consumption is not unconditionally positively adopted and he refers to the 'bloody regimented' nature his diet has.

The timing of the incidents seems to play an important part, for MH2, having just retired, and being more open to suggestion when ill. Thus he displays an important time link;

MH2 Its just when a finished work, I didn't think about it when a was working...I just didn't listen to her...she was the big push...What give 's the thought was the ticker, I thought am going to die here..that was the big kick, kick up the backside... If somebody had been tellin' me this, what I'm tellin' you now, about ten years ago I would have told them to bugger off, rubbish. ..it's only when the' get a bit troubles and a bit older you start thinking about this.

MH8 has substantially increased his fruit and vegetable consumption also. He also recognises that he has recently, as part of the current time of his life, become more reflective of media influence;

MH8 I liked fruit and that but a wouldn't say that a was doing it in the way that I was now, you might have an apple and then not look at one again for another few weeks. Now what can I say you read a book and every other paper has got something about your diet. Magazines...get instances of eating this and that. It's something you begin to follow and think about...more than when you did when you were a laddy or growing up.

Problems with his heart have made him more open to information about diet and health. Importantly also is the influence of his partner who he met following the death of his wife, and some time living alone (where very few fruit or vegetables were consumed). He is surprised by the fondness of eating the new diet including fruits and vegetables. The high level that MH8 exhibits is tied to his partners' enthusiasm for supporting a healthy diet for MH8, this is in the provision and availability of fruit and vegetables, such as physically making his meals, and from her interest in healthy eating and weight control for herself. This combines in an opportunity for MH8 to be more enthusiastic about elements of his diet and increased awareness of his diet, while recovering from ill

health. Without his partner however, as shown when he lived by himself, fruit and vegetables would not figure as strongly in his diet.

MH6 fruit and vegetable consumption has varied considerably over his life, but rather than changing in a single step, or sudden increase as the result of a healthier diet, throughout his working lifestyle he has shown food patterns that reflect availability of fruit and vegetables to this. Like others, some part of MH6's recent working life involved a lot of driving. He has always had some involvement with food through employment roles, whether as a chef, logistics, or a retailer of fruit and vegetables. This is discussed elsewhere, but is mentioned here in comparison to MH8 who has only in the last few years suddenly changed his opinion, access, and consumption of fruit and vegetable. MH6 appreciates and respects food, also having been a chef, and is involved in cooking at home, recognises quality in fruits and vegetables, but it is only very recently that he has purposefully consumed even higher levels of fruit and vegetables within his diet as a result of a heart attack three months prior to the interview; 'I'm eating more fruit and veg than a few months ago' (MH6)

As a result of his ill-health, and a higher degree over the control of what he eats and prepares, an increase of knowledge of beneficial effects of certain foods had been prominent in managing his diet to meet his health needs.

MH6 It's information I have read, I have been on the internet. Fruit and veg is good for you, roughage is good for you which you get from fruit and veg. Different fruits and vegetables are good for you. Pomegranate juice, pomegranates are good for the cholesterol, heart disease things like that. So I am eating a lot more stuff like that now than I ever did. Just to better my system.

MH6 is more self-reliant concerning dealing with his acute health needs than others, and is more functional in his approach of managing his (and his family's) high fruit and vegetable consumption who rely on others to drive their diet or support in the provision of their food. Thus MH6 made available fruit and vegetables, planning the cooking of the family meals, and accommodating his likes and preference for quality fruit and vegetables. He displays a greater sense of control and self efficacy.

Another of the interviewees to have recently undergone treatment and recovery for ill-health is MH7. MH7 has always eaten a high amount of fruits and vegetables. But recently the focus and aim of his diet has altered significantly, yet his fruit and vegetable consumption, both in type and amount has changed less. Having grown up and worked most of his life in rural areas, and worked closely in the outdoors with the production of food, MH7 routinely goes out foraging. However this

lifestyle has also been linked with his overconsumption (as far as health professions deem) of fats, such as fried breakfasts, four hearty meals to ward off the cold and keep him active throughout the manual-labour based day. Now that he no longer works in the same environment, since retirement, his diet has had to change towards reduction of fats. Despite his motivation for his diet (along with his wife's support) being the reduction of ill-health, fruit and vegetables do not pose a significant barrier, nor need a behaviour change. What is important in this case is MH7's engagement and confidence with food.

#### *5.3.4 Competition & Sport*

Sport featured strongly for a small number of the interviewees. Like weight loss and health, it was often closely tied with the setting of goals including: general and specific, short term and long term ambitions, and the role the sport played in a person's life.

Sport was also closely associated with being healthy and being fit, but was distinct in that the motivation was predominantly focussed on improving or maintaining competitive edge for sporting purposes. MH3 summarises the association regarding healthy food and fruit and vegetables for him. He starts by acknowledging the strong role of goal setting and aims, firstly as part of not being ill.

MH3 Well. Its, it's for the healthy lifestyle. I try to keep reasonably fit and keep healthy. I think there is benefits for work and all sorts of things by trying to keep a reasonable fitness level up...I have got specific goals of work such as a don't like being off...specific goals within part of my own life regarding fitness levels, I mean I have nearly cycled twelve hundred miles this year, and I try to...rock climb as hard as I can, to a technical grade.

Although MH3 had periods of his life where he wasn't as generally health inclined, such as a period where he lived alone, in between living with parents and being married, MH3 reaffirms the strength of fitness in his sporting interest. MH5 states; 'I was trying to be as competitive as anybody in the county... but because of that reason, a lot of goals to climb the hardest routes in the county, find new routes on rocks that hadn't been climbed'.

As with his wife (FH1), MH5 exhibits a pattern of fruit and vegetables during the working day being prepared, as in the soup that he mentioned and fruit (discussed above). Because of the activities he, and wife and child, are involved in he has a similar level of fruit and vegetable consumption during the weekend as with the working week.

Thus vegetable distribution remains similar throughout the week, rather than a more concentrated vegetable consumption at weekends as a result of greater time, social meals and traditional meals.

MH4 like MH5 has a strong interest in sport, but is very much focussed on a single pursuit. As a result his intention is less about the maintenance of health and eating sensibly (wellbeing), but performing in that sport. As a result of the competitive element, with specific times of competition and training, MH5 diet, including fruit and vegetable consumption is consciously aligned in this pursuit. Including a short and long term dimension based upon the properties of certain fruits in particular. When asked about the biggest influence on his fruit and vegetable consumption MH4 replied:

MH4 Just like a car if you don't put the right fuel in, don't get the right performance do you really. I just want to eat what's going to give me the best performance sport wise...With squash you are always looking for an edge to beat your opponent, I just felt that I was at a stage where I was doing all this training, I wasn't looking at my diet, could I get a little bit more out of my sport by looking at my diet.

MH4 iterates this in various descriptions that emerge throughout the interview (as well as strongly linking fitness and exercise). With respect to short term usage of fruits he states; 'Banana for energy, if I am playing squash I will usually have a banana beforehand' (MH4). A more projective thought on this; 'I think I gain health wise, just looking at what I eat, I never used to eat a lot of fruit, or vegetables, so I am eating more now...a long term thing for your health' (MH4). There is a thoughtfulness in his consumption of fruit and vegetables; this influence has only become prominent more recently, despite the playing and competing of squash being a constant throughout his life (now in his early 60s).

Prior to five years earlier he had not looked at his diet, and with the media attention on increasing fruit and vegetables at that time he undertook change. MH4 identifies that he looked at his diet as a way to increase his performance as a squash player, but to do so he was influenced by media regarding getting the best out of the body using the diet. He links this with a readiness to listen to such information tied with age getting older. Further to this he points to another change; approximately sixteen years earlier there was a situational change at home and MH4 separated from his partner. This had allowed him to focus more upon the requirements of his own diet rather than sharing meals and mealtimes. He gained control of his diet. In reflection of his previous diet he states 'If somebody has made a meal you're expected to eat it'. He highlights this further regarding

to eating whatever has been prepared for him at his son's home on a Sunday. Likewise while discussing his meals with his parents he stated that meals had no meaning and it was important to eat what was given. This is an indication that food within his diet had now a meaning, i.e. food for sport. Though he has important elements to his diet, he concedes that his works canteen could only do so much.

Linked with the importance MH4 places on particular meal times, he recognises the increases in fruit as part of his breakfast, and plays a major role in his dietary plan. The types of fruits he consumes is managed in such a way to make sure they are convenient snacks, or easy additions to his diet, as he himself admits. With fruits such as oranges, nectarines, and peaches MH4 declared that if they were there he would eat them, but he didn't like the preparation involved, and couldn't really be bothered with them.

### *5.3.5 Taste, Enjoyment & Engagement*

Most interviewees expressed consumption in relation to those fruits and vegetables that they enjoyed eating, others suggested a change in the preference for food types, and others of being forced to eat those things that they generally would not have eaten in other circumstances. For example, FH3 derived enjoyment from grapes; being a fussy eater and not eating proper meals so always picking at the fruit bowl. Some interviewees have described a preference for certain fruits and vegetables within their diet as opposed to others, some in line with effort of preparation, or a strong preference for individual items or certain characteristic.

FH6 exhibited a clear indication that her high consumption of fruit and vegetables was as a result of liking them way above alternatives. Fruits and vegetables are natural to her as food being grown by her father when she was a child. FH6 describes how fruit and vegetables were part of her upbringing, and recognised the growing aspect of the food, where she experienced the production of that food. Linking this to her engagement from a young age, supported and influenced by her parents provision.

FH6 It's just what I like, I like things like that, but it is, well I recognise it as a healthy diet, but I eat what I like... if anything I eat too much, as some has too much sugar in, and I like nuts as well.

The recognition of the healthiness does coincide with regard to health as a whole as well as diet, and FH6 attends exercise classes. FH6 actively amended her husband's diet to follow a more similar one

to her own. This is not to say that her diet is devoid of unhealthy foods, which again she notes as a joint diet with 'but sometimes we have nice things in our diet' with reference to biscuits. Interestingly her perception of her diet, and the things she likes (fruits and vegetables) points to a reflective nature of not being perceived as normal, or somehow less of a diet, for example when asked about the length of time she has had the dietary pattern FH6 jovially revealed 'always has been, sad life [laughing].

Like MH3, FH6 utilised a different diet of fruits and vegetables between winter and summer months. FH6 explained that her current engagement with vegetables was related strongly to the production of allotment vegetables produced by her husband, who now retired took up the allotment when offered eight years earlier. Although the allotment does not necessarily influence the amount that FH6 eats generally now that she has retired, it can have a significant influence upon type of fruit and vegetables consumed, as well as seasonal increases in particular foods consumed. This is similar to FH2's peas (grown by her father), and shows variability, as opposed to FH3's grapes which are fundamental to her fruit consumption.

MH4 with regard to the preference of fruit in his diet states that he would; '...rather have fruit to a bag of crisps now'. This demonstrates a change in his preferences in using fruit as a snack, where fruit, rather than 'having' to eat it, he prefers to eat it. It thus no longer acts as a substitution in the same way as a barrier to unhealthy snacks and grazing food but has evolved into a normalised part of the diet (which is overwhelmingly focussed on aiding sporting fitness).

MH1 had been on holiday abroad the week referred to by the food frequency screening tool, where as a result he did not have the same daily routine to when he is at home. Regarding fruit and vegetables MH1 indicated that he would consume more fruit in the UK if they were tastier (like abroad). He indicated that it was the taste of fruit that specifically led to the increase observed, and that while shopping in the UK, supermarket fruit in particular was lacking in flavour, having instead focussed on size and appearance. MH4 indicated that he would happily pay more for tastier fruit, citing farmers markets and farm shops as places he has used. He is happier with vegetables on offer to him, but suggests a preference to eat fruit because he enjoyed it rather than for the sake of eating fruit.

MH1 recognises the importance of fruit and vegetables to the diet, particularly working in a health promotion environment but does not identify health as a motivation or influence on an increase in fruits and vegetables already consumed. On this point, and awareness of amounts that he consumes, MH1 states; 'if there was a day where we just had four portions it wouldn't bother 's'. Counting of elements to the diet is not the intention or long term goal, unlike what was often seen in relation to weight loss, though he could roughly estimate a regular balance of vegetables with meals

and fruit as snacks. This is not to say that MH1 did not care about his diet, in fact he describes an engagement with food, and both evolutionary development, and defined periods in his life where he has noticed significant changes, particularly environmental. For example he described how when he lived at home, some years ago, prior to married life he would have not reached five portions of fruit and vegetables a day. Likewise he indicates that there was probably a difference in accessibility to foods between when he lived at home with his parents and subsequently living with his wife. MH1 discussed an increase in the engagement with food, experimenting now with new fruits and vegetables, looking at recipes (and other media) often buying cookery books and watching associated TV programmes.

### *5.3.6 Dieting, Weight-loss & Weight Control*

Despite a strong association for some interviewees between health and losing weight, weight loss was prominent enough to be categorised within its own section. FH4 described a very different food ideology when she and her sister lived with her mother than her current position. She indicated that a number of stages in her life and turbulent relationship with food subsequently caused eating problems that eventually developed into a healthier ideal, which she wishes to pass to her children. Like ML1, FH4 was forced to eat food that was given as a child, despite feeling that she and her sister were 'chubby', so she wanted her own children to escape being overweight by providing a 'variety' of 'healthy' options and integrating 'choice'. In particular she does not want her to be the cause of them potentially having a problem with weight. FH4 rationalised the reasons for her mother's meal time dealings, and how this contributed towards her experience when younger as related to limited money to provide food in her childhood home and did not want to add to the waste, regardless of taste, and thus felt pressure to eat too much.

She later developed eating disorders in relation to the perception of 'being too fat' (FH4). At that point fruit and vegetables were eaten as they were considered 'not fattening', but eaten as part of an unhealthy cycle and relationship with food from the age of 12. FH4 'was already getting back on track' when she met her husband, but found putting weight on a real issue, again relying on the strategy of cutting out all food but fruit and vegetables for the purpose of weight loss which she valued. Again she does not wish to project the wrong image of food to her children. FH4 strongly believes that there is a direct link between her past and significant feeding events that affect her current behaviour in relation to her food image.

FH1 linked the association between body size with diet, describing how her size, as a result of eating, can be influenced by what is going on in her life, including an increase in stress, but

interestingly can produce either an increase or decrease in her size. In particular she mentioned bereavement and other life changes, changing house and employment as unsettling to her weight management, stating 'there were five or six major life changes within a year and a half, and I, just everything blew up and I couldn't cope with it all' (FH1). FH1 also refers to points where physical condition related to pressures, such as lower mobility, less fitness, and being uncomfortable in herself. The trigger point however with regard to weight gain was clothing becoming too tight.

FH1 I used to be a size twelve before I had [daughter], then I went up to a size sixteen which was said to be the average size for a women in this country, so I felt quite comfortable being a size sixteen and I wasn't too bothered. But then I went up and up, so size eighTEENS were tight, then I was buying size twenties, there's no way that I am going any further up this scale.

FH1 conveys her issue with size (reflected by relating it to dress labels) into her own bodily form 'It was how I felt, I felt uncomfortable, I had rolls of fat and I thought no I don't want it' (FH1).

Linked with a history of weight control in one form or another, FH7 has dieted since a young girl. Believing 'if I eat I put weight on, so FH7 is always dieting to lose weight'. She saw this in relation to feelings of being fat, as compounded by comments made at school when a young teenager. FH7 highlights a number of trigger points where she reaffirms a need to diet for weight loss. From being teased regarding her weight she initiated a programme, then having lost the weight continued to be sensitive of being too large, establishing parameters of acceptability to her weight. FH7 contextualises this in relation to getting older and having children, but considers a particular weight as above her normal parameters (reaching ten stone).

FH2 like others that categorise dietary weight loss as an aim sees the loss of weight as a result in itself, as well as healthier lifestyle. For her it was the birth of her first son that led to an increase in weight, describing herself as 'roly poly'. FH2's recognition of being overweight and the appearance she associates with it, acts very much as a trigger to action to remedy the situation by more thoughtful or strict 'dieting'. FH2 displayed specific dieting periods within general dieting lifestyle.

FH1 considers the type of fruit and vegetables as well as a certain amount of the high consumption is related to a positive encouragement while sticking to the 'Slimming World' plan. She does so in order to meet the requirements of an organised (socially) weight loss schedule, based on set eating patterns.



FH1 Its combination and it's eating foods, you have different days; you have a red day where you would eat more protein stuff along with your fruit and vegetables, but you would have a green day where you would eat carbohydrates, or rice, pasta, beans, stuff like that...You can eat as much fresh fruit and veg as you like.

The dietary plan influences the food that FH1 consumes strategically for the purpose of weight loss. There is a stress on fresh, but some aspects of fruits and vegetables, when combined with fattening foods are discouraged (such as coleslaw, and beans). The role in this instance of some fruit is also interesting, as a 'free item' where you can eat as much as you like, but also as a 'snack' food.

FH1 perceived this as 'filling up', because in eating more fruit and vegetables 'you don't want to eat cakes and stuff because you haven't got the room to eat it' (FH1). This represents a substitute, in that it replaces cakes, but with an emphasis on filling up the body, rather than for example grazing, though both representing the prevention of consuming unhealthy foods. Filling up the body, or maintaining a full feeling can be conducted using meals at meal times, where there would be no need to eat anything necessarily between meals. This indicates dietary strategies and management of fruit and vegetables in the diet, based upon balancing patterns of consumption.

FH1 has also changed her approach to eating at work. In the management of her diet she brought food from home that she had prepared in advance, so that she did not have to rely on the local unhealthy food. It also meant it was more convenient in meeting the needs of the diet plan, as well as introducing fruit at the desk rather than eating sweets. Important to the structure of her diet, she links taste and preference with the food she consumes, with the dietary plan allowing for flexibility, but incorporates healthiness into this preference. FH1 acknowledges that fruit and vegetables fit into her diet and will play a part concerning weight control as an ongoing relationship, recognising that her diet is also part of exercise and weight control. Something she herself is aiming towards.

FH7 follows the Weightwatchers plan, giving food choices. Whereas FH1 has a system of food types and days, FH7 relies on the counting of points, where different foods have different values. This allows her to demonstrate clear preferences in the foods she does eat, and interestingly not always focussed entirely upon maximising weight loss or health as is seen by others (for example FH1 who during her interview states; 'it's just personal choice. Just I know that red meat just isn't as good for you, so I tend to choose the healthier meats'). Fruit and vegetables are used differently by FH7, despite her concern regarding weight. FH7 quite often bases decisions more on taste than necessarily following either weight loss or health. For example she knowingly substitutes the option of fruit with eating crisps if her points allow, exhibiting value negotiations.

Vegetables however FH7 eats in abundance, both as a composite meal and as a side to her meals; sometimes 'filling up'. Related to her current vegetable consumption, FH7 attempts to maintain a constant high volume, while attempting to reduce fats, using more obvious strategies including 'points calculator' for certain foods. Part of FH7 food management is the purchasing of large quantities of vegetables, eating some fresh, as well as demonstrating a planning of future meals by processing the vegetables then storing them.

Despite the intention to follow the Weightwatchers plan to control her weight, this is not a complete picture. FH3 and FH1 do mention a 'straying' or 'lapse' in their healthy eating plan, often with a result in an increase in sugary snacks. FH7 describes a much stronger conflict within her diet, summarised by her reference to foods she likes and food she 'can't' eat. This relationship and displayed reluctance with some elements to the constraints of her diet are demonstrated with much more vigour with a further behaviour pattern. While maintaining the use of the Weightwatcher's cookbook to create meals, incorporating high amounts of vegetables, particularly during the working week, FH7 describes a weekend change in her diet, where the consistency toward dieting retracts. This strong sacrificial and compensatory behaviour begins with a Thursday night then 'a slippery slope' over the weekend.

FH7 I can't enjoy myself as much as other people can, a lot of people can.

Because a lot of my friends can stay slim, and if they go out and have what I would have, they wouldn't change on the scales. I would love a Greggs' pasty - but I don't have one... I would love to be skinny and eat like a pig, the way some people get away with, but cannot, I would end up like a house end. I have to fight with my weight.

FH7 demonstrates a commitment to weight control. She prepares vegetable rich foods on the weekend for the forthcoming week, but simultaneously describes reluctance in having to control her weight and preferences for alternatives.

For FH2, food was an important issue within her life and her diet is something she thought about often. Relating what she ate her weight was of most concern and main influence 'I am very conscientious about me weight. If I am going to eat anything it will be something with fat, so I eat fruit...plus I enjoy it as well so it helps' (FH2). Unlike FH7, FH2 finds great positivity in the food she consumes for her weight control. This is similar to those who have changed towards health recovery following an acute illness, and enjoy fruit and vegetables. FH2 just happens to eat more consciously now and is generally positive about eating fruit and vegetables to overcome an issue of

being too heavy, and maintain a lesser weight now that it has been achieved. This is unlike FH5, who wanted to see her weight maintenance and diet as a contributing part of her healthy lifestyle, and to be 'better for herself' (FH5). During the interview FH2 mentioned how fruit in particular plays an important part within her diet: 'I am only on a diet now, I class it as a diet, but fruit is the only diet I enjoy'. FH2's lifestyle is not regimented, and she does not eat in what she would consider as structured patterns. Part of this she considers as a result of her hectic lifestyle running about for her children, and the time availability restraints that this places on her diet. Second, her husband works shift patterns and children return from school at different times which means that she does not regularly eat socially as a household.

FH2 strategizes the incorporation of fruit, something convenient and useful in controlling weight, while at the same time very fitting on the irregularity of her meal patterns. Concerning set meals and the role and vegetables FH2 states she will have some vegetables with chicken, and makes curries and stews from scratch. FH2 also displays some opportunist, seasonal elements to her diet, for example peas from her father's garden.

#### *5.4 Categorising the Fruit and Vegetable Consumer: Attitude and Action Typology*

As the interview stage and subsequent analysis progressed, and subsequent analysis, it became apparent that the interviewees as fruit and vegetable consumers held distinct positions relative to each other in relation to their own achievement (or non-achievement) of high levels of consumption. By regarding each the consumer as an individual case it was possible to define them by their degree of enthusiasm in consumption and by their level of consciousness towards the achievement. The typologies were identified by particular discourse exhibited throughout the interviews, and narrative descriptions of feelings towards fruit and vegetable consumption.

There are certain definitions that are important in understanding this. First 'consciousness' refers to the level of awareness of fruit and vegetables in the diet relating to a particular goal; thus a higher degree of goal orientation will allow for greater consciousness of the role of fruit and vegetables towards that goal. This is not to say that less 'conscious' consumers do not know or perceive benefits of consumption, but merely that they do not actively or deliberately apply such meaning towards a 'conscious' goal. Likewise, their 'enthusiasm' for the fruit and vegetables in their diet refers to an enthusiasm motivated towards their specific or general goals. Hence the role of fruit and vegetables in ones diet is of particular emphasis in the categorization by typology.

Interestingly the actual diets exhibited by consumers can be similar across different groups, but it is the relationship of the individual to the role of fruit and vegetables that is important to the defined group that the consumer belongs to and is explored in this section. Similarly those differences may be expressed as different attitudes, associated behaviours and potential differences in meaning for the consumers, which in relation to factors of fruit and vegetable consumption have significant weight.

A further point is that the typologies do not necessarily represent a permanent position. A number of interviewees expressed a change in relation to consciousness and enthusiasm towards high fruit and vegetable consumption, and hence movement between groups over their historical fruit and vegetable trajectory. In certain cases a dichotomy exists between their goals and achievement. The named typologies, and sub-groupings are **WANT TO (WT)**, **HAVE TO (HT)**; **HAVE TO (MADE TO)**, **HAVE TO (NEED TO)**, **WILL DO (WD)**; **WILL DO (STAPLE)**, **WILL DO (NOVEL)**, and **CAN DO (CD)**. These represent the categories relating to high consumption of fruits and vegetables. In addition, **WILL NOT (WN)**, and **DONT WANT TO (DWT)** refer to low consumers.

#### *5.4.1 WANT TO (WT) Consumers*

WT and HT consumers are more prevalent within the interviews conducted. For WT consumers the high level of fruits and vegetables consumed are related to the deliberate consideration and evaluation of fruits and vegetables for the properties they have in relation to a specified motivation. The consumers distinguish themselves as a group from the HT variant based upon the consumption being enthusiastically adopted. This is most often as a deliberate choice to eat fruit and vegetables as part of a 'healthy diet', without a sense of regret or reluctance in that choice. Thus the high fruit and vegetable consumption is part of the action towards the particular goal, they therefore demonstrate a high level of motivated consciousness in high consumption as well as high degree of motivated enthusiasm.

For example, MH3 expresses the wish to be more competitive within his chosen field of sport, as well as indicating that a conscious choice was made to eat a healthy diet and have a healthy lifestyle; fruits and vegetables play an important role to this end for him. It is not a problem, difficulty or even 'hardship' for him to consume high levels of fruit and vegetables, and this highlights that taste and enjoyment is an important element to this group. Thus there is inherent a positive notion of such high consumption, and positive regard for the intended outcome.

The management of fruit and vegetables within the diet is an important practical consideration to this group; that is, the end result hugely outweighs the assurances needed to maintain high

consumption, so that barriers to consumption are perceived as less of a problem, and more routinely overcome.

The setting of long-term or short-term goals is a characteristic that is fundamental to this classification. It is evident as both part of everyday lifestyle toward a goal, or as a selective period. FH5, for example, provides useful illustration; she is dedicated to providing herself with a lifestyle with a healthy core, in exercise, and diet, with prominence given to high levels of fruit and vegetable consumption. Following a health course, FH5 changed her ideology concerning food, and became enthusiastic about the inclusion of high levels of fruit and vegetables within her diet. Shorter term goals that were identified are those where a loss of weight is enthusiastically embraced and becomes integral into food ideology. Within the typology is the evidence of self-motivated individuals, who can remain motivated toward the conscious goal in relation to other pressures, such as family food differences. However, there are some individuals (MH8 and MR for example) where their enthusiasm towards high fruit and vegetable consumption is firmly supported, and informed by dedicated others.

#### *5.4.2 HAVE TO (HT) Consumers*

Those who are positioned within the HT group of interviewees, like the WT group, demonstrate a strong consciousness and deliberateness in their fruit and vegetable consumption. It is purposeful and goal motivated, but unlike the WT group, this group of consumers display significantly less enthusiasm towards high fruit and vegetable consumption within their diet. It is a goal to be reached, but they do not necessarily take pleasure in such consumption.

Fruits and vegetables in such volume regularly represent a utility. Such consumers may enjoy some of the flavours and taste, some of which were eaten prior to entering this consumer type. But these consumers often find themselves in this category as a result of a trigger which necessitates a change in diet. Thus, for some, such 'rabbit food', and the role it fulfils, synonymously represents a reluctance and resentment of their new diet and lifestyle compared to that which they have left behind. They feel somewhat pressured. As such, characteristically, interviewees expressed a reminiscent enjoyment of their previous dietary habits, and expressed how they missed many of the items they previously enjoyed, and would be happy to consume again. In many cases, either fruit or vegetables are used as a way to prevent eating those items which would be considered 'bad' for them, and hence places fruit or vegetables as a direct substitute. The typology quite often exhibit a strong thought of disliking something about where they were, or reflective of the past, linked with where they consciously want to be, rather than the more forward looking WT group.

There are two separate groupings within this category based upon the level of support required to sustain high fruit and vegetable consumption. The first named 'MADE TO' is the more extreme. In a reported case (MH5) the individual is supported almost fully by his wife, and has little self motivation or commitment to a high fruit and vegetable diet himself. His wife's motivation and commitment to his goal has in this instance superseded his own, and hence he is 'made to' (or perceives this as being forced to) consume high levels of fruit and vegetables by another.

Other examples highlight a more common position, of the HT 'NEED TO' consumer. Here a trigger or influence is sufficient in itself to provide the impetus to commit to high fruit and vegetable representation in their diet. This is not to say that support from others is not needed or useful, but rather they maintain self motivation and drive toward the conscious goal, whether it is for reasons of weight loss, as with FH2, or as is frequently reported to overcome or manage ill-health, while exhibiting those characteristics common to HT consumers.

#### *5.4.3 CAN DO (CD) Consumers*

CD and WD consumers occupy a position where there is little deliberate motivation, consciousness or enthusiasm towards a defined goal. CD differ from WD regarding high fruit and vegetable consumption in that their diet is less guaranteed to be sufficient in fruits and vegetables to permanently occupy a status as 'High' consumer. Thus the role and status of fruits and vegetables within the individual's diet is not as constant as with WD consumers. This group therefore sits on the margins of high consumption, although in some cases actual amount of fruits and vegetables can be very high for a period, but this period is not sustained, and equally low consumption can be exhibited in alternative periods. The length of that period may vary depending on the reason for the high or low consumption.

Whereas the HT consumers display reluctance in the consumption of high fruits and vegetables, CD consumers, when having consumed high levels display a general neutrality, contentment, or happiness in that consumption, relating to their own decision made to consume them, or general happiness and acceptance if provided for by a spouse or partner. However, low consumption may also be met with similar contentment or neutrality. Some exhibit low levels of guilt where the consumer recognises that their diet may not be 'as healthy as it could be', with either low consumption periods, or high levels of 'unhealthy' foods consumed when done so, but not sufficiently to immediately change their more laizze-faire dietary habits towards a goal motivated diet.

The role of taste is important and manifests in either a positivity towards fruits and vegetables, or a neutrality in their taste. In both cases 'accessibility' can feature prominently in the food that is eaten, including fruits and vegetables, and especially fruit. Interviewees expressed that they 'were not against fruit and vegetables', and 'actually quite like them', or 'I really like fruit and vegetables', stating more regularly that 'if they are around, I will eat them' (thus often demonstrated in eating a large volume of a small variety of fruit). This accessibility in consumption can be related to what is at hand in various circumstance, at work is there any available or does work or family commitments reduce personal consumption, or what is in the cupboards at home, is there any left in the fruit bowl, for example. As a result there may be a variety of dietary patterns exhibited, and strategies for high fruit and vegetable consumption as not a strong feature, more the management of fruits and vegetables in the diet are more circumstantial.

Further characteristics that were expressed by CD consumers are the role that convenience has in relation to accessibility, as well as, in relation to taste; the likelihood that fruits and vegetables may not be characterised as strongly in relation to taste as other foods. Thus fruits and vegetables would be ranked below some convenience foods, and the want to eat other types of food overtakes fruit and vegetables; 'if it were a choice between fruit and crisps, I would take be the Pringles every time...' (ML2).

#### *5.4.4 WILL DO (WD) Consumers*

The WD consumers are broadly defined as those who, within their regular diet, consume High levels of fruit and vegetables passively in relation to conscious consumption. That is fruit and vegetables almost 'naturally' occupy a high status level within the individual's diet, but without dedicated thought. It is this passive consumption that strongly identifies it as a separate group. Fruit and vegetables have certain strength within the diet, a passive commitment to their inclusion, even if there is some variability, they will be consumed in amounts clearly in excess of what has been considered high. Of those interviewed only a small number were identified as being associated to this style of consumption.

MH7 for example has always eaten fruits and had always eaten vegetables. He grew up in the countryside as a farm worker. As part of his normal life he would engage in the growing of both fruit and vegetables, which were eaten in the form of composite meals, as part of puddings, preserves, as meal accompaniments in cooked form. He also ate foraged vegetables and fruit, such as mushrooms and berries. As such there was in evidence a strong engagement with the production of food, not merely fruit and vegetables, but also large amounts of meats and fats were consumed also.

Sustenance, with fruit and vegetables being part, was fundamental in his relationship with food. Importantly this is not to say food was entirely functional, and indeed a feature of organisation of the WD group is the relationship with satisfaction, enjoyment and taste.

Of those who would occupy this position taste is an important aspect. Fruits and vegetables are enjoyed when eaten, and satisfaction is derived from the consumption of fruits and vegetables. Obviously currently being referred to at a conceptual level, fruit and vegetables are satisfying as eaten to a high level, but as individual types of fruit and vegetables, taste often leads to a preference of what fruit and what vegetables are consumed. Hence fruit and vegetables are 'liked' and 'enjoyed'.

There is a division that exists within WD consumers. Those whose approach to consume high levels of fruit and vegetables are considered 'STAPLE' and those whose consumption reflects a more 'NOVEL' approach. Characteristics of STAPLE consumption refers to individuals where their diet is often more routine in the types and processes used to include fruit and vegetables in the diet; often viewed as a 'traditional' diet, as 'three veg' eaten with a roast, a 'Sunday Lunch' or an 'evening meal'. Variety is a more limited concept for these consumers, where not eating the same type of meat for two consecutive evening meals constitutes variety.

A second position occupied is that described as NOVEL; where a key characteristic is an embrace of 'new' types of fruits and vegetables into the diet. This can include deliberately seeking out or trying unfamiliar ingredients (including fruit and vegetables), or using less traditional cooking or preparation methods for fruits and vegetables. Another feature may be alternative combinations of foods, other than meat and vegetables, and snacking on more exotic varieties, or inclusion within composite food. Further to this, willingness to seek out new recipes, such as cook books or using new media to engage with food ideas, such as from TV programmes or the internet.

The WD NOVEL consumer exhibits a high degree of enthusiasm towards fruit and vegetables, and often to the rest of the diet, as a love of food. However unlike the WT consumers differentiate their relationship; it is not enthusiasm for the properties of fruits and vegetables within the diet (health/weightloss) as key motivation or by-product, rather it is the enjoyment of that food. As such their enthusiasm is truer, and not related to an extraneous goal. Thus it is inward looking. WD STAPLE consumers are less outreaching and embracing in the variety and experimentation within their diet. They exhibit either a passive relationship with fruit and vegetables, as with the rest of their diet, and as such consciousness towards a goal is more neutral, despite perhaps recognition of potential properties of those fruit and vegetables inherent in their consumption.

Although there were not sufficient examples of individuals to represent a clear continuum, it is plausible to suggest that one exists between STAPLE and NOVEL consumers within the WD fruit and



vegetable consumer typology, where individuals either represent a degree on this continuum or parts of their diet and fruits and vegetables consumption are taken from different points.

#### *5.4.5 WILL NOT (WN) and DONT WANT TO (DWT) Consumers*

Two interviews were held with low consumers, and tentative inferences can be made to suggest characteristics of WN and DWT groups (not a comprehensive categorisation of low consumers). WN refers to a consumer where their diet does not include significant amounts of fruit and vegetables and will, while occupying this position, not consume enough to be considered high over the course of a week. There is an extremely limited role for fruit or vegetables in the diet, eaten scarcely if at all. There may be occasions where fruits or vegetables are chosen to be eaten, perhaps 'if fancied', or 'for a change', or if prepared on their behalf by someone else. Other food type occupy a solid position within the diet, and are by far the main concern, with vegetables being secondary to meat for example on a plate, and potatoes being favoured over other nutritionally- based vegetables.

For WN consumers, there is no considered thought regarding not eating high levels of fruits and vegetables, and the relationship can be completely passive, in that other foods are preferred above fruits and vegetables, or there is a negative connotation of the taste of fruits and vegetables, i.e. they are not 'liked'. Rather than an identification of individual types or groups of fruits or vegetables disliked, this second position often lumps fruits and vegetables together 'I am not keen on fruits and vegetables' and 'stuff like that' or 'rabbit food'. It is plausible to suggest that if a greater number of low fruit and vegetable consumers were interviewed, then these positions may offer separate categories in their own right.

The DWT position adopted by ML1 is characterised by his deliberate 'anti-fruit' and 'anti-vegetable' stance, but, not as WN consumers with regard to taste, but rather an approach to fruits and vegetables that resents fruits and vegetables for personal consumption based upon the reflection of being force-fed fruits and especially vegetables when a child by his father. Thus it is not necessarily the fruit and vegetables themselves but his father's ideals of food (including the role of vegetables and fruit perceived by his father's food ideology) and importantly the lack of choice that manifested at meal times. This is directly opposed to ML1's approach to food, meal times and provision for children, and results in ML1's deliberate avoidance of the signifier of reduced choice i.e. fruit and vegetables.

Interestingly, it is not that ML1 dislikes the taste of fruit and vegetables, and indeed he stated a fondness of certain fruits and vegetables, but exhibits an enthusiasm in the avoidance of consumption himself, but maintains the ideal of choice for his own children who happen to eat

varying levels of fruits and vegetables. It may be argued that his food rebellion relates to his relationship with his father, and the battle field built around mealtime and the role of fruits and vegetables therein. However it does position ML1 in an obviously different position to other groups. It can perhaps also be seen by those that broadly resent the interference of health professionals in their lives and diet in particular. Thus in such positions, fruits and vegetables and 5 A Day mantra signify an oppression against their own food ideals, and react strongly in a negative manner toward fruit and vegetable consumption, and not eating fruits and vegetables becomes a conscious battle, rather than passive low consumption.

#### *5.4.6 Movement Within the Typology*

There are a number of important inferences that the typology can demonstrate, particularly useful for health professional and those interested in consumption behaviour. It is not only the types of consumer, based on their cognition and relationship with fruits and vegetables that is interesting; the positions that are held by consumers are not necessarily fixed, as most interviewees demonstrated a variety of historical trajectories and movements within and between groups. The introduction of consumer movement is fundamentally linked to the influences and factors upon consumers at particular points and highlights the importance of such integration. For the purposes here it is important to state that the position of enthusiasm and consciousness towards high consumption may be of particular interest in the assessment of either behaviour change, or the notion of different levels of vulnerability to the occupied consumption level. The implication is that alternative strategies of how to support or strengthen a high consumption position, or identification of groups possibly at risk of consistent or variable low consumption.

#### *5.5 Non-synonymous 'Reasons' for High Levels of Fruit and Vegetable Consumption as Exhibited by Interviewees*

There are identifiable shared characteristics within the High fruit and vegetable consumers that took part in the interview investigation that allowed them to be expressed as within particular types. However this has only partially addressed the relationship between fruits and vegetables, their high consumption, and the consumers. A related aspect apparent within the discussion and after further analysis of the interview data suggests that the relationship between 'reasons' for high consumption and the consumer are not necessarily described in a linear fashion, nor necessarily does one

'reason' account for the entire high fruit and vegetable behaviour. These reasons are not the same for all consumers, nor necessarily characteristically similar.

Unlike section 5.4 where consumers are categorised by attitude and action type, and section 5.3 which focuses on particular themes, this section categorises the reasons for high consumption by how they are experienced commonly by consumers. These descriptions include the author termed; Motivations, Triggers/Trigger Points, Environment, Information, and their relationship with certain behaviours such as Strategies and Management to incorporate high consumption within the diet, such as overcoming barriers. 'Values et al' are also briefly discussed. The terms themselves have been created as useful descriptions of sentiments utilised by interviewees but have comparisons for other literature.

The importance of each element is discussed as relating to the high fruit and vegetable consumer. It does not represent any one individual, and thus the elements will vary in strength for different interviewees as to how important they are as a determinant for consumption. Similarly the elements are not seen as a cross section of behaviour and attitude as it incorporates past trajectory, reflection and future progression, both that influence the elements and link to future goals for example. The elements are a simplification in that they describes fruit and vegetable consumption alone, where in many cases fruits and vegetables are incorporated with the consumption or non-consumption of other foods and lifestyle traits /ambitions. The other foods and lifestyle traits/ambition are not included. What it does indicate however is that there are potentially a number of reasons that are apparent in the high consumption of fruits and vegetables. There are different levels of tangibility that the elements can display, and different levels of physicality. For example an aim or goal linked to the experience of 'motivation' and value may be more or less concrete and physical support conducive of physical actions of particular 'strategies'.

#### *5.5.1 Values et al*

Values et al refer here to a number of concepts that operate in mediating and influencing the way in which the named elements (Motivation; linked with goals, Information, Environment, Triggers/Trigger Points, Management) can operate, and therefore how they are experienced by the consumer. It is therefore worth a brief mention. For example a number of items such as general demographic details, contexts, and those characterised as 'influences' in life course literature e.g. Conner et al (2001) and Furst et al (1996). Likewise 'values' themselves; part of the personal food

system where they are important in food choice decisions, by applying 'personally developed interpretations and meanings' (Sobal et al, 2006) to particular situations.

The interviewees described a number of these, for example in relation to the value negotiation; FH4 described the constant balancing and prioritising of values important and imposed. For example, for FH4 her children's diet featured heavily for the family consumption (with notions of health, freshness, choice, and variety, which she wanted to offer her children) while reflecting these with the cost to a limited budget. At the same point issues of ensuring taste was met and waste was minimised. FH4 strategized this by making certain classifications for fruits and vegetables, some as fundamental to the diet; they became the core basics of shopping, and others important as treats which she purchased when the budget allowed. This schema also allowed her to incorporate a sense of flexibility, so that she could use promotions and special offers, but forward planning also (such as recognising what the week's food consumption could be).

For others, such as FH7 and FH2, weight, and the management of weight, featured as a prominent value, but was negotiated with taste. Their diets were mediated by what they preferred to eat. For FH2 fruit was particularly preferential and believed to be useful to control weight, it was also seen as convenient to meet the disrupted nature of meal provision. Therefore fruit represented a replacement as well as snacking item. FH7 utilised more vegetables in her diet, often prepared in advance of consumption and stored. These were consumed first as preference over other foods that were equivalent in points, in the belief that they would be filling while on a point's scheme. Interestingly she deliberately planned to keep the selections as low as possible while fulfilling their role so that she could use further points to include something less healthy and less weight orientated within the diet. FH7 further negotiated her structured diet Sunday to Thursday, but found herself not applying weight control on Friday and Saturday, instead focussing more on taste.

The negotiations between health and taste were also observed, for some where the latter mediated the type of fruit and vegetables were consumed, and others for others this was less important, reluctant in their consumption but it was important in meeting health requirements (linked with the importance of social support and relationships with partners). In the case of MH8, a combination of appreciation for his new partner in line a new importance of health has led to the discovery of new foods which he now enjoys. A number of interviewees have displayed a linking of lives, whether shifting to a diet more similar to their spouse, or taken over completely to resemble their spouse's diet.

A further example of prioritising in the negotiation of values was evident by MH4. Despite a very focussed diet and high level of consumption of fruits and vegetables in line with competitive sport, his diet could be affected by the managing of relationships and sense of gratitude to the provision of

foods in certain situations. To illustrate, when married his diet featured what was provided for him, likewise when eating at his son's on a Sunday, he accepted what was provided. Though it would include fruit and vegetables on a Sunday, it was very different to what he would choose to eat during the week where 'food was fuel'.

### *5.5.2 Motivation*

Certainly one of the most common and prominent features amongst high fruit and vegetable consumers, identifiable in the 'Want To' and 'Have To' consumer types (5.4) where there is an active awareness in that high consumption, is the occurrence of 'motivation'. The consumer is motivated towards eating a high level of fruits and vegetables. General motivations included, health maintenance, diet and weight management, weight loss, health improvement, competitive performance, better lifestyle and self satisfaction. Examples are cited below.

The categorisation of motivation as a distinct reason is found in motivations being progressive in terms of looking to the future. In particular this refers to a defined alignment of that particular motivation with either a specific target, or general aim. It is evident that both can be in existence, where one may be a subsidiary of the other, or where there are multiple aims relating to a chosen consumption pattern with regard to high fruit and vegetables.

To illustrate this, the interviewees described a variety of motivations. Health was a strong and regularly mentioned motivation; MH3 for example bases many of his food habits, including fruit and vegetable consumption, on a decision many years ago to eat healthily. Complementary to this is his interest that developed in competitive climbing, where he was motivated to be the best climber he could be. For MH3, both to eat healthily and to climb well involved the consumption of a high level of fruits and vegetables as a proportion of his diet. Thus he demonstrates this motivation being a prominent reason for consumption both in a general and in a specific sense.

Fruit and vegetables can often be carried as part of or 'piggy-backing' towards a related aim, and not necessarily a target of individual consumption. There are however instances where, as part of a wider aim, there are specific dietary targets for the consumption of fruit and vegetables. Whereas both FH3 and MH1 state that they do not 'count' the portions of fruit and vegetables they eat (yet recognise roughly their consumption) others who demonstrate motivation towards an aim or goal can be have more dietary awareness. FH5 for example, where fruit and vegetables are part of her way of life and motivation towards the maintenance of a healthier existence, keeps a diary of food consumed, and will actively increase her fruit and vegetable consumption if it does not meet the recommended daily amount. FH5 cites a theoretical example of perhaps being out of her normal

routine socially during the day, and will eat individual items of fruit in the evening to boost her number; though this is irregular and she most often consumes way above five portions. Thus FH5 identifies motivation in relation to targets and awareness of daily consumption.

Weight-loss is also identified as a specific aim, weight maintenance being more general. As a result of being triggered, either by an event or reaction to physical stimuli, some of the consumers identified being motivated to meet targeted or measured decrease in their weight (dress size, body image, a target weight) whether related to a subsequent health motivation (lose weight for an operation) or as a motivation in itself. Thus the diagrammatic representation highlights first that there can be a motivation for high fruit and vegetable consumption, but often found in relation to those specified aims.

A further indication represented in the diagram is that motivation can have an impact upon behaviour and attitude toward high consumption, and importantly the way in which a person will react to and manage potential barriers. A strong motivation is often associated within the consumer interviews with successful active management of high consumption within the diet, see below for such strategies, but importantly being in evidence of those consumer types that are positive and enthusiastic about both the aim and the consumption of fruits and vegetables.

### *5.5.3 Information*

The high fruit and vegetable consumers interviewed described a number of reasons for their dietary pattern that can be grouped according to the shared characteristic of being informed; thus 'Information(s)' as an impact upon consumption via awareness and knowledge. It represents an influence that is experienced by the consumer as information. As a result such a reason can be both tangible and less tangible, impact upon and reflect behaviour, as well as indicate particular motivations, and values. As is described within the strategies and management of high consumption, information can also be, when sought to maintain or achieve that high consumption, utilised as an active technique (incorporating ideas of novelty etc.). It can however, either actively or passively, be described as a pressure or guidance to high fruit and vegetable consumption, and generally has an attached source for the influence. Thus information can direct actual consumption or associated motivation. Information can aid in the description of how and why fruits and vegetables are consumed in high levels.

If for illustrative purposes; MH4 indicates that he was looking for competitive advantage within his chosen sport, having successfully implementing an exercise-fitness focussed lifestyle for some time, incorporating an aim and associated motivation, he looked to other areas where this could be

achieved. Using the analogy of fuel for a car, he actively sought information regarding the role of food in fitness, and in doing so encountered significant, fruit and vegetable behaviour changing influences (information). What he describes is both why fruit and vegetables became synonymous with a healthy body more fit for purpose, simultaneously finding how a high fruit and vegetable diet could be achieved. In this example the information has been one directional in that MH4 sought information and information was delivered. However this comes as part of being informed that there might be another way of increasing his competitiveness, an influence he describes as part of health information that was around at that time (thus contextually bound in an era of strong fruit and vegetable consumption).

FH5 similarly indicated that she actively sought an influence upon her diet. But for her weight loss, and ultimately a better, healthier lifestyle was the aim. Fruit and vegetables became an important feature to her diet and lifestyle, owing to the importance of food in her life. The planning of the influence to her lifestyle was very formal in the form a course, where an overhaul to her food values and philosophies, meant that fruit and vegetables had a larger role to play than previously. A parallel can be drawn with the formed ideas relating to fruit and vegetables within the diet, and how to achieve this, as exhibited by those interviewees who indicated some prescription as a result of attending commercial weight loss programmes. FH7 and FH1 for example attended weekly Slimming World, and Weight Watchers for others. Thus these interviewees describe a high degree of formal informational influence from formal channels upon their diet; with some interactivity with prescription of the potential effect upon fruit and vegetables i.e. some choice is involved.

Some interviewees described less enthusiasm and limited choice with regard to a need to be informed about healthy eating and the role of fruits and vegetables within the diet. FH4, with regard to the role of food in her life, so as to change a negative role for fruit and vegetables, was influenced by information and training from formal channels (food and illness), with warnings regarding the mistreatment of food. For the interviewees who suffered physical illnesses, such as cardiac problems, there were those who motivated towards a change in their lifestyle (often supported) and influenced by the specific dietary advice that was described as part of their recovery, and to help in the prevention of any further problems to their health. Thus a number of interviewees describe how they received significant amount of information on healthy living and diet, and the need for high fruit and vegetable consumption, from clinical medical staff, and from dietary advisors and environments during recovery; for example Healthy Living Centres, and dieticians.

Not all influences were as a result of direct influence relating to medical intervention. Many interviewees point out the influence of media more generally. Some on a health basis, such as 'y' hear it on the news' regarding 'the 5 A Day stuff', or from information in the supermarkets, or on TV,

or information in magazines. Most interviewees recognise the educational programmes regarding eating five or more fruits and vegetables per day, from a range of sources. The interviewees indicate that there are generally four areas of media attention from which they can draw influence from an information source about fruit and vegetables; these are fitness, health, diet and cooking.

MH6 and FH3 suggest that they have been heavily influenced by cookery information, both frequently on TV in the form of food programmes; with a number of series containing interesting recipes incorporating fruits and vegetables, and from literary information (food magazines or cookery books). They also refer to a new information source: the internet. Hence they are continually being influenced, both in terms of what and how they consume, as well as providing information to influence and negotiate food beliefs. MH5 indicates that the information received through programmes, or sought from cookery books/recipes are socially approached and negotiated between himself and his wife when they sit in the garden and go through them.

Although there was not a lot mentioned during the interviews regarding the role of childhood and positivity in high fruit and vegetable consumption, despite interviewees wanting to set a good example (whether choice, or health) to their own children in establishing good eating patterns, it is possible to identify interviewees who indicated being influenced positively by general food behaviours of the past. MH7 and his wife, for example refer to how things used to be done, contextualised by time and place, namely the past (throughout their lives) and in the countryside. Hence MH7's natural behaviour of grazing and foraging, even though he now lives in a more urban environment, actively seeks out wild berries and mushrooms for his diet. For MH7 and his wife, they were influenced in their behaviours and values of fruit and vegetables generally by the way they were brought up. What this does highlight is that influences can be more general, or very specific.

For others, family does play an up-to-date important part as an informative influence, and environment for influences to manifest and interactions to take place, such as the sharing of ideas. Thus interviewees experience support from family, friends, peers in the form of information that they bring together. A number of male interviewees consider themselves fortunate following incidents of ill-health and subsequent recovery that their wife's were already well placed 'informationally' regarding healthy diets as a result of the diet of their wife or partner being substantially 'healthier' than their own (often associated with weight management), 'she knows the right stuff for me'. Likewise MH5 indicates that he and his wife are embarking on a journey together both in information gathering (learning) and supporting a dietary change for the health benefit of MH5.



#### 5.5.4 Environment

The 'Environment' factor prevalent in the interviews with high fruit and vegetable consumers has been grouped as a distinct type of reason for such consumption, and describes a miscellany of potential enablers. Rather than the provision of informational support and sources, as with the self-titled Information, Environment(s) impact upon high consumption relate both to tangible and less tangible sources where focus relates to emotional and physical support, as well as those reasons which ease high consumption. Environments can relate to informational influences, as well as behaviours, motivations and goals.

Sub chapter 5.3 highlights a high volume of different and associated environmental factors as described by the interviewees. Environments can often be represented spatially, where either responsibility or social interaction therein can effect or aid in high consumption. The home is one example, the workplace another. All of the interviewees made mention of other people, and many considered their family or members of their family important in the high fruit and vegetable consumption they have. The most visible and obvious is shown in the role of familial support (though as has been mentioned elsewhere, the familial environment can also be a barrier). Whereas informational sources are regarded as influencing high consumption, which can also come from a partner or child; environmental factors in the support of high consumption can be seen in the provision of, and thus availability of fruits and vegetables. Certain wives and partners were described to be completely in control of the provision of the consumer's diet, from choices made when shopping, through to the preparation and cooking of food and creation of the diet. This is particularly evident in a group of high consumers who are recovering from incidents of ill-health MH5, MH8 and MH2, all male, ageing from late fifties into eighties, they rely upon their partners and wives to both support and drive the motivation of their own recovery, as well as the practical task of putting fruit and vegetables in front of them. There are differences between them regarding their enthusiasm for fruits and vegetables.

In relationships where dietary responsibility is shared within the family, the support of a partner, and subsequent joined food decisions indicate an environmental factor of high consumption for that consumer. This is seen with MH7; and seen inversely as a barrier. For example, FH7 describes how her dieting for weight loss is not supported by her husband's consumption in that different meals are cooked and compromises are made by the interviewee during mutually eaten meals. Mutual consumption, where acceptable, high levels of vegetables (in particular) are evident are generally indicated as a positive environment in an interviewee's high consumers, however mutual

consumption of a meal can be both an environment for high consumption, and a barrier (such as MH4 during marriage) to high consumption.

Further environments of high consumption can be less tangible than provision and accessibility. MH1 links the accessibility of tasty fruit and vegetables with high consumption, but taste itself was evident as an important factor both to the amount of fruit and vegetables eaten by the consumer and which fruits and vegetables were often chosen to be consumed. FH6 demonstrated a clear indication that pleasure derived from the taste was paramount and the fundamental characteristic to her high consumption diet. For those interviewees who were engaged in dieting for weight loss purposes, the fruit and vegetables selected within their respective programmes were often based on those that they would derive pleasure from; FH7 clearly reflects this with vegetables as opposed to fruit and food eaten outside of set programmes. FH3 demonstrates this with grapes and a small number of vegetables such as broccoli.

The reflective role of fruits and vegetables, in relation to their health properties and the projected image of the workplace is also an environment to high fruit and vegetable consumption of two interviewees prominently (FH1 and ML2). In this instance they provide the spatial environment where image is important, where availability and other strategies of consumption then become important (actively in the case of FH1, or passive consumption management for ML2).

#### *5.5.5 Triggers and Trigger Points*

Change as applied to food trajectories is a prominent feature of food choice process description of consumption (Wethington, 2005). In particular it is represented by the nature of change and the strength of the change on food trajectory. For example turning points (major directional change in behaviour) and transitions (effect of changing roles often resulting in gradual change). Author termed 'Triggers' are utilised here in a description of a change in the interviewees' fruit and vegetable consumption in relation to a tangible action or reflective of particular events (thus incorporating all effects upon trajectory). Thus it can relate to the formation of goal setting or in relation to self esteem, confidence and aspirations. For example, as described by a number of interviewees; their current food pattern and trajectory of high consumption was altered by an event (or series of events) which was significant enough to be considered a starting point for a change. This represents either behaviour (towards a higher consumption) or change in the motivation or values for that consumption. In particular the triggers deal with issues regarding why consumption is at a high level.

To illustrate; a common example of a trigger amongst the high fruit and vegetable consumers relates to an incident of ill-health. Reflection upon this event (coinciding with informational sources, advice and support) in relation to possible future morbidity or even mortality persuaded the consumer to change dietary behaviour, and rethink their food values and the role fruit and vegetables play within their diet. MH2 for example describes that prior to a cardiac incident he did not care about what he ate, resulting in what he described as 'sheer gluttony'. The role of food was based on uncontrolled excess; subsequently changing to a more controlled approach with a new health-based motivation. The change is noted as illustrating a movement from membership of the 'WILL NOT' type to 'Have TO' (5.4).

Another common trigger represented by high fruit and vegetable consumers relates to the motivation of weight loss, and its management. A number of triggers have been identified as important to the interviewees. As with the role of medical illness, the trigger is linked to self reflection: to assess ones weight against a psychological norm. To lie outside this acceptability is to act in triggering change. These triggers take the form of tangible measures. FH1 for example discusses this in relation to dress size (and, less tangibly, no longer feeling herself), FH3 refers to dietary triggers in relation to the tightening of work clothes, FH7 her belt getting too tight, and FH2 referring to an actualisation of a weight, and weight-to-height ratio. Thus in such cases the condition acts as an 'indicator' to the consumer; resulting in a triggered response.

'Trigger points' refer to specific time and place events, where the consumer is able to attribute a change in the reason for consumption or level of consumption of fruits and vegetables. Importantly, a characteristic of this is they provide an 'opportunity' for change, or adaptation of food philosophies and trajectory, rather than indicate a need for change. FH4 describes a number of trigger points within her relationship with food. Her current diet reflects the birth of her children, and need to ensure a healthy example is set. MH4 interestingly indicates that following a change in marital status, i.e. becoming divorced he was situationally free to pursue a diet he considers to be much more selfish, describing how when married the shared basis of consumption would have not allowed him to eat food as fuel for sport. Those suffering from an incident of ill-health could also consider the timing of the event a trigger point, in that an opportunity of change became available (particularly in line with the increased physical and informational support, or factors and influence upon their diet).

Interestingly triggers and trigger points are combined in the description of FH5 and her change in lifestyle which heavily included a rise in the consumption of fruits and vegetables. Rather than a trigger launching a growth in motivation, she describes how she was motivated and waiting for triggers and trigger points to present themselves so that she could direct appropriate management

and gain control of her life. For FH5 the differentiation between the why, and how of high fruit and vegetable consumption is blurred upon the realisation that there was a food, diet and lifestyle course available which met her motivational needs.

Gradual, or evolving diets, or where high fruit and vegetable consumption is non-attributable to identified points were evident within the interviews. Though this was seen less frequently, it was described by those with diets which did not link with a particular goal or motivation, or where high fruit and vegetable consumption predates a particular goal or motivation (MH1, MH7 for example).

#### *5.5.6 Strategies and Management*

The results of the consumer interviews identified the importance of the role of a person's behaviour in the explanation of why and especially how their diet showed an achievement of high levels of fruit and vegetable consumption. Though this seems somewhat obvious, tangible behaviours, or actions with a varying degree of awareness of fruits and vegetables for a specific purpose, were found to be useful in determining the success of high consumption. Behaviours did not work in isolation from the role of fruit and vegetables in the diet, motivations, informational influences and environmental factors, but were often reflective and related to these. Successful practical application and the behaviours shown by this are an important aspect to reasons behind high consumption; hence why such actions have been deemed Strategies and Management. Combinations of strategies are described by Falk et al (1996) as representing a 'repertoire' (in Sobal et al, 2006).

Broadly from interviewee descriptions strategies can be divided into those which demonstrate progressive and reactive management. Reactive, where the consumer is involved in some action to ensure their diet remains despite a situational change (potentially creating a barrier to high consumption). Or, in the case of the progressive situation, the consumer will plan or manages their diet or lifestyle to incorporate high levels of fruit and vegetables. A useful example of this can be seen in the dietary habits of FH5. Describing how she regularly plans to eat a certain amount of fruit and vegetables everyday day, utilising a variety of strategies at specific meal times so that fruit and vegetables are always present (progressive), FH5 indicates that if she has been unable to eat her measured amount because of a change to the activities on that day, she will 'reactively' consume items to increase her daily consumption.

Barriers can take a tangible form for the interviewees, such as an interruption to daily routine and the short term characteristics involved, or more long-term or regular barriers to potential high consumption such as food catering facilities at the place of work (MH4). Less tangible and non-physical barriers are also evident. FH7 mentions that her diet, based on weight loss and weight

management, is often directly opposed to her enjoyment of food and the issue of taste of 'unhealthy, junk food'. This is seen in a number of weight management programmes that interviewees make mention to, whereby the diet allows for the incorporation of 'healthy' and 'unhealthy' foods simultaneously, often moderated. Although barriers are not the focus of the investigation they are extremely useful and necessary in discussion because of the way consumers deal or manage them to maintain diets high in fruit and vegetables. Failure to do so often led to what interviewees described as 'straying' or 'lapse' behaviour. For FH7 this included bingeing behaviour at weekends, describing a split in her dietary behaviour. Alternatively, it could be interpreted that the compensatory behaviour is important so to achieve the partial fulfilment of goals.

This is not to say that all dietary and lifestyle strategies and management are fixated upon the overcoming of negative features present or interrupting their desired diet. In many instances there is positivity in the provision of high fruit and vegetable diets. A typical occurrence is the positive use of home prepared food for the consumption of healthy, high vegetable and fruit lunches while at work. As an overall picture it is true that perhaps for some this represents a substitution of healthy for unhealthy food, or high fat/sugared food that would otherwise be consumed in line with the role of fruit and vegetables being linked with weight loss. However; for others in the interviews, such as MH3 the consumption of healthy foods is a positive management of maintaining tasty, healthy components in his diet while at work. Thus he consumes pre-prepared foods: salads in summer, homemade soups in the winter, topped up throughout the day by the snacking upon fruit. Likewise FH7 often prepares vegetable based foods for lunch, soups and salads (though the same strategies could be utilised, hypothetically speaking, for the purpose of overcoming negative features such as poor access).

Less successful in the planning of diet into work were FH4, MH2, and MH5 for example. They describe how work will be a barrier to fruit and vegetable consumption. Low availability was described as detrimental for MH2 and MH5 where driving featured heavily. FH4 however lessens the overall impact of work by consuming more during the week when not at work, thus having different eating patterns based on the daily routine throughout the week.

It becomes apparent that the management of high fruit and vegetable consumption within the diet is linked with the positivity of consumption, the role that fruits and vegetables play within the diet and importantly the time and place that describes the arena for that strategy. Thus it can describe the management at different levels; the overall diet, or more minor details regarding consumption.

We have briefly mentioned working life and strategies both inside and outside of work to maintain high fruit and vegetable consumption, routines that moderate food on days worked, or planning to bring homemade food. A further arena can be those relating to shopping. At a small level, strategies of shopping can include the looking for more interesting fruit and vegetables or novelty in purchased items; using farm shops rather than supermarkets. Buying in bulk is a method often utilised by interviewees to ensure the presence of fruit and vegetables (availability and access), or by MH4 to reduce the number of times he has to visit the shop for food. Likewise top-up strategies are also employed. As is described in detail by FH4 (see below) food shopping can feature as a management system to ensure fruit and vegetables are fundamental in shopping patterns, and successfully managing her budget. She expands upon a number of time and place strategies to reduce the relative price of fruits and vegetables in the budget while maintaining necessary levels of consumption; e.g. seasonality, special offers, sharing bulk purchases. Interestingly such strategies are in line with her priority of 'fresh fruits and vegetables'. Her sister displays slightly different shopping strategies with less emphasis on fresh food, and hence a purchasing of value frozen and tinned produce to maintain a high level of fruits and vegetables in her and her children's diet.

Mealtimes, places and times of consumption are important in looking at behaviours negating high fruit and vegetable consumption. Food and work has been mentioned; in addition to this the interviewees expressed a range of important behaviours in high fruit and vegetable consumption. Namely: how that they are eaten. Further to shopping, both the preparation (provision e.g. kitchen), and consumption itself (sitting room/dining room) allow strategies to be observed.

One popular way of managing high vegetables in particular is the inclusion of vegetables as an accompaniment to a plate of food. FH3 describes how there are very few plates of food that she prepares where she won't add broccoli, making it a part of the mainstay of her diet. This is a very active decision for the purpose of increasing vegetable consumption for their health benefits. For some the accompaniment of vegetables is more general, for example the common use of vegetables as an accompaniment to roast meats ('proper dinner').

Another meal time strategy in consumption is making a vegetable-based dish the focus of the meal, or adding vegetables to a composite dish, such as curries, or Bolognese. Both increasing the level of vegetables consumed at a particular sitting. In the former, this type of substitution (instead of meat) has been adopted by FH7 who will regularly replace the meat in her diet with a vegetable based item. The latter, where vegetables boost a meat composite meal, can be illustrated by a number of interviewees. This approach is often more common and easier for those that process foods themselves (or by the cook at home at any particular point) from ingredients; whereas FH3 and the accompaniment strategy adds side vegetables to the plate, the composite increase, either

purposefully to increase vegetable consumption (e.g. FH4), or just to make the food dish more interesting (e.g. ML2, MH1) for taste purposes. Related to this, within formal weight management systems, the role of vegetables is often seen as 'free' or of low points value, hence their consumption can be seen as a 'filling' strategy (FH7 and FH1). This filling strategy can work in a different way, as a purposeful avoidance of carbohydrates or fats, thus salad rather than chips or potatoes.

Fruit can also be used to manage certain consumer behaviours, resulting in their overall or proportional increase within the diet. Like vegetable strategies, fruits can be added to meals; in particular fruits can be incorporated as either the main item of breakfast, such as the consumption of grapefruit or banana (MH1), as part of the breakfast dish (such as MH4, and the use of berries with cereal). More rarely this is seen at other meal times, though FH5 and FH6 do recognise that fruit can be cooked as accompaniments or inclusions with dishes. More regularly practice, the interviewees would utilise fruit as a dessert or pudding following a main meal.

The most commonly mentioned incorporation of fruit into the diet is as a between-meal snack, exhibiting snacking behaviour, either for the purpose of substitution of sugary or fatty foods (as part of a systematic weight management, or ad hoc system to ward off hunger) such as biscuits, chocolate, sweets or savouries.

The convenience of snacking or grazing behaviour and fruit was identified by FH2 who exhibits high fruit consumption in relation to vegetables. This she attributes this to the flexibility and practical ease of consumption while 'on the go' (a position that could have otherwise, and in the past food trajectory, been occupied by confectionary). The attribute of ease of consumption is important in relation and often reliant upon, ensuring fruit is accessible, a number of interviewees state that some form fruit is always in the fruit bowl. On the occasions where ML2 reaches high levels of consumption he attributes to the availability of fruit when it takes his fancy at work. Interestingly a number of interviewees stress that the practical nature of certain fruits that is displayed by ease of preparation often will contribute to their consumption, where peeling 'fiddly' or 'phaffy' puts certain people off.

Purposeful consumption of fruit for the properties of that fruit, e.g. MH4 and energy from banana consumption, is displayed as a strategy within the diet, but less common amongst the interviewees. That is rather than consumed for general well being or fitness, the energy is a boost at a specific required point prior to an athletic event or competition and concerning energy management. It is also a useful illustration of the direct linking of motivational aspirations and specific behaviours.

The interviewees also describe access and availability in terms of making use of seasonal availability. FH6 states that her husband's allotment now provides a large amount of the vegetables that they consume, and though it is managed as to what is produced, it is the seasonal readiness of the items that often dictates type of vegetable that is incorporated into the diet. It is however a purposeful action and dietary management of high vegetable consumption. A similar pattern is apparent in the diet of FH2, whose father is involved in the production of fruits and vegetables. At the point of interview, this was reflected in the high consumption of peas/beans which were eaten in high amounts straight from the plant pods.

Thus both more standardised and variation strategies are seen from the consumers interviewed. This distinction can be further noted regarding the achievement of novelty within the diet. For some high consumption is as a result of ensuring, or naturally, consuming a very regular pattern of consumption and in essence it is as a result of consuming those fruits and vegetables that are tried and tested for that person, and catered specifically to their known tastes (e.g. MH4, MH1). Therefore a fixed pattern in how fruit and vegetables are consumed. For others, more commonly there is greater variety in terms of type of fruits and vegetables consumed where novelty features strongly as a way of continual high consumption (such as FH5). This is linked with incorporating a strategy to experiment within their diet, often seeking out informational influences from recipes, trying new fruits and vegetables, or cooking the old favourites in different ways. FH6 utilises the roasting of a variety of vegetables as a mix, varying what goes in regularly. FH9 and spouse have recently discovered a recipe using beetroot which makes a perfect accompaniment to a variety of the meals they have. Part of this strategy is the learning of new preparation and kitchen skills.

In the case of MH5 and MH2, behavioural dietary management is heavily supported by the relinquishing of their own diet to their wife or partner, thus linking the role of factors and behaviour. Thus relying on their wife's motivation and production of the 'right' foods for health-based diet. MH8 enthusiastically tries novel fruits and vegetables consumed in a regular pattern that are provided by his partner.

The strategies to incorporate high levels of fruit and vegetables within the diet are quite complex, particularly when there are many actions and individual behaviours at one level, and linked with more general motivational behaviours across the diet as a whole. There are both reactionary and progressionary elements, and these are particularly associated with time and place, as well as the factors, influences and motivations that may be in evidence. To maintain high consumption, some consumers experienced a managed change in their fruit and vegetable trajectory to reflect external pressures, others maintained a similar high consumption despite external pressure. It is noteworthy, that not all behaviours and actions that were evident followed the direction for high consumption,



or indeed the direction of the motivational aim. Some behaviour manifested as 'straying' or even as an occasional 'treat'. There were few that believed that they consumed as high a level as they could. Exceptions to this included MH2 who was eating a diet managed by his wife, and relative to his diet prior to a health motivated change, could not see how his diet could be improved upon (and certainly had no enthusiasm to increase fruit and vegetables further). A further exception was FH8 who during the interview described a concern that her diet was too full of fruits and vegetables in, questioning the detriment to health of high consumption in her diet (focussed on weight loss, health, and a general appreciation of fruits and vegetables).

## *5.6 Chapter Summary*

The chapter has addressed the findings of interview analysis, primarily that of high consumers and their relationship with the fruit and vegetables they eat. A life course framework has proved particularly useful in data generation and interpretation of the results.

The first section described the importance of particular issues to the consumption of high levels of fruit and vegetables. Issues of procurement were prominent for many interviewees, including shopping, relevance of budgets and values, as well as the link with seasonality. Determinants of fruit and vegetable consumption related to lifestyle, home life, working environments (such as responsibility for image and accessibility), and for those with children, the importance of diet in reflection of children and their diet. Concerns of health, whether related to positive future health or a reaction to ill-health, was explored as a driver towards fruit and vegetable consumption. Dieting behaviour and weight control were also presented as reasons why fruit and vegetables are incorporated in the diet and what they represent for the interviewee. The section also explored the interviewee's relationship with fruit and vegetables in relation to taste, particularly as a mediator of behaviour linked with goals, or an influence in its own right. Less prominent was the issue of sporting activity and competitiveness, though where it did appear it provided a strong influence on the diet. Dietary management and strategies of consumption were important for some high fruit and vegetable consumers.

There is therefore considerable complexity in fruit and vegetable consumption with multiple factors frequently expressed as impacting on an individual's [relationship with] consumption. This is important in the development of further research processes in the thesis, including two broad hypotheses which guided the quantitative analysis, the results of which are presented in the

following chapter. The first hypothesis relates to differences between high and low fruit and vegetable consumers based on individual issues.

The second section of this chapter also presented a typology for fruit and vegetable consumers, focussing on two key areas identified as variables, i.e. level of enthusiasm, and consciousness involved in high consumption achievement. The typology included WANT TO (WT), HAVE TO (HT); MADE TO and NEED TO, WILL DO (WD); STAPLE and NOVEL, and CAN DO (CD) consumers. Movement between groups was also indicated. Two further potential types of low fruit and vegetable consumer were proposed (WILL NOT, and DONT WANT TO). As with the identification of issues associated with high and low fruit and vegetable consumption levels, the description of types of consumer informs the analysis of questionnaire results (as presented in Chapter Six). In particular, the second hypothesis, that specific groups of fruit and vegetable consumers displaying common characteristics can be identified, is tested.

The third section of the qualitative results utilises the interview data to identify common concepts relating to fruit and vegetable consumption. The importance of this is in how the consumer experienced the concept in relation to influencing their achievement of high levels of consumption. The concepts were defined as Motivation(s) (often linked with goals), Information(s), Environment(s), Trigger/Trigger Point and Strategies & Management. This is reflected in the incorporation of both attitudes and behaviours (representing a range of concepts) being utilised in the subsequent quantitative analysis, where it is hypothesised that there will be important differences in attitudes and behaviours between high and low fruit and vegetable consumers.

## Chapter Six

### **Quantitative Consumer Survey Results: Description and Analysis**

#### *6.1 Introduction*

##### *6.1.1 Chapter Content*

The chapter presents the main findings of the consumer survey stage of the research (from Figure 4.2a in the model featured in Chapter 4) so as to draw policy implications by identifying factors that impact on how consumers incorporate 5 or more portions of fruit and vegetables in their daily diet. The survey stage draws on the results of the literature review and qualitative results (consumer interviews). These results were consolidated into two broad hypotheses (outlined below, 6.1.2) which guided the structure and content of the questionnaire.

Following the introduction of the hypotheses, the chapter reports upon the description and analysis of the 239 successful responses collated from the survey that was distributed to institutions and associated individuals with a strong connection to the District of Wansbeck (South East Northumberland). This area displayed a high incidence of social deprivation according to the indices of multiple deprivation (WDC, 2004). 148 consumers were identified as 'high', having consumed 5 or more portions of fruit and vegetables per day, 91 respondents consumed less than 5 portions and were identified as 'low' consumers of fruit and vegetables. Details on the administration of the questionnaire were provided in Chapter Four, including a full list of distribution points. A purposeful sampling method, utilising the opportunities of snowballing, was conducted to maximise the responses with higher than normal fruit and vegetable consumption. The distribution and collection of the questionnaires took place over the summer months of 2007.

The chapter presents demographic and consumption data in the initial sections. The later stages address differences between high and low fruit and vegetable consumers, including attitude and behaviour (and dietary) as well as factors related to high consumer responses. Cluster analysis results are presented based on the attitude and behaviour factors.

### 6.1.2 Hypotheses

#### **1) High consumers would exhibit some attitudinal and behavioural differences to low consumers.**

The literature review, as well as the concepts presented in the food choice process model, supports the multi-faceted nature of attitudes and behaviours involved in consumption. The qualitative stages of this thesis, the consumer interviews in particular, identified a variety of reasons that were associated with high levels of fruit and vegetable consumption. These reflected attitudes and behaviours in areas relating to personal and environmental situations including the procurement of fruit and vegetables (shopping, price/value/budgeting, seasonality), worklife and homelife (lifestyle/time, availability, work image, children), health (proactive and reactive), competition and sport, taste and enjoyment/engagement, as well as weight control and dieting. The incorporation of these conceptual areas within the questionnaire allow the testing of the hypotheses that certain attitudes and behaviours would have significant associations with the consumption of high levels of fruits and vegetables (compared to low level consumers) within the sample.

The questionnaire was designed to assess respondents' agreement rating to statements of attitude and behaviour from those areas identified in earlier stages of the thesis as important to fruit and vegetable consumption (Appendix 5). These relate to behaviour and attitude to fruits and vegetables directly as well as food, diet and health. It is therefore hypothesised the analysis of the questionnaire would identify significantly different responses to certain statements from those fruit and vegetable consumers classified as 'high' and 'low' (by way of rejection of the null hypothesis).

The objectives of the quantitative stage were to examine and explore, in a wider context, the attitudes and behaviours considered important to the successful consumption of the recommended 5 or more portions of fruit and vegetables per day. As well as the analysis of individual statements, it is hypothesised that responses to the questionnaire will identify underlying thematic links, or factors (utilising factor analysis) amongst the statements. This will allow data reduction and the emergence of factors which will be further explored for their importance in the achievement of high levels of fruit and vegetable consumption, i.e. those factors which elicit significantly different responses between high and low consumers. This enables further comparative analysis with the qualitative data.

**2) Different fruit and vegetable consumer groups will be recognisable amongst respondents, based on identified factors important to consumption.**

The interview results suggest that groups of fruit and vegetable consumers are identifiable amongst respondents, based on the importance they attach to fruit and vegetable consumption and the values they associate with it. The consumer interview stage indicated bases of segmentation being thematic reason for consumption, as well as the level of enthusiasm and active engagement in fruit and vegetable consumption. It is hypothesised that an exploration of questionnaire respondent data, utilising a cluster analysis approach, will identify homogeneity amongst likeminded consumers in relation to attitude and behaviour factors, and heterogeneity between groups.

It is further hypothesised that the groups would vary in their proportion of high fruit and vegetable consumers included - and in particular some groups would feature high levels of consumption compared with others. The cluster technique will allow an assessment of the factors of consumption important to each segment and significant profiling according to patterns of consumption and relevant identifying characteristics. Methodologically, the clustering provides a comparative dimension for further discussion in relation to the results of the qualitative stage of research.

## 6.2 Demographic Characteristics

### 6.2.1 Age and Gender Profiles

There were 166 female (69.5 %) and 73 male (30.5 %) respondents. Table 6.1 presents the age distribution of those where age was determinable.

Table 6.1 Respondent Ages

Sex	Age Group (yrs)							Total
	>28	29-38	39-48	49-58	59-68	69-78	79-88	
Male	10 (13.9)	11 (15.3)	12 (16.7)	18 (25)	14 (19.4)	6 (8.3)	1 (1.4)	72
Female	20 (12.3)	31 (19)	40 (24.5)	32 (19.6)	23 (14.1)	13 (8)	4 (2.5)	163

(percentage of age group as part of the total sex features in bracket)

### *6.2.2. Domestic Make-up*

Most of the respondents lived with at least one other person in the household (83.1%), of those (n=196), 83.7 percent lived with a partner, spouse, boyfriend or girlfriend. 33.3 percent of respondents lived with child(ren) under the age 18 (37.3 % with 1 child, 40% with two children and 8 % with three children). 8.4 percent lived with dependent relatives over the age of 18, and 14.6 percent reported living with independent relatives over the age of 18. Only one person shared their household with a non-relative.

### *6.3 Fruit and Vegetable Consumption Patterns: Dietary Description and Analysis*

The dietary patterns described within this section have been collated from the responses to Section 1 of the Fruit and Vegetable Questionnaire; a retrospective seven day (Monday-Sunday) dietary recall and semi quantitative food frequency questionnaire amalgam (Appendix 2). Composite dishes have a range of levels of fruits and/or vegetables within their make-up and therefore were classified as either 'high' or 'medium' or 'low' (then halved or divided by three respectively, to correct them for over reporting of contribution towards a health defined and nutritional portion (standard 80g portion). Likewise for description and analysis purposes, the reporting of 'Fruit Juice, Fruit Smoothie' was amended in line with this, capping at a maximum of one portion per day. This capping was also applied for the 'Chickpeas, Lentils, Beans'. The remaining quantity of fruit and vegetable item types were converted to standardised portions, to the nearest halve portion aided by the serving information provided in the questionnaire.

An error in the survey construction; combining tomatoes with baked beans (where baked beans represents a maximum of one portion per day) meant a possible error in accuracy of either tomatoes or baked beans being consumed. The maximum impact of this would be the over reporting of this type of vegetable from the list (where no more than one portion of bean type foods can be counted, between the chick pea, and baked bean options) of less than 60 portions (in total) upon the diet. This would have a minimal effect to the daily consumption figures of the individual, with 36 respondents affected (none of the effected respondents moved from a high to low consumer position).

### 6.3.1 General Consumption

This section describes the overall popularity of the consumption of fruits and vegetables as reported by respondents. A total of 10733 portions were consumed by the 239 respondents. Of these, 1619 portions were derived from the composite meal consumption, 4481 from the consumption of those classified as fruit items, and slightly more 4633 eaten as vegetables. This represented an average weekly consumption of 44.91 per respondent, or mean daily consumption of approximately 6.4 portions, and median of 5.95 portions. Figure 6.1 presents the frequency of those consuming different daily fruit and vegetable levels consumption by 50 gram; Skewness is 0.33, and Kurtosis - 0.59.

Figure 6.1 Intake Distribution of Respondents

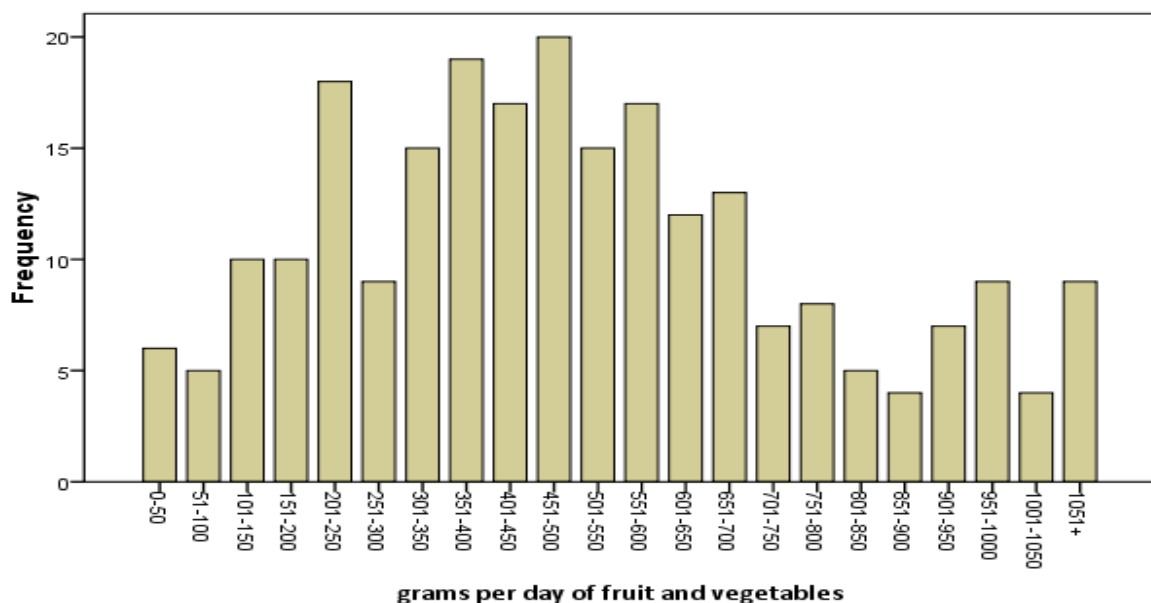


Figure 6.2 displays the total consumption for each day by each of the component parts, i.e. Composite (Comp), Fruit (Fruit) and Vegetables (Veg). The actual figures are presented in Table 6.2 along with the percentage (to the nearest whole figure) of the component consumed on each day as well as average consumption per person. The method of respondent completion allowed for any given point in the week retrospectively to be inputted (thus not all would respond necessarily from Monday to Sunday). As can be seen, the amount of fruit consumed decreased from Monday through to Sunday, the number of vegetables consumed decreased Monday to Friday, with Saturday

a level marginally higher than Friday, and the greatest consumption figure of vegetables registered for a Sunday. Portions derived from a composite dish also increased on a Sunday.

Figure 6.2 Total Consumption of Components by Portions Each Day

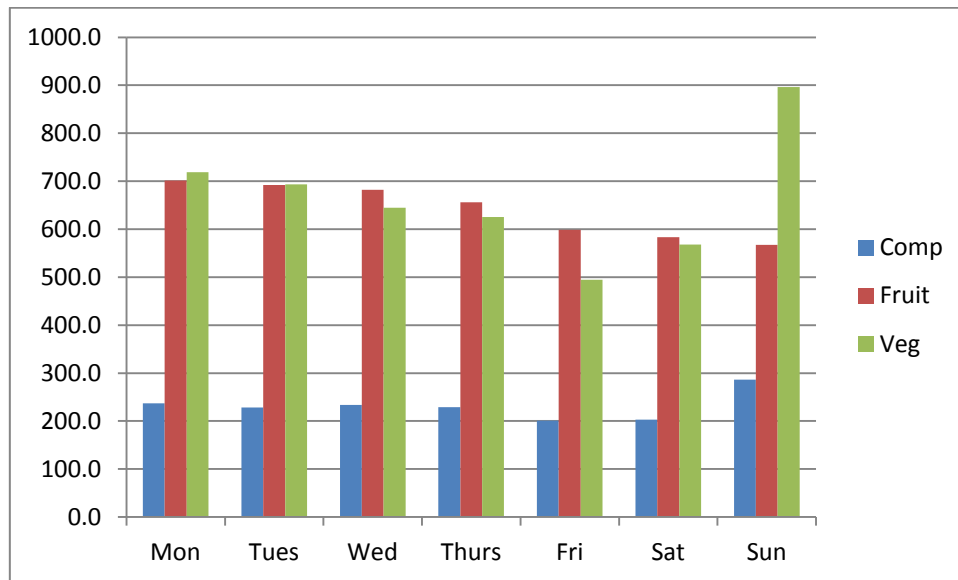


Table 6.2 Total Consumption of Components by Portions Each Day

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
<b>Comp</b>	237.2 (14)	228.6 (14)	233.8 (15)	228.8 (15)	200.8 (16)	203.3 (15)	286.4 (16)
<b>Fruit</b>	700.5 (42)	691 (43)	681 (44)	651 (43)	597.5 (46)	582.5 (43)	566 (32)
<b>Veg</b>	718.5 (44)	693.5 (43)	644.5 (41)	625.1 (41)	494.5 (38)	568 (42)	896.1 (51)
Average Portions Consumed Per Person							
<b>Comp</b>	1.00	0.96	0.98	0.96	0.84	.85	1.20
<b>Fruit</b>	2.93	2.89	2.63	2.74	2.42	2.44	2.39
<b>Veg</b>	3.01	2.90	2.70	2.62	2.06	2.37	3.75

(percentage, to nearest whole figure, of each component consumed per day).

Friday and Saturday exhibit a lower Composite (Comp) consumption than the rest of the week, although marginally so, and Monday to Thursday are roughly the same. On Sunday a higher number of 'Comp' are consumed than the rest of the week. Fruit is substantially out-consumed by Vegetables on a Sunday, unlike the rest of the week where a more similar proportion is seen in the make-up of fruit to vegetables. A marginal difference to this is Friday, where fruit makes up 8 percent more of the daily diet than vegetables (of these food types).



The pattern of relative consumption is similar from Monday to Saturday (except Friday) despite a variation in level of consumption, with Sunday demonstrating a distinctive picture and Friday a moderated picture for the respondents as a total. However as is made apparent below there is underlying variation in the component types of fruit and vegetable preference for consumption that make-up the total consumption.

### *6.3.2 Respondent Consumption of Fruit and Vegetable Types*

This section describes daily variation in consumption supported by a number of Tables and Figures. In general, Sunday offered a different picture of consumption to the rest of the week for respondents. Figure 6.3 represents consumption on a Sunday, with the mean daily consumption inserted as comparison. Full daily figures for consumption are shown in Table 6.4, while Table 6.3 demonstrates the popularity of certain foods on certain days.

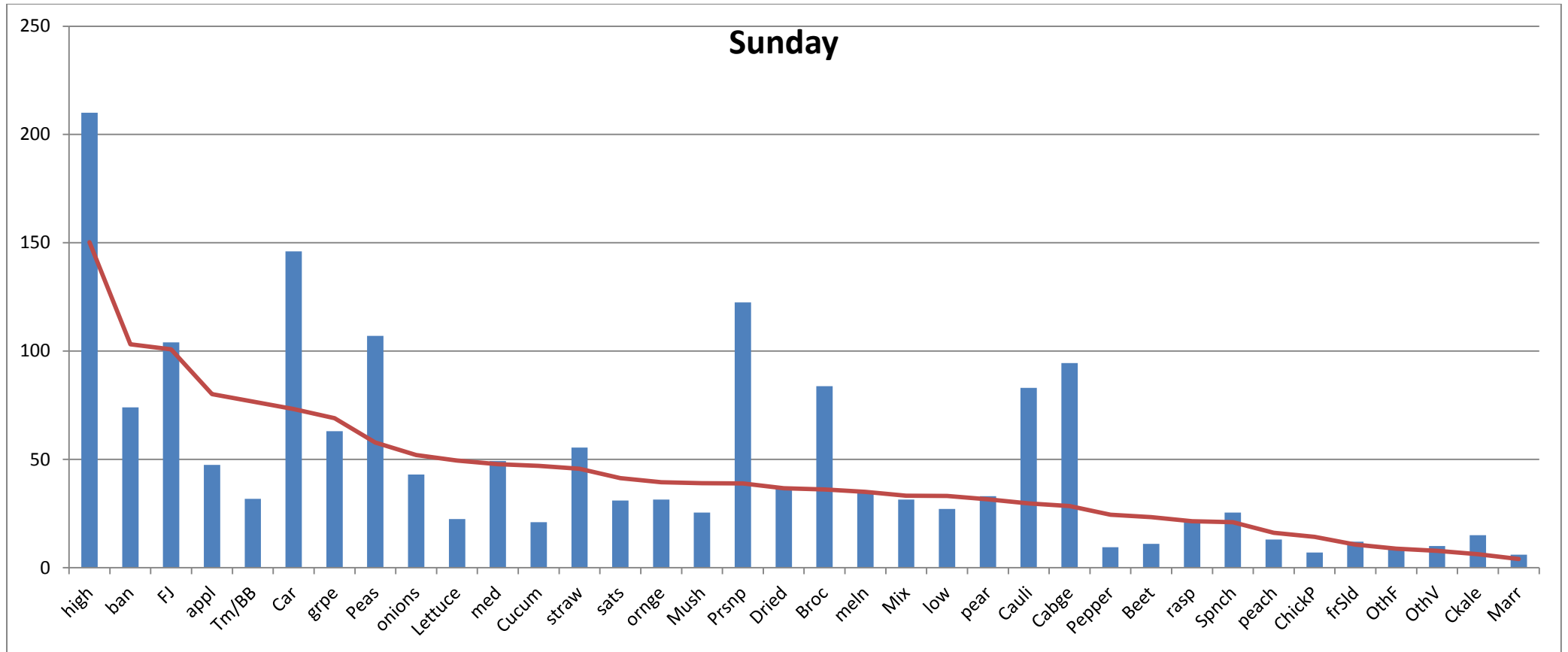
An increase in vegetables associated traditionally with 'Sunday Lunch', for example peas, cabbage, parsnip and carrots were observed on a Sunday. Though carrots and peas feature strongly anyway during the week a doubling or trebling of their consumption figure was noted, and broccoli, cauliflower, cabbage exhibited a quadrupling in their consumption (from less consumption figures during the rest of the week). Tomatoes / Baked Beans, and further salad material such as cucumber and lettuce (and in this instance pepper) fell considerably, onions less so (more stable throughout the week). Tomatoes / baked beans are most strongly consumed vegetables apart from Sunday. Thus there was the suggestion of substitution taking place for Sunday consumption. The consumption of 1<sup>st</sup> to 6<sup>th</sup> ranked vegetables on a Sunday were carrot, parsnip, peas, cabbage, broccoli and cauliflower (ranging from 146 to 83 portions respectively), the next popular was onions with only 43 portions, hence a large gap was noticed between the most and less popular foods on a Sunday. Such a gap was not evident the rest of the week, though tomatoes/baked beans featured as the strongest consumption Monday – Friday (falling by half to two-thirds consumption on a Sunday).

Fruit items generally demonstrated a small fall during the week. Sunday represented the lowest consumption day for fruit items. Strawberries however reached their highest consumption against this trend. Fruit juice and smoothies portions were consumed (nutritionally so, i.e. capped at 1 per day) with regular frequency, and bananas which were positioned first amongst fruits Monday to Friday were consumed in lesser amounts Saturday and Sunday, like apples. Interestingly 'dried' fruit feature perhaps more strongly than would be expected throughout the seven days, with overall consumption of 273 portions (ranked 7<sup>th</sup> overall fruit item) ahead of the likes of melon or pear, and just behind satsumas and oranges (which are lower than dried fruit on Sunday).

The nutritional fruit and/or vegetables portions gained from medium composite and low composite meal remains relatively standard across the week, and account for 334, and 233 portions respectively. High composite however accounts for in excess of one thousand portions over the week and was ranked 1<sup>st</sup> each day, even Sunday, where consumption over other items increased. Though it is recognised that as an item it incorporates fruit or vegetables in its make up, it does highlight the importance of recognising the contribution of this preparation/consumption method to the daily portion make up of fruit and vegetables.

There were a substantial number of portions consumed over a small number of food types, for example high composite meals (as well as other composite meals), bananas, apples, grapes and fruit juice. A number of these represent possible ease of consumption or as part of a meal (such as desert, or chopped with breakfast). This has implication for the usefulness and potential for increasing and maintaining of fruit and vegetable consumption, with specific food types associated with particular meal patterns and strategies for consumption. Likewise, there were a lot of fruit and vegetable items that allow for significant increases in consumption (as currently low consumption amounts). The increase of vegetable items on a Sunday also indicates the potential to identify possible growth areas for vegetables in non-Sunday consumption.

Figure 6.3 Sunday Consumption of Fruit and Vegetables Type (Line Indicative of Weekly Mean)



High = high composite, ban = banana, FJ = fruit juice, appl = apple, tm/bb = tomato/baked beans, Car = carrot, grpe = grape, med = medium composite, cucum = cucumber, straw = strawberries, sats = Satsuma, ornge = orange, mush = mushrooms, prsnp = parsnip, dried = dried fruit, broc = broccoli, meln = melon, mix = mixed vegetables, low = low composite, cauli = cauliflower, cabge = cabbage, beet= beetroot, rasp =raspberry, spnch = spinach, chickp = chickpeas, frsld = fruit salad, othf = other fruit, othv = other vegetables, ckale = curly kale, marr = marrow (key for food types for this Figure 6.2, and for Table 6.4).

Table 6.3 Daily Ranking of Top Ten Fruit and Top Ten Vegetables (Composite Dishes Removed)

Rank	Mon Fruit	Tues Fruit	Wed Fruit	Thurs Fruit	Fri Fruit	Sat Fruit	Sun Fruit
1	banana 119.5	banana 104.5	banana 114	banana 119	banana 106.5	FJ 103	FJ 104
2	apple 107.5	FJ 103	FJ 102	FJ 97	FJ 96	banana 84.5	banana 74
3	FJ 100.5	apple 88.5	apple 92	apple 86.5	apple 80.5	grapes 73.5	grapes 63
4	grapes 74.5	grapes 81.5	grapes 76	grapes 62.5	grapes 52	apples 58.5	strawberry 55.5
5	strawberry 47.5	satsuma 54	satsumas 43.5	orange 44.5	melon 37	strawberry 46.5	apple 47.5
6	orange 45.5	strawberry 51.5	strawberry 40.5	satsumas 43.5	dried 36.5	satsuma 43.5	dried 36.5
7	satsumas 38	orange 45.5	dried 39.5	strawberry 43	satsumas 36	orange 35.5	melon 35
8	melon 35	melon 37	orange 38.5	dried 40.5	strawberries 35.5	dried 35	pear 33
9	dried 34.5	dried 34.5	melon 38	pear 34	orange 35	melon 30	orange 31.5
10	pear 29	pear 30	pear 36	melon 33.5	pear 31	pear 28	satsumas 31
Rank	Mon Veg	Tues Veg	Wed Veg	Thurs Veg	Fri Veg	Sat Veg	Sun Veg
1	toms/bb 91.5	tom/bb 87	tom/bb 83	toms/bb 84.5	tom/bb 78	tom/bb 81.5	carrot 146
2	carrots 80	carrot 73	lettuce 59.5	carrot 67	Cucumber 50	lettuce 57	parsnip 122.5
3	lettuce 64	peas 64.5	carrot 55.5	onions 57.5	lettuce 48.5	cucumber 49.5	peas 107
4	onions 61	onions 63	onions 55	cucumber 48.1	Carrot 45	peas 47	cabbage 94.5
5	cucumber 60.5	cucumber 52	peas 51.5	peas 47	onions 40.5	carrot 46	broccoli 83.8
6	peas 51	lettuce 51.5	cucumber 48	mushroom 46	peas 36.5	onions 44	cauliflower 83
7	mushroom 41.5	Mix 37	mushroom 46	lettuce 43.5	mushroom 34.5	mushroom 43.5	onions 43
8	broccoli 37.5	beetroot 36	mix 38.5	mix 40	mix 24.5	mix 30	tom/bb 31.8
9	beetroot 33.5	mushrooms 36	pepper 34	broccoli 31	beetroot 22	parsnip 26	mix 31.5
10	parsnip 32.5	spinach 32.5	broccoli 33	pepper 27	broccoli 22	beetroot 26	spinach 25.5

On next page; Table 6.4 Total Ranking of Fruit and Vegetables (including Composite Dishes) by Day of the Week

Rank	Monday	Tuesday	Wednes	Thursday	Friday	Saturday	Sunday	Weekly								
1	high	160	high	148.5	high	149	high	142	high	118	high	124.5	high	210	high	1052
2	ban	119.5	ban	104.5	ban	114	ban	119	ban	106.5	FJ	103	Car	146	ban	722
3	appl	107.5	FJ	103	FJ	102	FJ	97	FJ	96	ban	84.5	prsnp	122.5	FJ	705.5
4	FJ	100.5	appl	88.5	appl	92	appl	86.5	appl	80.5	tm/bb	81.5	peas	107	appl	561
5	tm/bb	91.5	tm/bb	87	tm/bb	83	tm/bb	84.5	tm/bb	78	grpe	73.5	FJ	104	tm/bb	537.3
6	car	80	grpe	81.5	grpe	76	car	67	grpe	52	appl	58.5	cabge	94.5	car	512.5
7	grpe	74.5	car	73	lettuce	59.5	grpe	62.5	med	50.75	lettuce	57	broc	83.8	grpe	483
8	lettuce	64	peas	64.5	car	55.5	onions	57.5	cucum	50	cucum	49.5	cauli	83	peas	404.5
9	onions	61	onions	63	onions	55	med	53	lettuce	48.5	peas	47	ban	74	onions	364
10	cucum	60.5	sats	54	peas	51.5	cucum	48.1	car	45	straw	46.5	grpe	63	lettuce	346.5
11	Peas	51	cucum	52	med	50.5	peas	47	onions	40.5	car	46	straw	55.5	med	334.5
12	straw	47.5	lettuce	51.5	cucum	48	mush	46	meln	37	med	44.25	med	49.25	cucum	329.1
13	ornge	45.5	straw	51.5	mush	46	ornge	44.5	peas	36.5	onions	44	appl	47.5	straw	320
14	med	42.5	ornge	45.5	sats	43.5	lettuce	43.5	dried	36.5	sats	43.5	onions	43	sats	289.5
15	mush	41.5	med	44.25	straw	40.5	sats	43.5	sats	36	mush	43.5	dried	36.5	ornge	276
16	sats	38	meln	37	dried	39.5	straw	43	straw	35.5	ornge	35.5	meln	35	mush	273
17	Broc	37.5	mix	37	ornge	38.5	dried	40.5	ornge	35	dried	35	pear	33	prsnp	272.5
18	meln	35	mush	36	mix	38.5	mix	40	mush	34.5	low	34.5	tm/bb	31.8	dried	257
19	low	34.67	beet	36	meln	38	pear	34	low	32	meln	30	ornge	31.5	broc	252.8
20	dried	34.5	low	35.83	pear	36	low	33.83	pear	31	mix	30	mix	31.5	meln	245.5
21	beet	33.5	dried	34.5	low	34.34	meln	33.5	mix	24.5	pear	28	sats	31	mix	232.5
22	prsnp	32.5	spnch	32.5	pepper	34	broc	31	broc	22	prsnp	26	low	27.17	low	232.34
23	Mix	31	pear	30	broc	33	pepper	27	beet	22	beet	26	mush	25.5	pear	221
24	pear	29	prsnp	29	cauli	28.5	spnch	25.5	pepper	21	pepper	23	spnch	25.5	cauli	208
25	pepper	29	pepper	28	prsnp	23.5	prsnp	23.5	rasp	18	broc	20	lettuce	22.5	cabge	199
26	cauli	27.5	broc	25.5	rasp	23	cauli	21	chickp	16.5	rasp	18	rasp	22	pepper	171.5
27	rasp	27.5	cauli	25.5	spnch	20	rasp	20	peach	16	spnch	17.5	cucum	21	beet	163.5
28	cabge	23	cabge	25	beet	19	cabge	18	prsnp	15.5	peach	15	ckale	15	rasp	150
29	chickp	22	rasp	21.5	cabge	16.5	beet	16	spnch	12.5	cabge	14.5	peach	13	spnch	147.5
30	peach	18	peach	21	frSld	15.5	peach	16	cauli	10	cauli	12.5	frsld	12	peach	113
31	spnch	14	chickp	15.5	peach	14	frSld	10.5	frSld	10	chickp	11	beet	11	chickp	93
32	frSld	12.5	frsld	11.5	chickp	13	chickp	9	othf	8.5	othv	11	othv	10	frSld	75
33	pthf	12	othf	8	othf	9.5	othv	8	cabge	7.5	othf	9.5	pepper	9.5	othF	62
34	ckale	8.5	othv	8	othv	7	ckale	6.5	othv	4.5	marr	4	othf	9	OthV	54.5
35	othv	6	ckale	3	ckale	6.5	othf	5.5	marr	3.5	frsld	3	chickp	6	ckale	43.5
36	marr	3.5	marr	0.5	marr	5.5	marr	5	ckale	1	ckale	3	marr	6	marr	28

### 6.3.3 Differences between High and Low fruit and vegetables Consumers in Daily Consumption

Appendix 8 presents the daily consumption figures for each food category on each day of the week, divided into the amounts consumed by respondents classified in this study as 'High' and as 'Low' fruit and vegetable consumers. For purposes of this study, this is five and above, and below five standard portions of fruit and vegetables per day respectively. In line with this 148 respondents were deemed high, and 91 were low. From this the relative percentage attributed towards the total consumption of each food type on each day from High and Low consumers is calculated. The breakdown of the total consumption for all food types across the days of the week is 82.15 percent for High consumers, and 17.85 percent for Low consumers. Table 6.5 represents the deviation shown (in percentage values) for High consumers from the 82.15 percent total figure of each food type on each day. In so doing, differences in consumption for fruit and vegetable types on particular days between high and low consumers can be described.

Interesting observations are in evidence; composite dishes for example offer interesting trend between High and Low consumers, in general High consumers eat proportionately more than Low consumers in relation to 'HighComp' i.e. High Composite Meals. Though fluctuating, with highest levels of positive difference on Friday and Saturday, the high fruit and vegetable consumers ate 6.7% more than the average. This is in contrast to medium and especially low composite dishes where High fruit and vegetable consumers show a negative trend in the variation. This is limited in the case of medium composite dishes at -1.81, but Low consumers eat almost 24% of the low composite dishes. This may reflect the type of foods considered within these categories. The high composite dish represents either a dedicated vegetable dish or meat replacement dish, whereas medium composite is generally meat with vegetables, and low composite dishes vegetables very much secondary to the main ingredients (e.g. pizza toppings or Shepherd's pie).

There are other fruit and vegetable items that exhibit greater than average fruit and vegetable consumption by High fruit and vegetable consumers. Those that demonstrate this feature on most, if not all of the days of the week include oranges (especially Saturday and Sunday), grapes, raspberries (although only 150 portions eaten in total), and both pepper and cucumber (the lowest weekly variation with 4.33). Conversely there are those fruit and vegetable items where Low consumers eat proportionately more (and High consumers less). Those items where this occurs (for the majority of the week) include pear (except Sunday), peach, parsnip (except Saturday), mushrooms (except Wednesday), broccoli (except Friday) and Peas. The results for bananas indicated that High consumers ate less than average consumption Monday through Friday, and a greater than average consumption by on Saturday and Sunday (marginal). This pattern is similar to

Table 6.5 High Consumer Variation from Expected average difference: F&V by Day of the Week

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednes</b>	<b>Thursday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>Weekly</b>
highComp	6.60	7.41	7.78	2.71	11.07	11.42	3.09	6.73
medComp	-2.15	-3.62	-3.93	-1.49	2.09	-0.79	-2.96	-1.81
lowComp	-10.04	-6.79	-3.03	-7.28	-5.06	-3.89	-4.86	-5.90
apple	-0.29	-5.31	-8.24	-2.38	1.70	9.30	5.22	-0.96
pear	-6.29	-5.48	-1.59	-2.74	-7.96	-10.72	2.70	-4.32
orange	4.66	2.47	2.27	6.61	6.42	17.85	8.33	6.62
banana	-4.33	-3.68	-8.03	-6.94	-9.85	3.06	0.28	-4.73
satsuma	0.74	-6.22	-3.99	8.65	10.91	6.36	13.01	3.34
grape	11.14	4.35	1.40	7.45	4.39	7.65	8.33	6.36
strawberry	-3.20	8.14	3.04	-4.24	0.95	11.40	-0.17	2.38
raspberry	14.21	1.57	9.15	12.85	12.29	12.29	13.30	10.85
peach	-21.04	-1.20	-10.72	-13.40	-0.90	-2.15	-5.23	-7.81
melon	2.14	-1.07	9.96	11.88	4.34	2.85	-5.01	3.59
fruit salad	-10.15	-3.89	-17.63	-5.96	-2.15	17.85	9.52	-4.82
fruit juice	-5.04	-4.48	-0.78	0.32	-0.90	1.35	2.47	-1.00
dried fruit	-0.99	-6.79	-1.14	-3.14	-5.44	6.42	9.63	-0.24
other fruit	1.18	17.85	-8.47	8.76	-11.56	-8.47	-4.37	-1.50
carrots	-0.28	-7.49	-1.97	-3.05	0.07	-1.72	-12.29	-5.37
onions	2.28	0.39	2.40	2.20	-0.67	-1.47	6.22	1.64
peas	-0.78	-11.61	-3.51	-4.49	-5.44	-0.24	-9.72	-6.01
cabbage	13.50	-10.15	2.70	3.96	-8.82	0.61	-6.49	-2.50
parsnip	-12.92	-13.18	-5.55	-5.55	-4.73	0.54	-8.27	-7.84
spinach	17.85	-11.38	7.85	6.09	-2.15	-10.72	-1.76	-0.46
curly kale	0.20	17.85	2.47	17.85	17.85	17.85	-8.82	2.91
beetroot	-4.54	-4.37	7.32	5.35	8.76	2.47	17.85	2.25
mushrooms	-6.25	-4.37	9.15	-4.98	-8.24	-2.84	-11.56	-3.40
cauliflower	1.49	0.20	-17.24	-5.96	7.85	-14.15	-12.27	-8.11
broccoli	-8.82	-13.52	-1.85	-6.34	4.21	-7.15	-11.98	-7.86
marrow	17.85	17.85	17.85	17.85	17.85	17.85	1.18	14.28
pepper	7.51	1.78	6.09	10.44	1.18	9.15	7.32	6.19
chick peas	0.46	-0.33	3.56	-12.15	0.71	9.52	3.56	0.85
lettuce	-2.46	0.37	-0.64	10.95	7.54	3.81	2.29	2.70
cucumber	0.49	2.47	3.27	5.38	7.85	5.73	8.33	4.33
tomato/bb	-2.37	2.33	-0.22	-1.08	1.18	-1.78	3.70	-0.11
mixed veg	-11.18	0.28	-0.33	0.35	3.56	4.52	1.98	-0.21
other veg	17.85	-7.15	17.85	17.85	6.74	-0.33	-2.15	5.92
Total	-0.32	-1.81	-0.17	0.48	1.32	3.40	-1.92	0.00
Comp	2.60	3.05	3.67	0.26	6.23	6.16	1.29	3.15
Fruit	-0.54	-1.59	-2.38	0.24	-0.53	5.34	4.01	0.47
Veg	-1.08	-3.64	0.78	0.81	1.57	0.42	-6.70	-1.57

fruit salad (although a low number consumed), and dried fruit. A more varied pattern of consumption between the levels of High and Low consumer included mixed vegetables, cauliflower, onions, lettuce, chickpeas, beetroot and melon for example. Fruit Juice was perhaps more stable between High and Low consumers with marginal movement across the week from the regular average consumption; Tomatoes / Baked Beans was similar to this.

#### *6.4 Fruit, Vegetable, and Composite Factor Analysis*

##### *6.4.1 Factor Interpretation of Fruit and Vegetable Consumption*

The first part of the survey presented the respondents with a consumption indicator, based upon the frequency of named items being consumed over the period of one week prior to the completion of questionnaire. The items were grouped into 'Composite Meal' items (with High, Medium and Low) levels of fruit and vegetable proportions therein, 'Fruits', and 'Vegetables'. From the information collated it was possible to derive the total consumption for each of the items. With the exception of items described as 'other' (low in consumption volume and difficult to interpret), the items' weekly totals (34 in total) were subjected to a Factor Analysis to explore underlying structures which may lead to identifying dietary types, and provide reduced data useful for further analysis.

Appendix 9 presents the processes, statistical undertaking and interpretation of the exploratory factor analysis. Table 6.6 provides the 12 factor solution for the fruit and vegetable consumption data. Factor 1 is 'Traditional Meat Accompaniment', factor 2 is 'Salad Lunch Bar', factor 3 'Salad Accompaniment & Kale', factor 4 'Fry-up Accompaniment', factor 5 'Composite Meals', and factor 6 is 'Soft Fruits & Berries'. 'Non-Convenient Fruits' is factor 7, factor 8 is 'Convenient Health Mix', factor 9 is 'Rich High Fashion Foods', factor 10 is Summer Garden Foods, factor 11 is Convenient Fruit, and factor 12 is 'Juicy Fruits'.



Table 6.6 Factor Loadings for the Fruit, Vegetable, and Composite meal Totals

Tradition Meat Accompaniment (Component 1)		Factor Loading	Salad Lunch Bar (Component 2)		Factor Loading	Salad Accompaniment (Component 3)		Factor Loading
Peas	PeaT	0.691	Pepper, avocado	PeppT	0.773	Beetroot, radishes	BeeT	0.777
Parsnip, turnip, swede	ParsT	0.683	Marrow, courgettes	MarrT	0.583	Curly kale, spring greens	KaleT	0.773
Carrots	CarT	0.678	Lettuce, beansprouts	LetT	0.507	Cucumber, celery, spring onions	CucT	0.474
Cabbage	CabT	0.599	Spinach, sweetcorn	SpinT	0.454			
Cauliflower	CaulT	0.501	<i>Cucumber, celery, spring onions*</i>	<i>CucT</i>	<i>0.399</i>			
'Fry-Up' Accompaniment (Component 4)			Composite Meal (Component 5)			Soft Fruits & Berries (Component 6)		
Onion, leeks	OnT	0.728	Medium Proportion Composite	HT2	0.794	Raspberries, Blackcurrants, blueberries	RaspT	0.849
Mushrooms	MushT	0.657	High Proportion Composite	HT1	0.644	Strawberries	StrwT	0.788
<i>Tomato, baked beans*</i>	<i>TomT</i>	<i>0.389</i>	Low Proportion Composite	HT3	0.62			
Non-Convenient Fruits (Component 7)			Convenient Health Mix (Component 8)			Rich 'High Fashion' Foods (Component 9)		
Peach, nectarine	PeachT	0.725	Fruit salad, tinned fruit	FrSldT	0.777	Dried fruit, e.g. raisins, prunes, figs, dates	DrdT	0.737
Melon, mango, pineapple	MelT	0.652	Chickpeas, Lentils, Beans - kidney, black eye, broad, butter	ChickT	0.713	Broccoli, asparagus	BroccT	0.668
Satsumas, mandarins, tangerines, kiwi fruit, plums	SatT	0.554	Mixed vegetables, mixed salad	MixT	0.442	<i>Spinach, sweetcorn*</i>	<i>SpinT</i>	<i>0.392</i>
Summer Garden Fruit (Component 10)			Convenience Fruit (Component 11)			Juicy Fruits (Component 12)		
Pears	PrT	0.756	Bananas	BanT	0.638	Oranges	OrT	0.837
Grapes, cherries, gooseberries, blackberries	GrpT	0.643	Apple	ApT	0.497	Fruit juice, fruit smoothie	JuiceT	0.453

(\*Near 0.4 Factor Loading)

#### 6.4.2 Aggregate Consumption Totals for Fruit Vegetable Composite Factors

Utilising the 12 fruit and vegetable consumption factors brought together as a result of analysis reported in 6.3.1, Appendix 10 highlights the total consumption and daily breakdown Monday – Sunday in a tabular format of the combined factor consumption as well as the mean weekly consumption line. The figures of Fruit Vegetable Composite Factors represent recognised repetition of some food types and are not exact to original amounts, therefore different number of fruit and vegetable items to different factors.

The weekly Total indicates the approximate grouping of fruit and vegetables by level, with ‘Juicy Fruits’ contributing most as a single factor, ‘Composite Meals’ and ‘Traditional Meat Accompaniment’ the next two preferred fruit and vegetable factor types. At a consumption rate of around half that of the most popularly consumed, ‘Convenience Fruit’, ‘Fry-Up Accompaniment’, and ‘Salad Lunch Bar’ feature. ‘Sumer Garden Fruit’, ‘Rich ‘High Fashion’ Foods’, and ‘Non-Convenient Fruits’ make up the next similar block of consumption, and this is followed by the concluding group of three; ‘Salad Accompaniment’, ‘Soft Fruits & Berries’ and ‘Convenient Health Mix’.

Table 6.7 Aggregate Fruit Vegetable Composite Factor Consumption By Portions Consumed On Each Day, Ranked by Total Consumption

FACTOR	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Juicy Fruits (F12)	303.7	293.6	301.8	289.3	252.8	248.3	336.9	2026.3
Composite Meals (F5)	237.2	228.6	233.8	228.8	200.8	203.3	286.4	1618.8
Traditional Meat Accompaniment (F1)	214	217	175.5	176.5	114.5	146	553	1596.5
Convenience Fruit (F11)	227.0	193.0	206.0	205.5	187.0	143.0	121.5	1283.0
Fry-Up Accompaniment (F4)	194.0	186.0	184.0	188.0	153.0	169.0	100.3	1174.3
Salad Lunch Bar (F2)	171.0	164.5	167.0	149.1	135.5	151.0	84.5	1022.6
Summer Garden Fruit (F10)	103.5	111.5	112.0	96.5	83.0	101.5	96.0	704.0
Rich 'High Fashion' Foods (F9)	86.0	92.5	92.5	97.0	71.0	72.5	145.8	657.3
Non-Convenient Fruits (F7)	91.0	112.0	95.5	93.0	89.0	88.5	79.0	648.0
Salad Accompaniment (F3)	102.5	91.0	73.5	70.6	73.0	78.5	47.0	536.1
Soft Fruits & Berries (F6)	75.0	73.0	63.5	63.0	53.5	64.5	77.5	470.0
Convenient Health Mix (F8)	66.5	65.0	68.0	60.5	52.0	45.0	50.5	407.5

Interestingly, Juicy Fruits, i.e. fruit juice and oranges which in interview stages were noted as featuring different levels of ease of consumption; fruit juice most easy, and oranges typical of ‘fiddly’ or ‘faffy’ nature are linked together by the data. Fruit juice providing two to three times the daily volume of total standard portions across the respondents than that of oranges, but both are stable

in their consumption and this was reflected in a low standard deviation of approximately 30 portions despite consumption in excess of 2000 portions.

Composite Meals, had a similar small daily deviation. Traditional Meat Accompaniment demonstrated a large increase on Sunday, to levels approximately three times the average consumption for the rest of the week (lowest level on Friday), which in part accounted for the large standard deviation. Portions consumed per day ranged from 115 to 215 without the exceptional Sunday. Interestingly Traditional Meat Accompaniment (and lesser extent Rich High Fashion Foods, especially broccoli) demonstrated a Sunday effect, but not the other factors. Convenience Fruits indicated a drop in consumption at the weekend, i.e. bananas and apples, and perhaps reflect the nature and ease of consumption (probable need to eat quickly and conveniently during the week for many).

In contrast to Traditional Meat Accompaniment, Fry-Up Accompaniment demonstrates a lower consumption of its vegetable item group on a Sunday, and maintains a reasonable level of stability for the rest of the week. Salad Lunch Bar factor also demonstrates a decrease in consumption on Sunday, as does Salad Accompaniment (although Monday and Tuesday have a higher consumption than Wednesday to Saturday and hence a high relative standard deviation). Summer Garden Fruits have a stable pattern of consumption. Rich 'High Fashion' Foods (which includes Broccoli asparagus and Spinach sweetcorn items) demonstrate three stages of consumption throughout the week, Monday – Thursday (86-97 portions per day), Friday and Saturday (low 70s) and then a doubling from Saturdays consumption to Sundays (almost 146 portions). Non-Convenient Fruits have consumption generally similar across the week.

### *6.5 Attitude and Behaviour Differences of High Fruit & Vegetable Consumers*

The previous research stages, consumer interviews as well as the literature review, presented a range of influences upon fruit and vegetables consumption, and high consumers indicated that there were certain attitude and behaviour characteristics that were associated with their fruit and vegetable consumption in particular, as well linked situational contexts. These were operationalised in the form of statements that related to the sentiments of the attitude and behaviour characteristics about reasons for consumption and how consumption is carried out. The purpose of the list in its entirety was to analyse to compare high (n=148) and low (n=91) consumers of fruits and vegetables on their average score, proposing that differences would be observed for some of the statement in the wider sample; this would either support or contrast with the consumer survey information. It was also proposed that the statements would feature different levels of importance

and strength of agreement so as to identify those influences that were most strongly agreed or disagreed with by respondents in general.

Respondents were asked to state their level of agreement on a 7-point Likert scale, between Strongly Disagree (1) and Strongly Agree (7) (with neutral position of 4; neither agree or disagree), with 130 statements either directly or indirectly found, in earlier stages of the research, to be related to possible fruit and vegetable consumption. Those statements not applicable to certain respondents (statements 104-130) allowed the respondent to express this with the addition of an eighth option (Does Not Apply To Me); these were then recoded to the neutral response (Corbett et al 1981). The statement order was in part purposeful to aid in successful completion by the respondent and tackles the issue of similar sounding statements. Appendix 11 presents the response frequencies for each of the statements.

Table 6.8 illustrates 57 statements that demonstrate a statistically significant difference (to 95 percent confidence) between High and Low fruit and vegetable consumer, ranked from most Strongly Agree, to most Strongly Disagree by average agreement. The table (6.9) shows the mean response for those who are classified as High (148) and Low (91) fruit and vegetable consumers, i.e. above and below five daily nutritional portions respectively. Significance information for this can be seen in Appendix 12 along with relevant standard deviations. Appendix 13 presents the full 130 statement with corresponding average scores (those which demonstrate significant and non-significant differences) and corresponding high and low consumer positions (as well as significant gender differences).

Those statements that feature above 5.0 as Agree and Strongly Agree are 27 in number. In part these referred to common consumption behaviours, such as eating vegetables as part of a meal, eating fruit as a snack and eating fruit at work. Recognition of the importance of food and fruit and vegetables also features at this level of agreement; 'food is important to daily life' as well as vegetables and fruit individually, although vegetables did feature stronger agreement in importance than fruit for the consumers as a whole. Fruit and vegetables were important, but more so for High consumers; 'fruit is important to my diet'. This extended to food shopping budget, for example, vegetables are important part of my food shopping budget, as well as for fruit. Vegetables, however, were more similar in response between High and Low consumers than fruit; both however represent statistically significant differences.

Derived enjoyment from consumption was also found at this level of agreement: with both 'I enjoy eating fruit' and 'I enjoy eating vegetables' featuring. High consumers derived greater enjoyment from the consumption of both fruits and vegetables. Taste features, with a high level of agreement that both the 'type' of fruit and vegetables and 'amount' of fruit and vegetables

consumed by the respondents is affected by how they taste. Variety of the diet was associated with a high level of agreement with 'I Have a Varied Diet' (High consumers showed significantly higher agreement). Likewise the happiness of that variety for vegetables and fruits follow a similar trend, with High consumers having demonstrated a stronger agreement with the variety of each that they eat.

Preparation also featured, with a general agreement that both fruit and vegetables are easy to prepare and use. Another type of statement that had higher levels of agreement was independence in the decision to consume fruits and vegetables. The amount of fruit and the amount of vegetables consumed is affected by the 'respondent alone'. There was some evidence of the role of circumstance within the higher agreement levels; there were those statements that related to eating patterns being interrupted and different 'when at work to when I am not at work', as well as holidays, where the amount and type of both fruit and of vegetables. On the same theme, respondent's diet was different to that when they lived at home with parents/guardians.

At the other end of the scale; statements that registered an average strong disagreement, included those items of playing and competing in sporting activity regularly, and disagreement that this has an effect upon the amount of fruit or vegetables consumed. This compares to the response to regular exercise which had a mean of 4.54 (and a significantly different response between High consumers; 4.84, and Low consumers; 4.05). Although both High and Low consumers were similar in their mean response to playing a part in the growing and collection of fruit and vegetables they ate, the origin of fruit and of vegetables (i.e. where and how fruit and vegetable are grown) registered different mean responses from the two categories with High consumers relatively less disagreement. Likewise there was relatively greater agreement with 'type' of fruit and vegetables being effected more so than 'amount' of fruit and vegetables.

'I eat vegetables as a snack' had a mean moderate disagreement response of; in comparison to the consumption of fruit as a snack, a behaviour with strong agreement. There was a difference between High and Low consumers in both cases, with the Low consumers registering the least agreement. In terms of substitution; 'rather than sweets, crisps or chocolate' the same pattern was observed, with fruit showing an agreement with the statement compared to vegetables showing disagreement, again Low consumers disagreed more so with regard to vegetables and with fruits. High consumers were in agreement whereas Low consumers are in disagreement with the statement.

What had been highlighted is that there was number of statements that show not only statistical difference but large variation in the corresponding means between High and Low consumers; 17 statements in total had a difference of 0.99 or more. Of these, only one of them demonstrated

higher agreement to the statement by Low consumers, i.e. ‘the only time I will eat fruit is when I fancy them’. This illustrated the trend for less agreement from High consumers to statements concerning the consumption fruits and vegetables when fancied or could be bothered’.

Groups of themed statements, where High consumers demonstrated a difference greater than 0.99 (with Low consumers) related to ‘happiness’, for example more happy in the variety eaten and more happy about the amount eaten, the ‘importance of fruit and vegetables’ to the respondents diet, ‘shopping budget’, and ‘having always consumed lots of fruits and vegetables’. Interestingly the enjoyment derived in the consumption of fruit also fits this trend. Preference of vegetables and fruit over fatty and sugary food alternatives (particularly snack foods) could be found in this group of statements, as well as those statements regarding the planning of the amount of fruit and vegetables that were consumed. The consumption of fruit as part of a meal or as a meal had an agreement difference of greater than 0.99, in addition, the ‘specific health concern’ reason for fruit and for vegetable consumption had a difference in excess of 0.99 also, with High consumers demonstrating greater agreement.

The results indicated that happiness (in particular with variety) and preferences (such as snacking) represent satisfaction surrounding fruit and vegetable consumption that differentiated high consumers from low consumers. In addition importance to the shopping budget indicated the value of fruits and vegetables to the diet for high consumers. Snacking represented a practical behaviour and associated attitude to high daily consumption, health demonstrated possible motivation for high consumption, and having always eaten high fruit and vegetables a link to high consumption and trajectory formation.

Table 6.8 Significant Differences Between High & Low Consumers’ Attitude and Behaviour

Statement	Total Mean	5ADay	5ADay Mean
<i>I eat vegetables as a meal or as part of a meal*</i>	6.13	Low	5.86
		High	6.30
Food is important to my daily life	6.08	Low	5.88
		High	6.21
<i>Fruit is easy to prepare and use</i>	6.00	Low	5.78
		High	6.14
<i>Vegetables are important to my diet*</i>	5.85	Low	5.37
		High	6.14
<i>Vegetables are easy to prepare and use</i>	5.81	Low	5.52
		High	5.99

<i>Statement</i>	<i>Total Mean</i>	<i>5ADay</i>	<i>5ADay Mean</i>
I enjoy eating <i>fruit</i> *	5.68	Low High	5.07 6.06
I enjoy eating <i>vegetables</i> *	5.68	Low High	5.26 5.93
<i>Fruit</i> is important to my diet*	5.64	Low High	4.90 6.09
<i>Vegetables</i> are important part of my food shopping budget*	5.54	Low High	4.92 5.93
I have a varied diet*	5.46	Low High	4.88 5.82
<i>Fruit</i> is an important part of my food shopping budget*	5.32	Low High	4.45 5.85
I am happy with the <u>variety</u> of <i>vegetables</i> I eat*	5.10	Low High	4.46 5.50
I am responsible for doing the food shopping	5.08	Low High	4.76 5.28
I eat <i>fruit</i> at work	5.08	Low High	4.68 5.33
I am happy with the <u>variety</u> of <i>fruit</i> I eat*	5.03	Low High	4.32 5.46
I am happy about the food I eat*	4.99	Low High	4.47 5.30
I am responsible for the preparation, and cooking of the food within the household.	4.97	Low High	4.66 5.16
I eat the <u>amount</u> of <i>vegetables</i> I do for general health well-being *	4.95	Low High	4.20 5.42
I decide what is eaten and bought to eat within the household	4.89	Low High	4.54 5.11
I eat the <u>amount</u> of <i>fruit</i> I do for general health well-being*	4.87	Low High	4.07 5.37
I am happy with the <u>amount</u> of <i>vegetables</i> that I eat*	4.87	Low High	4.11 5.33
I have always eaten lots of <i>vegetables</i> *	4.87	Low High	4.25 5.24
I like to try <i>fruit</i> and <i>vegetables</i> that I am not used to*	4.84	Low High	4.22 5.22
I eat <i>fruit</i> as a meal or as part of a meal*	4.78	Low High	3.76 5.41
I am happy with the <u>amount</u> of <i>fruit</i> that I eat*	4.72	Low High	3.75 5.31
I have always eaten lots of <i>fruit</i> *	4.56	Low High	3.65 5.11

<i>Statement</i>	<i>Total Mean</i>	<i>5ADay</i>	<i>5ADay Mean</i>
I exercise regularly*	4.54	Low High	4.05 4.84
I listen and act on health advice/promotion/information in other general areas such as smoking or exercise	4.51	Low High	4.04 4.79
I have deliberately changed the <u>amount</u> and <u>type</u> of fruit and vegetables I eat	4.23	Low High	3.86 4.47
I would prefer to eat <i>fruit</i> or <i>vegetables</i> as a snack rather than crisps or sweets/chocolate	4.23	Low High	3.74 4.53
I am interested in where the <i>fruit &amp; vegetables</i> I eat come from & how they are grown	4.23	Low High	3.79 4.50
I have deliberately changed the food I eat	4.22	Low High	3.75 4.51
I eat the <u>amount</u> of <i>fruit</i> I do as part of reducing or controlling my weight	4.07	Low High	3.49 4.43
I eat the <u>amount</u> of <i>vegetables</i> I do as part of reducing or controlling my weight	4.06	Low High	3.60 4.34
Health advice/promotion/information affects the food I eat	4.01	Low High	3.67 4.22
I eat <i>vegetables</i> at work	4.00	Low High	3.48 4.31
I am always thinking about food	3.98	Low High	3.67 4.18
Health advice/promotion/information affects the amount of fruit I eat	3.93	Low High	3.58 4.14
Health advice/promotion/information affects the amount of vegetables I eat	3.89	Low High	3.53 4.11
I plan the <u>amount</u> of <i>vegetables</i> I eat during the day	3.86	Low High	3.02 4.38
I plan the <u>amount</u> of <i>fruit</i> I eat during the day	3.84	Low High	2.93 4.40
I exercise regularly for health reasons	3.82	Low High	3.29 4.16
I exercise regularly to lose or control my weight	3.77	Low High	3.24 4.10
The only time I will eat <i>fruit</i> is when I fancy them*	3.70	Low High	4.47 3.23
I eat <i>vegetables</i> as a snack*	3.54	Low High	2.95 3.91
I eat the same <i>fruit</i> in the same amounts every week	3.41	Low High	3.11 3.60
I eat <i>vegetables</i> rather than sweets, crisps or chocolate*	3.38	Low High	2.63 3.84



<i>Statement</i>	<i>Total Mean</i>	<i>5ADay</i>	<i>5ADay Mean</i>
<i>Where fruit and vegetables are grown &amp; how they are grown affects the type I eat</i>	3.37	Low	2.85
		High	3.70
<i>The amount and type of fruit I eat is affected by a specific health concern*</i>	3.28	Low	2.57
		High	3.72
<i>The only time I will eat vegetables is when I fancy them*</i>	3.28	Low	3.66
		High	3.05
<i>The amount and type of vegetables I eat is affected by a specific health concern*</i>	3.22	Low	2.55
		High	3.63
<i>Where fruit and vegetables are grown &amp; how they are grown affects the amount I eat*</i>	3.15	Low	2.59
		High	3.50
<i>The only time I will eat fruit is when I can be bothered*</i>	2.86	Low	3.19
		High	2.66
<i>The only time I will eat vegetables is when I can be bothered*</i>	2.68	Low	3.10
		High	2.42

\* utilised Levene Statistical Test

There were 25 of the statements for which male and female respondents have a mean that was significantly different (shown in Appendix 13). In terms of responsibility for preparation and shopping, and decision over what is to be consumed, female mean response exceeded that of men. Thus the amount of fruit and of vegetables consumed relied on independence more so than males. Similarly females had a mean agreement higher in response to the planning of fruit and of vegetables within their diet, the importance of fruit and with the snacking of fruit. Females showed more agreement to vegetable consumption being influenced by what they were doing on that day, the way in which they felt about themselves, and the influence of weight control on the consumption of fruit.

Conversely, males demonstrated more agreement to statements that suggested that they were influenced by their spouse or partner in the amount and type of vegetables and fruit consumed. They showed stronger agreement that fruit and vegetables were 'cheap', and were significantly less in disagreement about competing in sport.

## 6.6 Reduction of the Attitude & Behaviour Agreement Statements by Factor Analysis

The purpose of the conducting factor analysis was twofold, first to explore potential underlying constructs and relationships within the 130 statements related to fruit and vegetable consumption; second to reduce the statements into reflective interpreted themed components for further analysis. Section 4 of the questionnaire presented 130 statements (derived from in formative interviews) which were ticked by respondents to indicate their level of agreement; on a 7-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. An extra box was available for the statements 104 through 130, where the item 'Does Not Apply to Me' (Corbett et al, 1981). Respondents who indicated this were recoded to the neutral position of 'Neither Agree or Disagree'.

All 239 valid respondents were therefore included in the analysis; both those categorised as High and Low fruit and vegetable consumers. An analysis with all respondents allowed the potential discovery amongst the data of factors relating to fruit and vegetable consumption, and how these factors are perceived, rated, by both high and low consumers using post hoc analysis. Similarly themed statements were generally placed close to one another to reduce possible confusion when dealing with statements of a similar nature, such as 'type', and 'amount', and 'fruit' and 'vegetables', and variations therein.

The Factor Analysis conducted used principal component analysis, with Varimax rotation. The factorability derived was acceptable; observing the correlation coefficients, and anti-image correlations as presented in SPSS. Appendix 14 displays the factor analysis data, including the extracted communalities for each of the 130 statements; respectably ranging from 0.590 to 0.944; no statements were omitted. The Kaiser Meyer Olkin measure was 0.677, according to the associated index (Kaiser 1974) this represents an above 'Mediocre' near 'Middling' classification value. Likewise Bartlett's Test of Sphericity was significant ( $0.000 < 0.05$ ), thus  $H_0$  was rejected and assumed data correlation.

The number of factors was derived using the criterion of the Eigenvalue reaching unity; the factor solution arriving at thirty-four factors with Eigenvalues greater than one. Table 6.8 presents the rotated total variance explained of the 34 components. The 34 factor solution accounted for 79.2 percent of the variance, and a data reduction of almost 74 percent. Most of the statement variables were accounted for in the 34 factor solution, with a factor loading of 0.4 or more and only five statements were duplicated on two of the factors. All derived factors had a factor loading upon it greater than this, in such cases where a near 0.40 appeared it was also accepted for ease of interpretative analysis (though indicated in situ).

Table 6.9 Total Variance Explain for each Component, Initial Eigen Value and Rotated Solution

Component	Initial	Rotation Sums of Squared Loadings		
	Eigen	Total	% of Variance	Cumulative %
1	15.499	8.123	6.249	6.249
2	12.362	5.486	4.220	10.469
3	6.880	4.552	3.502	13.970
4	5.072	4.244	3.265	17.235
5	4.810	4.233	3.256	20.491
6	4.277	3.988	3.067	23.559
7	3.709	3.963	3.048	26.607
8	3.512	3.850	2.962	29.569
9	3.289	3.612	2.779	32.347
10	2.987	3.413	2.626	34.973
11	2.839	3.276	2.520	37.493
12	2.695	3.227	2.482	39.975
13	2.490	3.138	2.414	42.389
14	2.405	3.102	2.386	44.775
15	2.150	3.002	2.309	47.084
16	2.086	2.882	2.217	49.301
17	1.953	2.755	2.119	51.421
18	1.888	2.696	2.074	53.494
19	1.804	2.559	1.968	55.462
20	1.746	2.551	1.962	57.425
21	1.643	2.532	1.948	59.372
22	1.627	2.484	1.910	61.283
23	1.554	2.380	1.831	63.114
24	1.474	2.058	1.583	64.697
25	1.446	2.051	1.578	66.275
26	1.412	1.988	1.529	67.804
27	1.338	1.979	1.522	69.326
28	1.237	1.975	1.519	70.845
29	1.216	1.961	1.508	72.353
30	1.203	1.953	1.502	73.856
31	1.158	1.950	1.500	75.356
32	1.126	1.917	1.474	76.830
33	1.080	1.734	1.334	78.164
34	1.003	1.358	1.044	79.208
35	0.973			

The average percentage of each of the components identified, one through thirty-four, is approximately 2.3 percent. The largest percentage of variance explained, component 1 (Table 6.9) is 6.25, the second 4.22, and the third is 3.50. The largest component is only six times the size of the

final component (34), with a range of 5.21. This indicates a relatively equal spread of variance across the factor solution.

Table 6.10 (pgs 229-232) presents a summary of the factor loadings as important to each of the components, i.e. over (or near to) 0.40, in order of weighting of the statement on that component, thus allowing interpretation. The factors are presented in order of percentage of variance explained (highest first). Most of the factors derived presented easily interpretable statements with common identifiable links.

The ten statements that feature strongly on the first factor mention people close to the respondent, children, partners, and cohabitants, both in terms of their dietary pattern and more generally; hence this factor was interpreted as the effect of 'significant others' upon the respondents. Factor 2 brought together eleven statements. These thematically link to an awareness of fruit and vegetables within the respondents' diet and contentment of consumption, as well as the importance of such items within the diet; with a bias towards vegetables. This was interpreted as General Contentment/Awareness. The third factor focuses on those statements related to health advice and promotion, both generally and in relation specifically to fruit and vegetables; this has been interpreted as the 'Health Conscious factor'.

The fourth factor was interpreted as that of 'Changing Diet'. The six statements loaded strongly on this factor related to a change in diet of the adult life, a deliberate change in fruit and vegetable consumption, and a deliberate change in food eaten generally. The interpretation of factor five (four statements) is based on those statements referring specifically to 'Price'. Factor 6 was constructed of six statements of a fruit-based nature. These include the enjoyment derived from fruit, the importance of fruit to the budget and within the diet, as well as eating of fruit as a snack. Hence this factor was interpreted as 'Fruit Importance & Enjoyment'.

Factor seven had common statements relating to similar consumption, but importantly the similarity of diet of those people within the same household; therefore 'Similarity of Household Diet'. This was distinct from Factor 1, as Factor 7 was specific to the relative likeness of foods consumed by household members. Factor 8 brought together four specific statements regarding the wasting of food and named accordingly 'Wastage'.

The statements in the ninth factor ('Sport') commonly referred to the role of sport in the diet, and competition in sport. The four statements were interpreted as 'Sport'. Factor 10 was loaded heavily by those statements that refer to the 'Value' of fruit and vegetables (but not price) including attitudes towards cheapness and value for money. The eleventh component made from four statements was a compilation of the growing of fruits and vegetables, the respondents' role in the

growth of fruit and vegetables, and an interest of how and where they were grown. Factor 11 was interpreted as 'Origin'.

Factor 12 was made up of four statements that refer to particular attitudes concerning the emotional place conducive to fruit and vegetable consumption. Hence this factor was interpreted as incorporating a respondent's 'Mood'. 'Work Environment' was the common link in Factor 13. The four statements related to fruit and vegetable consumption, as well as food more generally being impacted upon by being at work, and availability of fruit and vegetables while at work. The fourteenth factor incorporated situational behaviour exhibited by the respondents, with a focus upon the interaction with food from a procedural perspective. It included four statements regarding the responsibility for preparation and cooking of household food, food shopping, food process decisions, and the evidence of thought prior to food preparation. The most strongly loaded statements referred to the respondents' role specifically and therefore the factor was interpreted as 'Primary Responsibility for Food Process'.

Factor 15 ('Snacking') referred to statements regarding preference of vegetables and fruit to snack foods, as well as actual behaviour consuming vegetables as a snack, which indicated a distinct behaviour (perhaps related to vegetable snacking as a healthy action). The two statements that strongly loaded on to factor 16 referred to a difference in consumption of fruit and vegetables while on holiday and have been interpreted thus; 'Holiday Differences'. Three statements loaded strongly to the seventeenth factor. These drew upon the dietary differences when living with parents and interpreted as 'Differences to Parental Influence' as they identified a physical and/or temporal difference. Factor 18 also related to differences, but rather than parental or holiday specifically as earlier statements, the five statements loaded strongly on to this factor mentioned the effect of daily occurrences, the season, and traditional weekend-days to weekdays. The interpreted name for this factor was 'Diary / Schedule Differences'.

The loadings on factor nineteen referred to two statements relating to 'weight control' and were described as such. Three statements loaded strongly on to factor 20 also. In this instance the statements referred to the level of routine or regularity of fruit, vegetable and general diet consumption, identifying the same levels each week, and the food eaten daily. Factor 20 was therefore labelled 'Constancy'. Three 'Children' related statements were the specific focus of strong loadings on factor 21, both in terms of a child's eating habits, and more generally.

Factor 22 featured three statements that related to 'Exercise'. Factor 23 and Factor 24, had two statements each that feature strongly. The Health Conscious factor, Factor 3, referred to health advice and promotion, Factor 23 however focused on those statements that related to a 'Specific Health Concern' and the impact upon fruit and vegetable consumption. The latter referred to an

independence of amount of fruit and vegetables consumed; affected by the respondent alone: and factor 24 interpretatively labelled 'Self-Determination'. 'Prominence of Food Thought' (Factor 25) was composed of three statements concerned with emotional feelings; the importance of food, looking forward to meal times and food being the forefront of the respondents mind.

The effect of 'Taste' on the amount and type of fruit and vegetables consumed made up the two statements interpreted as Factor 26. Conversely to factor 24, the statements that loaded strongly on to the derived Factor 27 referred to people outside of the household environment, and the impact of those people. The factor was interpreted as 'Significance of Social Others'. The twenty-eighth factor drew heavily on the statements that mentioned 'Free Time' and resulting impact on the amount of fruit and vegetables consumed. Factor 29; 'Self-Esteem', incorporated the statements that was concern with the way respondents felt about themselves, and impact upon food and on fruit and vegetables. The respondents' thoughts on the practical nature of the ease of preparation and usage of fruits and vegetables made up the construct statements with stronger loadings within Factor 30, and assigned the interpretation of 'Ease of Preparation'.

The statements with strong factor loadings on factor 31 reflected the vegetable components of the attitude and behaviour statements, in the same way factor 6 refers to fruit. It drew upon statements of the importance of vegetables (budget and diet) and the enjoyment derived, and the nature of consumption; as a meal or part of a meal, but not snacking as in factor 6. Factor 32 was interpreted as 'Eating Out'. Factor 33 was slightly different in terms of factor loading in that it was a factor made from one outright loading (greater than 0.4; 0.445). The 'self-esteem' factor as part of the factor solution specified the impact upon diet, factor 33 referred specifically to feeling good about oneself, and hence was interpreted as 'General Happiness'. Statements regarding eating vegetables at work, along with the planning of the amount of fruit and vegetables throughout the day led interpretation of 'Preplanning of Daily Intake' as the final factor (34).

Table 6.10 The Factor Loadings of Appropriate Statements onto the Described Factor (S2\*\*\* for example is corresponding statement reference, 0.\*\*\* is factor loading)

Effect of Significant Others (Component 1)			General Contentment & Importance (Component2)			Health Conscious (Component 3)		
The <u>type</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2118	0.907	I am happy with the <u>amount</u> of <i>vegetables</i> that I eat	S210	0.862	Health advice/promotion/information affects the <u>amount</u> of <i>fruit</i> I eat	S270	0.904
My spouse or partner affects the <u>type</u> of <i>fruit</i> I eat	S2122	0.901	I am happy with the <u>variety</u> of <i>vegetables</i> I eat	S212	0.819	Health advice/promotion/information affects the <u>amount</u> of <i>vegetables</i> I eat	S271	0.898
The <u>amount</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2119	0.893	I am happy about the food I eat	S213	0.794	Health advice/promotion/information affects the food I eat	S269	0.877
My spouse or partner affects the <u>amount</u> of <i>fruit</i> I eat	S2121	0.885	I am happy with the <u>amount</u> of <i>fruit</i> that I eat	S29	0.722	I listen and act on health advice/promotion/information in other general areas such as smoking or exercise	S272	0.667
The <u>type</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2120	0.884	I am happy with the <u>variety</u> of <i>fruit</i> I eat	S211	0.721			
My spouse or partner affects the <u>type</u> of <i>vegetables</i> I eat	S2124	0.872	<i>Vegetables</i> are important part of my food shopping budget	S278	0.556			
The <u>amount</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2117	0.863	I have always eaten lots of <i>vegetables</i>	S288	0.548			
My spouse or partner affects the <u>amount</u> of <i>vegetables</i> I eat	S2123	0.855	I enjoy eating <i>vegetables</i>	S217	0.519			
The foods I eat are affected by those that I live with	S2129	0.605	I have a varied diet	S255	0.527			
My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2116	0.443	<i>Vegetables</i> are important to my diet	S215	0.486			
			I have always eaten lots of <i>fruit</i>	S87	0.397*			
Changing Diet (Component 4)			Price (Component 5)			Fruit Importance & Enjoyment (Component 6)		
The <u>type</u> of <i>fruit</i> I eat has changed over my adult life	S2100	0.829	The price of <i>vegetables</i> affects the <u>type</u> of <i>vegetables</i> I eat	S282	0.873	I enjoy eating <i>fruit</i>	S216	0.717
The <u>type</u> of <i>vegetables</i> I eat has changed over my adult life	S2101	0.828	The price of <i>fruit</i> affects the <u>type</u> of <i>fruit</i> I eat	S281	0.871	I eat <i>fruit</i> as a snack	S23	0.713
The <u>amount</u> of <i>vegetables</i> I eat has changed over my adult life	S299	0.788	The price of <i>fruit</i> affects the <u>amount</u> of <i>fruit</i> I eat	S279	0.869	I eat <i>fruit</i> at work	S112	0.634
The <u>amount</u> of <i>fruit</i> I eat has changed over my adult life	S298	0.765	The price of <i>vegetables</i> affects the <u>amount</u> of <i>vegetables</i> I eat	S280	0.855	<i>Fruit</i> is important to my diet	S214	0.454
I have deliberately changed the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2103	0.574				I eat <i>fruit</i> as a meal or as part of a meal	S21	0.431
I have deliberately changed the food I eat	S2102	0.524				I eat the amount of fruit I do for general health	S229	0.399*

Similarity of Household Diet (Component 7)			Wastage (Component 8)			Sport (Component 9)		
Everyone in the house eats similar <u>types</u> of <i>fruit</i>	S2127	0.841	The possible waste of <i>fruit</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S251	0.932	The <u>amount</u> of <i>fruit</i> I eat is affected by playing or competing in sport	S238	0.917
Everyone in the house eats similar <u>types</u> of vegetables	S2126	0.826	The possible waste of <i>vegetables</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S252	0.927	The food I eat is affected by competing in sport	S237	0.887
Everyone in the house eats similar <u>amounts</u> of vegetables	S2125	0.805	The possible waste of <i>fruit</i> affects the <u>amount</u> bought (from preparation and from having to throw out food)	S250	0.921	The <u>amount</u> of <i>vegetables</i> I eat is affected by playing or competing in sport	S239	0.852
Everyone in the house eats the same foods generally	S2128	0.807	The possible waste of <i>vegetables</i> affects the <u>amount</u> bought (from preparation, and food thrown out not eaten)	S249	0.888	I compete in sport regularly	S236	0.762
Everyone in the house eats similar <u>amounts</u> of <i>fruit</i>	S2130	0.695						
Value (Component 10)			Origin (Component 11)			Mood (Component 12)		
<i>Vegetables</i> are cheap to buy	S284	0.837	Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>type</u> I eat	S243	0.813	The only time I will eat <i>fruit</i> is when I fancy them	S273	0.78
<i>Fruit</i> is cheap to buy	S283	0.836	Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>amount</u> I eat	S242	0.807	The only time I will eat <i>fruit</i> is when I can be bothered	S275	0.749
<i>Vegetables</i> are good value for money	S286	0.825	I am interested in where the <i>fruit</i> & <i>vegetables</i> I eat come from & how they are grown	S241	0.736	The only time I will eat <i>vegetables</i> is when I fancy them	S274	0.705
<i>Fruit</i> is good value for money	S285	0.819	I play a part in growing or collecting some of the <i>fruit</i> and <i>vegetables</i> I eat	S240	0.42	The only time I will eat <i>vegetables</i> is when I can be bothered	S276	0.526
Work Environment (Component 13)			Primary Responsibility for Food Process (Component 14)			Snacking (Component 15)		
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by being at work	S2109	0.812	I am responsible for the preparation, and cooking of the food within the household.	S225	0.872	I eat <i>vegetables</i> rather than sweets, crisps or chocolate	S26	0.81
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by being at work	S2108	0.768	I am responsible for doing the food shopping	S262	0.849	I would prefer to eat <i>fruit</i> or <i>vegetables</i> as a snack rather than crisps or sweets/chocolate	S27	0.676
My eating patterns (type, amounts, regularity of food) are different when I am at work to when I am not at work	S2107	0.706	I decide what is eaten and bought to eat within the household	S226	0.836	I eat <i>vegetables</i> as a snack	S24	0.666
The <u>amount</u> and <u>type</u> of <i>fruit</i> & <i>vegetables</i> I eat is affected by how available they are at work	S2110	0.645	The food for the household is bought with a plan of what meals are to be made and what will be eaten before the next shopping trip	S263	0.439	I eat <i>fruit</i> rather than sweets, crisps or chocolate	S25	0.526



Holiday Differences (Component 16)			Differences to Parental Influence (Component 17)			Diary / Schedule Differences (Component 18)		
When on holiday the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different	S296	0.863	My diet is different to that when I lived at home with parents/guardians	S2106	0.842	The <u>amount</u> of <i>fruit</i> I eat is affected by what I am doing on that day	S267	0.743
When on holiday the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different	S297	0.852	The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different to when I lived with parents/guardians	S2105	0.828	The season affects the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S260	0.722
My diet is different when I am Holiday	S95	0.761	The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different to when I lived with parents/guardians	S2104	0.8	The season affects the <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S261	0.697
						The <u>amount</u> of <i>vegetables</i> I eat is affected by what I am doing on that day	S268	0.649
						The <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is different on a Saturday & Sunday to the rest of the week	S266	0.398*
Weight Control (Component 19)			Constancy (Component 20)			Children (Component 21)		
I eat the <u>amount</u> of <i>vegetables</i> I do as part of reducing or controlling my weight	S232	0.808	I eat the same <i>vegetables</i> in the same amounts every week	S259	0.829	My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat	S2114	0.87
I eat the <u>amount</u> of <i>fruit</i> I do as part of reducing or controlling my weight	S231	0.793	I eat the same <i>fruit</i> in the same amounts every week	S258	0.82	My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat	S2115	0.869
			I generally eat the same food(s) every day	S265	0.516	My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2116	0.737
			I eat meals at the same time each day	S264	0.424			
Exercise (Component 22)			Specific Health Concern (Component 23)			Self Determination (Component 24)		
I exercise regularly	S233	0.739	The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by a specific health concern	S228	0.817	The <u>amount</u> of <i>vegetables</i> I eat is affected by me alone	S224	0.811
I exercise regularly for health reasons	S234	0.724	The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by a specific health concern	S227	0.79	The <u>amount</u> of <i>fruit</i> I eat is affected by me alone	S223	0.801
I exercise regularly to lose or control my weight	S235	0.634						

Prominence of Food Thought (Component 25)			Taste (Component 26)			Significance of Social Others (Component 27)		
I am always thinking about food	S219	0.747	The <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S254	0.877	I eat with a person / or people (other than those who live within the house) regularly	S221	0.791
Food is important to my daily life	S218	0.709	The <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S253	0.847	Other people (other than those I live with) have an effect on the food I eat	S222	0.75
I look forward to meal times	S220	0.666						
Free Time (Component 28)			Self Esteem (Component 29)			Ease of Preparation (Component 30)		
The amount of free time I have affects the <u>amount</u> of <i>fruit</i> I eat	S247	0.765	The way that I feel about myself affects the food I eat	S290	0.785	<i>Vegetables</i> are easy to prepare and use	S246	0.737
The amount of free time I have affects the <u>amount</u> of <i>vegetables</i> I eat	S248	0.752	The way I feel about myself affects the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S291	0.735	<i>Fruit</i> is easy to prepare and use	S245	0.668
Vegetable Prominence (Component 31)			Eating Out (Component 32)			General Happiness (Factor33)		
I eat <i>vegetables</i> as a meal or as part of a meal	S24	0.468	I would like to eat out at restaurants more than I do	S292	0.693	I have good self esteem (feel good about myself generally)	S289	0.445
I enjoy eating vegetables	S217	0.443	I would like to eat takeaway food more than I do	S293	0.552			
<i>Vegetables</i> are important part of my food shopping budget	S278	0.402	Restaurant and takeaway food is different to that which I eat/make at home	S294	0.46			
<i>Vegetables</i> are important to my diet	S215	0.389*						
Preplanning of Daily Intake (Component 34)								
I plan the <u>amount</u> of vegetables I eat during the day	S257	0.523						
I plan the <u>amount</u> of fruit I eat during the day	S256	0.477						

(\*near .400 loading)

### *6.6.1 Supporting Attitude & Behaviour Factor Analysis: More Robust Variable to Sample Ratio*

The factor solution, derived from the 130 attitude and behaviour statements, provides 34 factors which are all intuitively plausible. However it is recognised that the ratio between the sample size and number of variables, at less than 2/1, is not ideal. Hair et al (1998) suggest that it is desirable to have a ratio of 5/1. As it was not feasible to increase the sample size, the only way of testing the robustness of the factor analysis was to divide the statements into three sets and to undertake a separate factor analysis on each set. The usual way of achieving this is to structure the questionnaire into related attitude themes (though this can lead to bias with respondents being induced into providing similar responses within each attitude group). It was partly for this reason that it was decided to have all the attitude statements in a single block in the questionnaire. Thus, rather than arbitrarily divide the questionnaire into three sections, it was decided to utilise the original factor analysis to determine a rational distribution of attitude statements into three groups. Therefore the statements which were found to relate to particular factors from the original solution were thematically grouped into valid concepts for a separate analysis; one relating to 'others' and interruptions, the second identifying motives and food characteristics, and the third relating to importance and relationship with fruit and vegetables. The sample to variable ratio for each was 4.3/1, 8.9/1, and 5.3/1 respectively.

Three factor solutions were produced using principal component analysis with Varimax rotation, where the number of factors for each solution was indicated by Eigenvalues reaching unity. The statements that loaded to each of the factors, as well as suitability measures can be seen in Appendix 15. Table 6.11 highlights the factors interpreted in each of the further analyses in comparison to the original 34 factors. It is evident from Table 6.11 that the second analysis generates a set of factors which is very similar to the original. In total 34 factors were derived in both the single and multiple factor analysis of the statements. There are minor differences in the statements loaded on to a small number of the factors; General Importance & Enjoyment, Fruit Prominence, and Primary Responsibility for Food Process (see Appendix 15). In addition the factor described as Diary/Schedule Difference factor in the original analysis was split between 'Seasonal Effect' and 'Schedule Effect' in the secondary process; and 'Vegetable Prominence' was incorporated into 'General Importance & Enjoyment'. Nevertheless, the second factor analysis produces an outcome sufficiently similar to the original to justify proceeding with the full set of original 34 factors in further analysis of the questionnaire data.

Table 6.11 Comparing Factor Solutions

<b>34 Factors from 3 Analyses</b>	<b>Original 34 Factor Solution Listed</b>
<i>(Others &amp; Interruptions)</i>	
Eating Out	Eating Out
Effect of Significant Others	Effect of Significant Others
Significance of Social Others	Significance of Social Others
Self Determination	Self Determination
<b>Schedule Effect</b>	
Free Time	Free Time
Changing Diet	Changing Diet
Constancy	Constancy
Differences to Parental Influence	Differences to Parental Influence
Holiday Differences	Holiday Differences
<b>Seasonal Effect</b>	
Children	Children
Primary Responsibility for Food Process	Primary Responsibility for Food Process
Work Environment	Work Environment
Similarity of Household Diet	Similarity of Household Diet
<b>Diary/Schedule Differences</b>	
<i>(Motives &amp; Food Characteristics)</i>	
Wastage	Wastage
Price	Price
Health Conscious	Health Conscious
Sport	Sport
Origin	Origin
Exercise	Exercise
Weight Control	Weight Control
Specific Health Concern	Specific Health Concern
<i>(Importance &amp; Relationship with Fruit &amp; Vegetables)</i>	
General Importance & Enjoyment	General Contentment & Importance
Fruit Prominence	Fruit Importance & Enjoyment
Value	Value
Mood	Mood
Snacking	Snacking
Self Esteem	Self Esteem
Preplanning of Daily Intake	Preplanning of Daily Intake
Prominence of Food Thought	Prominence of Food Thought
Taste	Taste
Ease of Preparation	Ease of Preparation
General Happiness	General Happiness
	<b>Vegetable Prominence</b>

(Bold indicates amendment from original analysis)

6.7 Attitude & Behaviours Relating to Fruit and Vegetable Consumption: Comparing 5 A Day (High) Consumers' Responses with Low Consumers

Using the derived factor solution of 34 factors above, those statements rating highly on to each factors were computed to generate a general average score for further analysis. This provided the opportunity to assess the position of the factor on the 7 point Likert scale (where one was strongly disagree and seven was strongly agree, four being neutrally neither agree or disagree). It also allowed the assessment of differences between 'Low' fruit and vegetable consumers (i.e. below five portions per day) and 'High' consumers (five or more portions a day); in particular the differences in means across the 34 factors, thus to identify and assess those factors which high consumers of fruit and vegetables position themselves significantly differently to low consumers.

To achieve this, an independent samples t-test design was utilised between the responses of the two conditions, i.e. High and Low consumers. A null hypothesis for each of the tests was that there would be no significant difference between the two conditions, and a confidence interval of 95 percent. Table 6.12 presents the factors ranked from highest to lowest according to their overall mean and highlights the differences between High and Low consumers.

Table 6.12 Independent Groups T-Test Results; Comparing High and Low Fruit and Vegetable Consumers across the 34 Factors

Factor	Factor Mean	Low(1) High(2)	N	Mean	StdD	Sig. (2-tailed) $p =$
Ease of Preparation (Factor30)	5.90	1	91	5.65	1.00	<b>0.001</b>
		2	148	6.06	0.88	
Taste (Factor26)	5.82	1	91	5.87	1.09	0.600
		2	148	5.79	1.04	
Vegetable Prominence (Factor31)	5.80	1	91	5.35	1.21	<b>0.001*</b>
		2	148	6.08	0.82	
Self Determination (Factor24)	5.61	1	91	5.51	1.34	0.364
		2	148	5.67	1.28	
Fruit Importance & Enjoyment (Factor6)	5.29	1	91	4.59	1.27	<b>0.001*</b>
		2	148	5.71	0.83	
Holiday Differences (Factor16)	5.25	1	91	5.27	1.31	0.887
		2	148	5.24	1.44	
Prominence of Food Thought (Factor25)	5.14	1	91	4.90	1.07	<b>0.011</b>
		2	148	5.29	1.16	
General Contentment and Importance (Factor2)	5.10	1	91	4.43	1.21	<b>0.001*</b>
		2	148	5.51	0.92	
Differences to Parental Influence (Factor17)	4.94	1	91	4.99	1.38	0.651
		2	148	4.91	1.48	

Factor	Factor	Low(1)	N	Mean	StdD	Sig. (2-tailed)
General Happiness (Factor33)	4.92	1	91	4.82	1.50	0.449
		2	148	4.98	1.56	
Primary Responsibility for Food Process (Factor14)	4.88	1	91	4.57	1.47	<b>0.012</b>
		2	148	5.06	1.44	
Work Environment (Factor13)	4.78	1	91	4.65	1.18	0.193
		2	148	4.86	1.24	
Diary / Schedule Differences (Factor18)	4.68	1	91	4.56	1.36	0.275
		2	148	4.75	1.23	
Changing Diet (Factor4)	4.65	1	91	4.41	1.31	<b>0.032</b>
		2	148	4.80	1.36	
Value (Factor10)	4.63	1	91	4.52	1.18	0.315
		2	148	4.69	1.27	
Similarity of Household Diet (Factor7)	4.59	1	91	4.38	1.39	0.074
		2	148	4.71	1.35	
Effect of Self Esteem on Diet (Factor29)	4.30	1	91	4.22	1.51	0.534
		2	148	4.35	1.56	
Eating Out (Factor32)	4.19	1	91	4.29	1.01	0.250
		2	148	4.12	1.14	
Health Conscious (Factor3)	4.08	1	91	3.71	1.43	<b>0.002</b>
		2	148	4.32	1.48	
Weight Control (Factor19)	4.07	1	91	3.55	1.79	<b>0.001</b>
		2	148	4.39	1.84	
Exercise (Factor22)	4.05	1	91	3.53	1.65	<b>0.001</b>
		2	148	4.36	1.60	
Price (Factor5)	4.03	1	91	3.96	1.68	0.606
		2	148	4.07	1.72	
Significance of Social Others (Factor27)	4.00	1	91	3.65	1.66	<b>0.010</b>
		2	148	4.21	1.62	
Wastage (Factor8)	3.89	1	91	3.93	1.69	0.806
		2	148	3.87	1.76	
Snacking (Factor15)	3.86	1	91	3.16	1.26	<b>0.001</b>
		2	148	4.28	1.43	
Preplanning of Daily Intake (Factor34)	3.85	1	91	2.98	1.59	<b>0.001</b>
		2	148	4.39	1.60	
Children (Factor21)	3.85	1	91	3.81	1.08	0.709
		2	148	3.87	1.30	
Free Time (Factor28)	3.81	1	91	3.81	1.79	0.997
		2	148	3.81	1.86	
Effect of Significant Others (Factor1)	3.67	1	91	3.79	1.16	0.272*
		2	148	3.60	1.42	
Constancy (Factor20)	3.50	1	91	3.34	1.26	0.111
		2	148	3.60	1.23	

Factor	Factor	Low(1)	N	Mean	StdD	Sig. (2-tailed)
Origin (Factor11)	3.43	1	91	3.04	1.32	<b>0.001</b>
		2	148	3.67	1.46	
Specific Health Concern (Factor23)	3.25	1	91	2.56	1.49	<b>0.001*</b>
		2	148	3.67	1.77	
Mood (Factor12)	3.13	1	91	3.60	1.42	<b>0.001</b>
		2	148	2.84	1.32	
Sport (Factor9)	2.23	1	91	2.15	1.09	0.410
		2	148	2.29	1.40	

(\*Levene's Equality of Variances Not Assumed, **Significant p Value**)

Twenty-two of the thirty four Factors represented a positive overall response, that is above neutral ('4'; neither agree or disagree), of these eight factors had a mean response above '5'. One factor; the Significance of Social Others was neutrally positioned, and eleven factors exhibited a mean response of disagreement. One factor, with the lowest mean (2.23) fell into 'strongly disagree' as a factor. Of the thirty-four factors, sixteen had a p value of less than 0.05 and therefore rejected the null hypothesis; these indicated a significant difference between High and Low fruit and vegetable consumers for their average responses on said factors.

The position of the mean suggests that on average the factor Ease of Preparation demonstrated the strongest agreement (5.90). Both High and Low consumers responded positively, 6.06 and 5.65 respectively. This represented a significant difference with High consumers showing the more positive response concerning Ease of Preparation. Likewise, this could be seen for factors Vegetable Prominence, Fruit Importance & Enjoyment, Prominence of Food Thought and General Contentment & Importance. The factors concerning 'Taste', 'Self-Determination', and 'Holiday Differences' showed non-significant results between High and Low consumers, but had an average response above '5'.

There was a significant difference in the responses of high and the responses of low consumers for the factor, Primary Responsibility for Food Process. With an average agreement position of 4.88; and 5.06, 4.57 to each group respectively. The factor 'Changing Diet' was also responded to significantly differently by High and Low consumers, with a comparative mean of 4.80 and 4.41, overall at 4.65. The factors concerning 'Health Conscious', 'Weight Control' and 'Exercise' followed from each other when ranked by average mean position, i.e. 4.08 to 4.05, just above a neutral response. For these factors, the mean exhibited by High fruit and vegetable consumers was not only more positive than the Low counterparts, but was above neutral, and the response for Low consumers below the neutral position.

The Significance of Social Others (Factor27) exhibited a similar pattern of relative means for High and Low consumers. With an average on 4.00, High consumers responded positively with 4.21, whereas the negative agreement 3.65 is demonstrated by the Low consumers. Snacking, as a factor was the same; with an average position of 3.86, but a High consumer mean response of 4.28, and Low consumer response of 3.16. Greater difference between the means of High and Low consumers, following the same pattern, can be seen in the factor interpreted as the Preplanning of Daily Intake; the mean of High consumers was 4.07 and for Low consumers 3.96. Price as a factor (mean 4.03) showed a non-significant difference between consumer types.

The following factors exhibited similar patterns in terms of being non-significant in the difference between means of High and Low consumers. But in each case, the mean for the high consumers remained more positive in response than the low consumers, with an average mean ranging from 4.92 to 4.30. The factors were, 'General Happiness', 'Work Environment', 'Diary /Schedule Differences', 'Value', 'Similarity of Household Diet', and 'Effect of self Esteem on Diet'.

The factors 'Differences to Parental Influence' and 'Eating Out' were two factors above neutral position and showed a difference between the means of High and Low consumers that was not significantly different but were different to other factors mentioned in that the level of agreement was reversed; with Low consumers responding generally more positively. The means for High consumers on the factors are 4.91 and 4.12, whereas the Low consumers' means are 4.99 and 4.29. 'Children' and 'Free Time' had very equal means for both High and Low consumers. Effect of Significant Others had an average response of 3.67 and 'Constancy' a mean of 3.50.

The factors Specific Health Concern, as well as Origin occupied a 'Disagree' position regarding the general mean, with 3.25 and 3.43. These factors were responded to differently by High and Low fruit and vegetable consumers. For the former; the High consumers responded more positively than Low consumers 3.67 to 2.56 and the latter 3.67 to 3.04. The factor Mood (mean position of 3.13) was also significant in the mean difference between High and Low consumers. In this instance High consumers had a lower mean to that of the Low consumers, 2.84 versus 3.60. The factor that featured as most strongly disagreeing with the statements within was 'Sport' (2.23). Table 6.13 summarises the key factor differences between High and Low consumers.



Table 6.13 Differences between High and Low Fruit and vegetable Consumers by Factor

Factors with significant differences between High and Low Consumer means ( $p < 0.05$ )
General Contentment and Importance (Factor2)
Health Conscious (Factor3)
Changing Diet (Factor4)
Fruit Importance & Enjoyment (Factor6)
Origin (Factor11)
<b>Mood (Factor12)*</b>
Primary Responsibility for Food Process (Factor14)
Snacking (Factor15)
Weight Control (Factor19)
Exercise (Factor22)
Specific Health Concern (Factor23)
Prominence of Food Thought (Factor25)
Significance of Social Others (Factor27)
Ease of Preparation (Factor30)
Vegetable Prominence (Factor31)
Preplanning of Daily Intake (Factor34)

***(High Consumer mean disagreement stronger than Low Consumer counterparts\*)***

### *6.8 Grouping likeminded Fruit and Vegetable Consumers: Cluster Analysis of the Attitude and Behaviour Responses*

The post hoc analysis of average scores for each of the thirty four derived attitude and behaviour factors (associated with fruit and vegetable consumption) assessed the relative means of those deemed high and low fruit and vegetable consumers. However it was surmised, from discussion with interviewees, as well as the descriptive statistics relating to each of the attitude and behaviour statements (and factors) that exploration of the means would allow useful interpretation of certain groupings of likeminded and like-actioning fruit and vegetable consumers from within the data. This exploration would allow profiling of such groups, useful in descriptive differentiation of consumer types, as well as comparable to the typologies (identified/proposed) in the consumer stages.

For the purpose of such grouping the respondents' average mean scores of the factors saved within SPSS were utilised to maximise homogeneity between respondent groups while making these groups heterogeneous to one another, based upon the relative mean position of these groups placed upon the factors. Thus it was useful to identifying the particular differential positions on the attitude and behaviour statement factors held by each of the clusters. Both the derived factor scores as well as the mean scores were analysed in Cluster procedures to explore the suitability of cluster

solutions, and decision in favour of a solution from the latter. The method utilised for this was a two phase cluster analysis, where the initial stage was to assess the possible number of groups to be used in the interpretation. 239 respondents were included. The Hierarchical analysis was conducted with Ward's method, measuring Euclidean Distance; and then a K-Means optimisation technique employed on the chosen number of clusters. With a descriptive, simplicity led criteria, with ease of interpretation important also, a six cluster solution was considered most appropriate, with focus upon the attitude and behaviour of the respondents. The solution was derived in 5 iterations, with a minimum distance between initial centres of 15.719. Although there were derived solutions of the cluster analysis with more even size of group membership, and the chosen solution had two distinctly smaller groups, the overall assessment for descriptive profiling was considered suitable.

The final cluster centres represent the clusters' optimised relative position on the corresponding factor original seven point Likert scale, and is the feature of Table 6.14. When ranked by level of agreement there was a general similarity in those statements that feature strongly, and those that feature less strongly for each of the clusters (for example Taste, and Sport); the variation from the total mean for each Cluster, thus presenting those attitude and behaviour factors important in differentiating the clusters from each one another (Table 6.15).

Table 6.14 Final Centre Position for Attitude and Behaviour Clusters based on Raw Factor Data

Final Cluster Centres	Cluster						Total
	1	2	3	4	5	6	
Effect of Significant Others (Factor1)	2.88	3.85	4.23	2.98	3.62	3.80	3.67
General Contentment and Importance (Factor2)	5.66	4.23	5.57	5.83	5.14	3.84	5.10
Health Conscious (Factor3)	2.66	3.63	4.97	4.62	4.93	1.64	4.08
Changing Diet (Factor4)	3.22	4.39	5.19	5.26	5.45	2.88	4.65
Price (Factor5)	3.05	4.31	4.55	3.41	5.16	1.50	4.03
Fruit Importance & Enjoyment (Factor6)	5.23	4.70	5.77	6.00	5.44	2.93	5.29
Similarity of Household Diet (Factor7)	4.96	4.04	5.10	4.89	3.82	3.94	4.59
Wastage (Factor8)	3.55	4.08	4.65	2.85	4.05	1.93	3.89
Sport (Factor9)	2.17	1.91	2.71	1.92	3.05	2.29	2.23
Value (Factor10)	4.65	4.23	5.09	5.03	2.95	4.86	4.63
Origin (Factor11)	3.53	2.91	4.02	3.62	3.57	2.04	3.43
Mood (Factor12)	2.01	3.65	3.37	1.97	4.18	4.71	3.13
Work Environment (Factor13)	4.03	4.91	5.13	4.43	5.64	3.68	4.78
Primary Responsibility for Food Process (Factor 14)	4.46	4.41	5.33	5.31	5.30	4.07	4.88
Snacking (Factor15)	4.75	3.18	4.47	4.13	2.84	2.21	3.86
Holiday Differences (Factor16)	3.98	5.51	5.61	5.07	5.82	3.90	5.25
Differences to Parental Influence	3.85	5.20	5.04	4.99	5.58	3.67	4.94
Diary / Schedule Differences (Factor18)	3.41	4.75	5.23	4.53	5.45	3.03	4.68
Weight Control (Factor19)	2.26	3.43	5.21	4.74	4.86	2.00	4.07
Constancy (Factor20)	2.89	3.19	3.95	3.85	3.48	3.14	3.50
Children (Factor21)	3.74	3.84	4.30	3.29	3.67	3.81	3.85
Exercise (Factor22)	3.62	3.26	4.60	5.04	4.52	2.57	4.05
Specific Health Concern (Factor23)	2.72	2.38	4.78	2.83	4.41	1.43	3.25
Self Determination (Factor24)	6.00	5.26	5.61	5.85	5.91	6.21	5.61
Prominence of Food Thought (Factor25)	4.94	4.80	5.23	5.43	6.24	5.57	5.14
Taste (Factor26)	5.61	5.80	5.89	6.15	5.36	4.93	5.82
Significance of Social Others (Factor27)	3.30	3.62	4.46	4.09	5.77	3.29	4.00
Free Time (Factor28)	3.07	4.06	4.61	2.52	5.27	1.86	3.81
Effect of Self Esteem on Diet (Factor29)	2.96	4.34	5.26	3.59	5.50	2.29	4.30
Ease of Preparation (Factor30)	6.35	5.57	5.95	6.41	5.00	5.86	5.90
Vegetable Prominence (Factor31)	6.37	5.17	6.16	6.28	5.77	4.50	5.80
Eating Out (Factor32)	3.75	4.31	4.25	3.92	5.03	4.14	4.19
General Happiness (Factor33)	5.96	4.05	5.07	5.64	4.45	5.86	4.92
Preplanning of Daily Intake (Factor34)	2.91	2.84	4.62	5.24	5.09	1.21	3.85

Table 6.15 Attitude & Behaviour Cluster's Profile in Relation to Each Attitude and Behaviour Factor; Ranked by Difference to the Mean Position

Positive-Generally Content / Non-Specific Drivers	Cluster 1	Non-Important / Low Priority Unmanaged	Cluster 2	Reason-Led Success	Cluster 3
General Happiness (Factor33)	1.04	Mood (Factor12)	0.52	Specific Health Concern (Factor23)	1.53
Snacking (Factor15)	0.89	Price (Factor5)	0.29	Weight Control (Factor19)	1.14
Vegetable Prominence (Factor31)	0.57	Differences to Parental Influence	0.26	Effect of Self Esteem on Diet (Factor29)	0.96
General Contentment and Importance	0.56	Holiday Differences (Factor16)	0.26	Health Conscious (Factor3)	0.89
Ease of Preparation (Factor30)	0.45	Free Time (Factor28)	0.25	Free Time (Factor28)	0.80
Self Determination (Factor24)	0.39	Wastage (Factor8)	0.19	Preplanning of Daily Intake (Factor34)	0.77
Similarity of Household Diet (Factor7)	0.38	Effect of Significant Others (Factor1)	0.18	Wastage (Factor8)	0.76
Origin (Factor11)	0.10	Work Environment (Factor13)	0.13	Snacking (Factor15)	0.61
Value (Factor10)	0.02	Eating Out (Factor32)	0.13	Origin (Factor11)	0.59
Fruit Importance & Enjoyment (Factor6)	-0.06	Diary / Schedule Differences (Factor18)	0.07	Exercise (Factor22)	0.56
Sport (Factor9)	-0.07	Effect of Self Esteem on Diet (Factor29)	0.04	Effect of Significant Others (Factor1)	0.55
Children (Factor21)	-0.11	Children (Factor21)	-0.01	Diary / Schedule Differences (Factor18)	0.55
Prominence of Food Thought (Factor25)	-0.21	Taste (Factor26)	-0.02	Changing Diet (Factor4)	0.54
Taste (Factor26)	-0.21	Changing Diet (Factor4)	-0.26	Price (Factor5)	0.52
Wastage (Factor8)	-0.35	Constancy (Factor20)	-0.32	Similarity of Household Diet (Factor7)	0.51
Primary Responsibility for Food Process	-0.41	Sport (Factor9)	-0.32	Fruit Importance & Enjoyment (Factor6)	0.49
Exercise (Factor22)	-0.43	Ease of Preparation (Factor30)	-0.33	Sport (Factor9)	0.48
Eating Out (Factor32)	-0.43	Prominence of Food Thought (Factor25)	-0.34	General Contentment and Importance	0.47
Specific Health Concern (Factor23)	-0.53	Self Determination (Factor24)	-0.35	Significance of Social Others (Factor27)	0.47
Constancy (Factor20)	-0.62	Significance of Social Others (Factor27)	-0.38	Value (Factor10)	0.46
Significance of Social Others (Factor27)	-0.70	Value (Factor10)	-0.40	Primary Responsibility for Food Process	0.46
Free Time (Factor28)	-0.74	Health Conscious (Factor3)	-0.46	Children (Factor21)	0.45
Work Environment (Factor13)	-0.76	Primary Responsibility for Food Process	-0.47	Constancy (Factor20)	0.44
Effect of Significant Others (Factor1)	-0.80	Origin (Factor11)	-0.52	Vegetable Prominence (Factor31)	0.36
Preplanning of Daily Intake (Factor34)	-0.94	Similarity of Household Diet (Factor7)	-0.55	Holiday Differences (Factor16)	0.36
Price (Factor5)	-0.98	Fruit Importance & Enjoyment (Factor6)	-0.59	Work Environment (Factor13)	0.35
Differences to Parental Influence	-1.09	Vegetable Prominence (Factor31)	-0.63	Mood (Factor12)	0.24
Mood (Factor12)	-1.12	Weight Control (Factor19)	-0.64	General Happiness (Factor33)	0.15
Diary / Schedule Differences (Factor18)	-1.26	Snacking (Factor15)	-0.67	Differences to Parental Influence	0.11
Holiday Differences (Factor16)	-1.28	Exercise (Factor22)	-0.79	Prominence of Food Thought (Factor25)	0.08
Effect of Self Esteem on Diet (Factor29)	-1.34	General Contentment and Importance	-0.87	Taste (Factor26)	0.07
Health Conscious (Factor3)	-1.43	Specific Health Concern (Factor23)	-0.87	Eating Out (Factor32)	0.06
Changing Diet (Factor4)	-1.44	General Happiness (Factor33)	-0.87	Ease of Preparation (Factor30)	0.04
Weight Control (Factor19)	-1.81	Preplanning of Daily Intake (Factor34)	-1.01	Self Determination (Factor24)	0.00

Table 6.15 Continued

Active Structured Happy	Cluster 4	Busy Persuadable	Cluster 5	Happy Deliberate Non-Consumers	Cluster 6
Preplanning of Daily Intake (Factor34)	1.39	Significance of Social Others (Factor27)	1.77	Mood (Factor12)	1.58
Exercise (Factor22)	0.99	Free Time (Factor28)	1.46	General Happiness (Factor33)	0.94
General Contentment and Importance	0.74	Preplanning of Daily Intake (Factor34)	1.24	Self Determination (Factor24)	0.61
General Happiness (Factor33)	0.72	Effect of Self Esteem on Diet (Factor29)	1.20	Prominence of Food Thought (Factor25)	0.43
Fruit Importance & Enjoyment (Factor6)	0.71	Specific Health Concern (Factor23)	1.16	Value (Factor10)	0.23
Weight Control (Factor19)	0.67	Price (Factor5)	1.13	Effect of Significant Others (Factor1)	0.13
Changing Diet (Factor4)	0.61	Prominence of Food Thought (Factor25)	1.10	Sport (Factor9)	0.05
Health Conscious (Factor3)	0.54	Mood (Factor12)	1.05	Children (Factor21)	-0.04
Ease of Preparation (Factor30)	0.51	Work Environment (Factor13)	0.85	Eating Out (Factor32)	-0.04
Vegetable Prominence (Factor31)	0.48	Health Conscious (Factor3)	0.85	Ease of Preparation (Factor30)	-0.05
Primary Responsibility for Food Process	0.44	Eating Out (Factor32)	0.84	Constancy (Factor20)	-0.36
Value (Factor10)	0.40	Sport (Factor9)	0.81	Similarity of Household Diet (Factor7)	-0.64
Constancy (Factor20)	0.35	Changing Diet (Factor4)	0.80	Significance of Social Others (Factor27)	-0.71
Taste (Factor26)	0.33	Weight Control (Factor19)	0.80	Primary Responsibility for Food Process	-0.80
Similarity of Household Diet (Factor7)	0.30	Diary / Schedule Differences (Factor18)	0.78	Taste (Factor26)	-0.89
Prominence of Food Thought (Factor25)	0.29	Differences to Parental Influence	0.64	Work Environment (Factor13)	-1.11
Snacking (Factor15)	0.27	Holiday Differences (Factor16)	0.57	General Contentment and Importance	-1.25
Self Determination (Factor24)	0.24	Exercise (Factor22)	0.47	Differences to Parental Influence	-1.27
Origin (Factor11)	0.19	Primary Responsibility for Food Process	0.42	Vegetable Prominence (Factor31)	-1.30
Significance of Social Others (Factor27)	0.09	Self Determination (Factor24)	0.30	Holiday Differences (Factor16)	-1.35
Differences to Parental Influence	0.05	Fruit Importance & Enjoyment (Factor6)	0.15	Origin (Factor11)	-1.40
Diary / Schedule Differences (Factor18)	-0.14	Wastage (Factor8)	0.15	Exercise (Factor22)	-1.47
Holiday Differences (Factor16)	-0.18	Origin (Factor11)	0.14	Snacking (Factor15)	-1.64
Eating Out (Factor32)	-0.27	General Contentment and Importance	0.04	Diary / Schedule Differences (Factor18)	-1.65
Sport (Factor9)	-0.31	Constancy (Factor20)	-0.03	Changing Diet (Factor4)	-1.77
Work Environment (Factor13)	-0.35	Vegetable Prominence (Factor31)	-0.03	Specific Health Concern (Factor23)	-1.82
Specific Health Concern (Factor23)	-0.42	Effect of Significant Others (Factor1)	-0.06	Free Time (Factor28)	-1.96
Children (Factor21)	-0.56	Children (Factor21)	-0.18	Wastage (Factor8)	-1.96
Price (Factor5)	-0.61	Taste (Factor26)	-0.46	Effect of Self Esteem on Diet (Factor29)	-2.01
Effect of Significant Others (Factor1)	-0.70	General Happiness (Factor33)	-0.47	Weight Control (Factor19)	-2.07
Effect of Self Esteem on Diet (Factor29)	-0.71	Similarity of Household Diet (Factor7)	-0.77	Fruit Importance & Enjoyment (Factor6)	-2.36
Wastage (Factor8)	-1.04	Ease of Preparation (Factor30)	-0.90	Health Conscious (Factor3)	-2.44
Mood (Factor12)	-1.16	Snacking (Factor15)	-1.02	Price (Factor5)	-2.53
Free Time (Factor28)	-1.29	Value (Factor10)	-1.67	Preplanning of Daily Intake (Factor34)	-2.64

Table 6.16 Selective Socio-Demographic and Behaviour Profiles for Attitude and Behaviour Clusters

Attitude and Behaviour Statement Clusters	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
<b>Number Respondents</b>	27	82	68	44	11	7
<b>AvAge (Yrs)</b> (Sig .003)	49.62	43.05	52.81	50.26	40.09	38.43
<b>Gender</b>						
<b>Male (73)</b>						
Count	12	26	17	11	3	4
Expected	8.25	25.05	20.77	13.44	3.36	2.14
<b>Female (166)</b>						
Count	15	56	51	33	8	3
Expected	18.75	56.95	47.23	30.56	7.64	4.86
(Non Sig Fisher's Exact .267)						
<b>AvPtnsDay (per member)</b> (Sig .000 F=14.12, 5df)	<b>7.65 (%)</b>	<b>4.44 (%)</b>	<b>7.68 (%)</b>	<b>8.11 (%)</b>	<b>6.02 (%)</b>	<b>1.93 (%)</b>
CompDailyAv	1.00 13.0	0.75 16.8	1.12 14.6	1.22 15.0	1.01 16.7	0.29 15.2
VegAvDaily	3.53 46.1	1.87 42.2	3.35 43.6	3.34 41.2	2.38 39.6	1.28 66.1
FAvDailyT	3.13 40.9	1.82 41.0	3.21 41.7	3.55 43.8	2.62 43.6	0.36 18.5
<b>Fruit &amp; Veg Consumer Type</b>						
<b>Low FV Consumers</b>						
Count	7	54	13	7	3	7
Expected	10.28	31.22	25.89	16.75	4.19	2.67
<b>High FV Consumers</b>						
Count	20	28	55	37	8	0
Expected	16.72	50.78	42.11	27.25	6.81	4.33
(Sig. Fisher's Exact .000)						
<b>Fruit&amp;Veg Pref</b>						
<b>Fruit</b>						
Count	6	26	24	15	4	0
Expected	8.77	24.68	21.75	14.29	3.57	1.95
<b>Vegetable</b>						
Count	12	25	26	11	2	5
Expected	9.47	26.65	23.49	15.43	3.86	2.10
<b>Fruit&amp;Vegetables</b>						
Count	8	17	13	16	4	0
Expected	6.78	19.08	16.82	11.05	2.76	1.51
<b>Strong Composite</b>						
Count	1	8	4	2	1	1
Expected	1.99	5.60	4.93	3.24	0.81	0.44
(Non Sig. Fisher's .202)						
<b>Food Outside the Home 'Takeaway'</b>						
<b>More Often</b>						
Count	10	46	20	4	6	4
Expected	10.17	30.88	25.61	16.57	4.14	2.64
<b>Less Often</b>						
Count	17	36	48	40	5	3
Expected	16.83	51.12	42.39	27.43	6.86	4.36
(Sig. Fisher's Exact .001)						
<b>Food Outside the Home 'Shop Prepared'</b>						
<b>More Often</b>						
Count	6	56	27	11	9	5
Expected	12.88	39.11	32.44	20.99	5.25	3.34
<b>Less Often</b>						
Count	21	26	41	33	2	2
Expected	14.12	42.89	35.56	23.01	5.75	3.66
(Sig. Fisher's Exact .000)						

Table 6.17 Average Cluster Member Weekly Consumption of Each Fruit Vegetable Composite Factor Type

Fruit Vegetable Composite Factor	Attitude & Behaviour Cluster											
	1	2	3	4	5	6						
Traditional' Meat Accompaniment	8.65	15.8	5.62	17.5	7.21	13.0	7.49	12.6	5.18	11.7	3.71	26.7
Salad Lunch Bar	4.74	8.7	2.41	7.5	5.10	9.2	6.36	10.7	5.32	12.0	1.64	11.8
Salad Accompaniment	3.15	5.8	1.36	4.2	2.87	5.2	2.69	4.5	1.77	4.0	0.57	4.1
Fry-up' Accompaniment	6.72	12.3	3.10	9.6	6.27	11.3	5.53	9.3	3.95	9.0	2.79	20.0
Composite Dish	6.98	12.7	5.22	16.2	7.87	14.2	8.52	14.4	7.07	16.0	2.05	14.7
Soft Fruits & Berries	2.44	4.5	1.15	3.6	2.65	4.8	2.47	4.2	1.82	4.1	0.14	1.0
Non-Convenient Fruits	2.39	4.4	1.32	4.1	3.12	5.6	5.39	9.1	1.91	4.3	0.00	0.0
Convenient 'Health' Mix	1.61	2.9	0.98	3.1	2.56	4.6	2.22	3.7	1.09	2.5	0.00	0.0
Rich 'High Fashion' Foods	4.33	7.9	1.55	4.8	3.48	6.3	3.43	5.8	1.86	4.2	0.64	4.6
Summer Garden Fruits	4.02	7.3	2.01	6.2	3.46	6.2	3.59	6.1	3.36	7.6	0.07	0.5
Convenience Fruits	5.67	10.3	4.04	12.6	5.88	10.6	7.24	12.2	6.64	15.0	1.00	7.2
Juicy Fruits	4.07	7.4	3.41	10.6	5.12	9.2	4.30	7.3	4.18	9.5	1.29	9.2
Total Weekly Portions	54.78	100	32.17	100	55.58	100	59.22	100	44.16	100	13.90	100
Av. Portions (per day)	7.65		4.44		7.86		8.11		6.02		1.93	

*Associated Percentage Figure to the Right in Italics*

Table 6.16 provides other information concerning the demographic characteristics of the groups and recorded consumption patterns. Table 6.17 presents the average weekly consumption for cluster members by fruit vegetable composite factor. The section draws upon these in presentation of the cluster profiles. Cluster 1, Cluster 3, Cluster 4, and Cluster 5 represent members with an average daily consumption of in excess of 5 portions of fruit and vegetables. Cluster 2 and 6 represent low consumption groups.

Cluster 1 is a group of twenty-seven respondents; nine of the thirty-four factors have an above average position. The first of these is General Happiness, followed by Snacking, Vegetable Prominence, and General Contentment and Importance. These factors project a positive image of consumption, as well as a positive contentment generally. Those factors on which the group score particularly negatively include Weight Control and Health Conscious, and thus those areas which have certain drivers. Likewise both Mood and Effect of Self Esteem on Diet are also strongly below average, as are notions of change; Changing Diet and Differences to Parental Influences feature as

below average. The impression therefore is that for these respondents at the point of completing the questionnaire; contentment with a diet that recognises the importance and enjoyment of food with no notion of changing or having changed their diet, are generally happy in themselves, but are not focussed upon particular drivers of their diet. Thus the cluster can be described as Positive-Generally Content / Non-Specific Drivers.

The cluster mean consumption of fruit and vegetables per day for Cluster 1 is 7.65, with a regular breakdown between fruit, vegetables and composite meals (similar to all but Cluster 6). Cluster 1 displays a greater percentage of their diet being made from Rich High Fashion Foods, and Fry up Accompaniment vegetables, but slightly less of Juicy Fruits. Although expected results are shown for both restaurant usage (as for all clusters), and takeaway food (when recoded into More Often, and Less Often binominal variables) a larger number of respondents within this cluster feature as Less often when it comes to consumption from shop prepared out of home consumption. The average age of the respondents in Cluster 1 is 49.62, with more men than would be expected.

The second of the clusters produced from the analysis is the largest, with 82 members, and eleven factors of above average concern. The average age of the respondents is 43.05 with an expected mix of males and females. The respondents in the cluster place Mood as most strongly above average to other clusters, i.e. only consuming fruit and vegetable when they either 'can be bothered', or when they 'fancy them'; reflecting attitudinally. The 'haste' theme is continued, with 'Free Time', 'Wastage' and 'Holiday Differences' also featuring above average. 'Price' also features strongly. Thus there is time consciousness around these factors, and as indicated by below average factors, a lack of preplanning, overall enjoyment for fruit and vegetables, as well as a general negativity in themselves (below average General Happiness). The cluster can perhaps be interpreted as slightly chaotic and disorganised in fruit and vegetable consumption, being time conscious with less positivity towards consumption, thus fruit and vegetables are not a priority (i.e. not important) within the lifestyle of the consumer, with other factors effecting their consumption. Therefore suitably described in relation to fruit and vegetable consumers as 'Non-Important / Low Priority Unmanaged'.

As indicated by the average daily consumption of 4.44 portions for the cluster, 5 A Day is not met, but some fruit and vegetables are consumed during the course of the day/week, thus it does feature in their diet, but as described above with little direction and thought compared with other things; or overall satisfaction (compared to cluster 1). General fruit, vegetable, composite breakdown is similar to other groups (Table 6.16). A lower than average proportion of 'Salad Accompaniment', and 'Salad Lunch Bar' food factor type is consumed; but marginally above average 'Composite Meal' and 'Juicy Fruit' as part of the dietary make-up. The More Often categories of



both Takeaway and Shop Prepared consumption has a higher number of observed respondents than would be expected.

Cluster 3, the second largest cluster at 68 respondents has an average daily consumption very similar to that of Cluster 1; 7.68 portions per day, however displays very different set of above average factors. In this instance, the cluster has all thirty four factors above or equal to the mean response. The factor with highest above mean response is Specific Health Concern, followed by Weight Control, with Health Conscious at fourth. Exercise is also positioned reasonably highly on above average response. Such factors in this position suggest there is very much a design to the consumption of fruit and vegetables. Likewise, behaviourally, Preplanning of Daily Intake of fruit and vegetables features strongly. Unlike Cluster 1 where there appears to be a relaxed or content nature of consumption (though no below average response), the Effect of Self Esteem on Diet features third most strongly above average for this cluster, as well as the previous intentional drivers to consume, and behind, high levels of fruit and vegetables. Interestingly Ease of Preparation does not feature as an important above average response, nor Taste or Self Determination (feeling of control over their own diet), which compound the notion that the importance of fruit and vegetable consumption is 'purposeful' rather than general. A sense of anxiety or 'Worried Well' is incorporated, where there is success by design. Thus the cluster has been interpreted as 'Reason-Led Success'.

A slightly greater proportion of the fruit and vegetable diet is made up of 'Convenient Health Mix', and like Cluster 1 'Salad Accompaniment'. There is a slight weighting in the categories of Less Often in terms of Shop Prepared and Takeaway consumption than would be expected. The average age of the Cluster is 52.81, the oldest of the six clusters.

The fourth cluster in the derived solution has a group membership of 44. Twenty-one of thirty four factors feature above average mean responses. Like Cluster 1 General Contentment and Importance and General Happiness feature strongly above average as factors, and thus place a positive recognition and importance within lifestyle. In addition, in line with importance and happiness, Fruit Importance and Enjoyment is also in a prominent position. However unlike that of Cluster 1, Cluster 4 has the most strongly above average response on Preplanning of Daily Intake, indicating (like Cluster 3) more of an intentional diet. This is supported by various purposeful / intentional factors featuring strongly; Weight Control, Health Conscious, and for differentiating purposes Exercise second only to Preplanning. There is a measured notion, but less anxious approach to fruit and vegetable consumption than respondents in cluster 4. Respondents are actively engaged and organised in fruit and vegetable consumption, and enjoying it. Strong, below average responses to Mood, Effect of Self Esteem on Diet, and Free Time support this. The

interpretation would indicate a cluster identification of 'Active Structured Happy' consumer. The average daily consumption rate for respondents within this cluster is 8.11, the highest of all the clusters. Cluster 4 have more than expected respondents featuring in Less Often in relation to consumption of both Shop Prepared and Takeaway food. The dietary breakdown by fruit vegetable composite factor indicates a relatively average dietary pattern, although a higher percentage of fruit is obtained by 'Non-Convenient Fruit'. The average age of Cluster 4 respondents is 50.26 years.

Cluster 5 and Cluster 6 are the two smaller clusters produced by the solution. The penultimate has eleven respondents within. Just above six portions of fruit and vegetables are consumed on average per day by members of Cluster 5. Twenty-Four of the factors have positive response, the most strongly above average compared to the other clusters is the Significance of Social Others i.e. they dine with, or are influenced by those outside of the household substantially more than the other clusters. Interestingly, Free Time and Preplanning of Daily Intake feature strongly in second and third position, with Prominence of Food Thought, and Mood in seventh and eighth, and Effect of Self Esteem on Diet fourth. The Specific Health Concern features in a prominent above average position, as well as Price sensitive to consumption. The cluster has a certain sense of busyness, with the issue of free time effecting amount of fruit and vegetables consumed, as well as some active thought regarding those fruit and vegetable consumed. However it does not express the positivity or negativity of the importance of fruits and vegetables to the diet as other clusters, merely other foods may be of preference.

There is also a certain vulnerability to consumption, as though there would be more likelihood of the consumers within the cluster finding themselves eating less fruit and vegetables; in relation to free time, self-esteem, and the prominence of Mood, as well as price featuring as important factors to the cluster. The significance of Social Others also identifies the possible influences of others (non-householders) upon their diet (whether a positive or negative in itself). The cluster has similar important factors to that of Cluster 2. Those factors that are positioned strongly below average mean include Ease of Preparation, that is compared to other clusters fruits and vegetables are less easy to prepare (supported in the clusters consumption type below) and in terms of Snacking the cluster have a preference not to consume fruits and vegetables as snack items or above sweeter/fattier snack items such as sweets, chocolate or crisps. The cluster also sees fruit and vegetables as less value for money and less cheap compared to the average position. The cluster has been named 'Busy Persuadable'. A greater than expected number of respondents are categorised as consuming Shop Prepared food 'More Often', and slightly more as a proportion of their diet is made up of the Composite Dish factor, Convenient Fruit and Salad Lunch Bar. The average age of Cluster 5 is 40.09, thus the second youngest group.

Cluster 6 represents the smallest number of respondents at only seven, but is very much distinct in a number of attitude and behaviour factors. Seven of the thirty-four factors are above average, the remainder are below. Daily fruit and vegetable consumption is only 1.93 portions, with no respondents achieving High consumption status of 5 or more portions per day. The cluster is made up of slightly more men than women, with an average age of 38.43 years (the youngest of all clusters).

The strongest above average factor that Cluster 6 exhibit is upon Mood, like Cluster 2, which also have a below 5 A Day fruit and vegetable consumption. The respondents only consume fruit and vegetables when they either fancy them or can be bothered. The cluster also displays an above average agreement with Prominence of Food Thought, where they think about food all of the time compared to other clusters. However like Cluster 1, there is an above average response to Self Determination, and Importantly General Happiness. The cluster exhibit above average responses that suggest respondents are positive in the diet they have and do think about food, as well as single themselves as ultimately responsible for the food they consume (which isn't fruit or vegetable prominent). They place below average levels of important to fruit and vegetables in the diet, and do not eat fruit and vegetables for Health or Weight purposes. They do not pre-plan their consumption, and price has little effect upon the fruit and vegetables they do consume. Therefore it is possible to interpret the cluster in relation to fruit and vegetables as 'Happy Deliberate Non-Consumers'.

Most of the small amounts of fruit and vegetables consumed are to be disproportionately (compared to other clusters) found in the factors Traditional Meat Accompaniment, and Fry up Accompaniment. Conversely low percentages of fruit and vegetables are consumed in those factors; Soft Fruits & Berries, Non-Convenient Fruit, Convenient 'Health' Mix, and Summer Garden Fruit. As this would suggest; daily consumption is weighted in favour of vegetables. Though small in number, they occupy a more than expected number in the More Often position for consuming Takeaways, and in eating Shop Prepared food. Table 6.18 presents a summary of the Cluster results

Table 6.18 Attitude and Behaviour Cluster Summaries

	Cluster 1 (27)		Cluster 2 (82)		Cluster 3 (68)		Cluster 4 (44)		Cluster 5 (11)		Cluster 6 (7)	
Cluster Name	<b>Positive-Generally Content/Non-specific Driver</b>		<b>Non-Important/Low Priority Unmanaged</b>		<b>Reason-Led Success</b>		<b>Active Structured Happy</b>		<b>Busy Persuadable</b>		<b>Happy Deliberate Non-Consumer</b>	
	<i>Av. FVC/day</i> 7.7	<i>Av. Age</i> 50	<i>Av. FVC/day</i> 4.4	<i>Av. Age</i> 43	<i>Av. FVC/day</i> 7.7	<i>Av. Age</i> 53	<i>Av. FVC/day</i> 8.1	<i>Av. Age</i> 50	<i>Av. FVC/day</i> 6.0	<i>Av. Age</i> 40	<i>Av. FVC/day</i> 1.9	<i>Av. Age</i> 38
<b>Defining Factors</b>	Positive image of consumption. Generally Happy, Content and importance recognition, particularly vegetables. Ease of Preparation and Snacking behaviour. Origin of food and fruits and vegetables is important. - Low importance of Mood, Self Esteem, and specific drivers not important (e.g. Weight Control)		Has to be in the correct frame of mind to consume e.g. Mood. Consumption seen as more generally as hassle; Free Time, Wastage, Holiday Differences. Display greater price sensitivity. - Not pre-planners or interested in specific drivers for consumption.		Specific drivers important to this cluster, e.g. Specific Health Concern, Weight Control, (to a certain extent Exercise) as well as Health Conscious. Tendency to pre-plan consumption of fruit and vegetables. Snacking behaviour displayed, and interest in the origin of food.		Pre planners of consumption, where exercise is important as well as weight control. The consumers show high importance on General Contentment, and are generally happy in themselves and their diet (Fruit Importance & Enjoyment). Dietary Change is evident. - Free Time is not important, nor price or Wastage. Not price sensitive or sensitive to significant others. Mood does not affect high consumption		Social others important to consumption as is the amount of Free Time and Work. Pre planners and price sensitive. Mood can interfere with consumption as can Self Esteem. Food is a Prominent Thought. Health features, both for a Specific Concern, and Health Conscious. - Low General Happiness and little Similarity of the Household Diet. Snacking behaviour is not conducted, and Fruits and Vegetables are not seen as good Value for money. Fruits and vegetables are seen with low Ease of Preparation.		Consumers Generally Happy, with Fruit and Vegetables seen as good Value, but consumed only when the Mood allows. Prominence of Food Thought. - Little enjoyment derived from fruit. Little preplanning behaviour for fruit and vegetable consumption. No importance place upon healthfulness; either for a Specific Health Concern or from health advice. Weight Control not prominent. Self Esteem does not affect consumption.	
<b>Other Profiling Features</b>	- There are less shop prepared food consumers than expected. - Greater balance in proportion of Fry-up Accompaniment and Composite (lower than other clusters) dishes consumed.		- Greater number of heavy takeaway users and shop prepared food users than expected.		- Slightly more consumption of Convenient Health and Salad Accompaniment.		- There are less shop prepared food and take away food consumers than expected.		- More consumers consume shop prepared food than expected.		- Greater percentage of Traditional Meat Accompaniment as part of fruits and vegetables in diet. Hence greater vegetable consumption as part of FVC.	

## 6.9 Chapter Summary

This chapter has highlighted the key findings of the consumer survey featuring 239 respondents; 148 of these consumed 5 or more portions of fruit and vegetables per day, and were accordingly categorised as 'high'. The survey was grounded in the results of the qualitative consumer interview stage (as well as the literature review). The derived attitudes and behaviours were operationalised as a list of statements tested on a 7 point Likert agreement scale. The statements did not represent a predetermined statistical construct, but allowed the use of multivariate techniques to explore the underlying data. Likewise the fruit, vegetables, and composite consumption (using a food frequency method) allowed for exploratory analysis of consumption patterns.

In relation to the first broad hypothesis outlined in the chapter introduction - that high consumers would exhibit attitudinal and behavioural differences to low consumers, differences were identified in relation to attitudes, motivations, behaviours, habit, and level control in an initial bivariate analysis. These related to; happiness and enjoyment of own diet with fruit fruits and vegetables, consumption and variety, food/fruit and vegetables as prominent in budgets and shopping, consumption related to health and wellbeing, preferences for vegetables (in particular) as a snack item, but also in relation to planning foods for consumption. Differences were also found in trying foods that are unfamiliar, changing diet, and having always eaten fruits and vegetables. Difference were also identified with level of control of own diet. High fruit and vegetable consumers showed greater disagreement than low consumers to only eating fruits and vegetable when "could be bothered" or "fancied them".

Following the reduction of the 130 statements to 34 factors using a factor analysis method, 16 factors demonstrated significant difference between the responses of high and low consumers. These supported the general interpretation of the 130 statements; General Contentment and Importance, Health Conscious, Changing Diet, Fruit Importance & Enjoyment, Origin, Primary Responsibility for Food Process, Snacking, Weight Control, Exercise, Specific Health Concern, Prominence of Food Thought, Significance of Social Others, Ease of Preparation, Vegetable Prominence, Preplanning of Daily Intake, and Mood (where however, low consumers showed more agreement). The robustness of the described model interpretation was support by a secondary factor analysis being undertaken, utilising a thematic tripartite division of the original statements which increased the variable to sample ratio (Hair et al, 1998). However, this had only minor effects on to the factor structure.

The second broad hypothesis relates to the segmentation of groups within the respondent sample, based on the importance attached to fruit and vegetable consumption and associated

values. Utilising the previously identified 34 factors, a multivariate cluster technique was applied and a six cluster solution was derived (table 6.18 summarises these clusters). Hypothesis 2 proposed that some of these clusters would have an average fruit and vegetable consumption of a high level. The average consumption levels across the clusters range from approximately 2 portions per day to 8 portions, with four clusters demonstrating high average consumption. These were labelled 'Positive – Generally Content/Non-specific Driver', 'Reason-led Success', 'Active Structured Happy', and 'Busy Persuadable'.

The discussion chapter that follows addresses the importance of various factors in the consumption of high levels of fruit and vegetables, as well as comparing the findings with those identified in the qualitative stages. Likewise the evidence of clusters of like-minded fruit and vegetable consumers is compared to typologies interpreted in the qualitative study.

## **Discussion: What is Different About 'High' Consumers?**

### *7.1 Introduction*

This chapter addresses the important research findings, drawing upon the results chapters and the existing body of literature. In so doing the chapter will address the aim of the research - to identify characteristics important to the consumption of five or more portions of fruit and vegetables daily. The characteristics are discussed in relation to the identified factors and the way that they are experienced by the consumer. The chapter will link this to the evaluation of similarities and differences between groups of fruit and vegetable consumers. The chapter approaches the factors associated with high levels of fruit and vegetable consumption as well as the routes of that achievement. That is, both why fruit and vegetable consumers achieve 5 A Day, and importantly the implication of how they achieve 5 A Day. The body of discussion highlights the implication for fruit and vegetable policy.

The chapter is divided into three main sections. The initial sections address the role of multiple factors associated with high consumption. The following sections address the evident groups of consumers within the research and the way in which the differences and similarities are useful to the topic. The research stages are used comparatively to draw support and contrast the results. The subsequent sections discuss the role that strategies and management take with regard to 'how' high levels of fruit and vegetables are achieved.

### *7.2 The Impact of Multiple Reasons Associated with High Consumption*

A plethora of information was given in relation to the consumption of fruit and vegetables at the consumer interview stages. A variety of notions were expressed, displaying a range of enthusiasm towards fruit and vegetables and towards achieving high consumption. Themes derived from the consumer interviews related to the procurement of fruits and vegetables (shopping pattern, price/value/budget, season) work life and home life (lifestyle, availability, work image and responsibility, responsibility for a child's diet), health (proactive and reactive). Competition and consumption for the purpose of sport featured, as well as consumption for purposes of weight

control. A further theme associated taste, enjoyment and engagement with fruit and vegetable consumption. The effect of influences was related to the particular contexts, themes often related to an identifiable environment, reflecting attitudes and behaviours.

A number of areas of empirical investigation have identified the role of multiple influences and fruit and vegetable consumption. Reviews such as Kamphuis et al (2004) addressed the environmental determinants of consumption. Pollard et al (2002) identified a broad review reflecting the effect on what a person can do and chooses to do, and Shaikh et al (2008) highlight psychosocial predictors. Models also acknowledge the role of multiple influences, for example the social contextual model (Sorensen, 2007), and food choice process models (e.g. Furst, 1996).

The multivariate analysis, within the thesis, identified 34 factors were underlying the attitude and behaviour statements data. Importantly the earlier consumer interview stage was useful in deriving the utilised statement list. The derived factors exhibited a broad range of mean level of agreement (on a 7 point likert scale), from higher levels of agreement of 5.9 to strong disagreement levels of 2.2. Difference in responses between high consumers and low consumers indicated 16 of the factors were statistically significant (shown in Table 7.1, along with factor mean for high consumers and difference between high and low consumers). Factors where significantly different responses were given by high and low consumers reflect common areas. These were derived satisfaction and recognition of importance, the ways that fruit and vegetables are consumed, and identified reason for high consumption.

The classification of different 'reasons' behind consumption, as illuminated by consumer interviews, was derived from how that reason was experienced by the consumers. It categorises factors of consumption by their specific forms and impact upon high fruit and vegetable consumption. These were termed Motivations, Aims/Goals, Triggers/Trigger Points, Information, Environments, and Strategies & Management, in relation to food ideology and Values. All components need not be affective simultaneously for an individual consumer. The mechanics behind the factors and 'reasons' of consumption were interpreted and aggregated from the interviewees' descriptions. Models based upon the Theory of Planned Behaviour, and the work of Sorensen (2007) for example highlight the possible link between factors and classify certain tangible and non-tangible behavioural dimensions to the intention to consume such as sense of control or self-efficacy (Connor & Armitage 2002, Blanchard et al 2009).



Table 7.1 Reported Factors of Fruit and Vegetable Consumption

Factor	High Factor Mean	Difference Between High & Low Means
<b>Preplanning of Daily Intake (Factor34)</b>	<b>4.39</b>	<b>1.41</b>
<b>Fruit Importance &amp; Enjoyment (Factor6)</b>	<b>5.71</b>	<b>1.12</b>
<b>Snacking (Factor15)</b>	<b>4.28</b>	<b>1.12</b>
<b>Specific Health Concern (Factor23)</b>	<b>3.67</b>	<b>1.11</b>
<b>General Contentment and Importance (Factor 2)</b>	<b>5.51</b>	<b>1.08</b>
<b>Weight Control (Factor19)</b>	<b>4.39</b>	<b>0.84</b>
<b>Exercise (Factor22)</b>	<b>4.36</b>	<b>0.83</b>
<b>Vegetable Prominence (Factor31)</b>	<b>6.08</b>	<b>0.73</b>
<b>Origin (Factor11)</b>	<b>3.67</b>	<b>0.63</b>
<b>Health Conscious (Factor3)</b>	<b>4.32</b>	<b>0.61</b>
<b>Significance of Social Others (Factor27)</b>	<b>4.21</b>	<b>0.56</b>
<b>Primary Responsibility for Food Process (Factor 14)</b>	<b>5.06</b>	<b>0.49</b>
<b>Ease of Preparation (Factor30)</b>	<b>6.06</b>	<b>0.41</b>
<b>Prominence of Food Thought (Factor25)</b>	<b>5.29</b>	<b>0.39</b>
<b>Changing Diet (Factor4)</b>	<b>4.80</b>	<b>0.39</b>
Similarity of Household Diet (Factor7)	4.71	0.33
Constancy (Factor20)	3.60	0.26
Work Environment (Factor13)	4.86	0.21
Diary / Schedule Differences (Factor18)	4.75	0.19
Value (Factor10)	4.69	0.17
Self Determination (Factor24)	5.67	0.16
General Happiness (Factor33)	4.98	0.16
Sport (Factor9)	2.29	0.14
Effect of Self Esteem on Diet (Factor29)	4.35	0.13
Price (Factor5)	4.07	0.11
Children (Factor21)	3.87	0.06
Free Time (Factor28)	3.81	0
Holiday Differences (Factor16)	5.24	-0.03
Wastage (Factor8)	3.87	-0.06
Taste (Factor26)	5.79	-0.08
Differences to Parental Influence (Factor17)	4.91	-0.08
Eating Out (Factor32)	4.12	-0.17
Effect of Significant Others (Factor1)	3.60	-0.19
<b>Mood (Factor12)</b>	<b>2.84</b>	<b>-0.76</b>

(Significant factors highlighted in bold)

There are a number of significant factors demonstrated by those derived from multivariate processes which are often linked by a consumer's goals and motivations, exhibiting both for the long and short term and for specific and general purposes. This interwoven relationship is important in that it demonstrates a similar level of complexity to that which Didsdall et al (2003) describe. Highlighted from the derived factors are examples (where stronger agreement is shown by high consumers) these are Specific Health Concern, Health Conscious, and Weight Control. Falk et al (2007) highlight the inherent differences in attitude and perception displayed by consumers relating to health themes based upon their common use of language and the overriding purpose for the relationship with health. This division by attitude (and some associated behaviour) is supported by the findings of this research. Interestingly for this research, findings from interview stages suggest similar levels of fruit and vegetables can be consumed by individuals for different purposes.

Importantly, the data indicates that the sense of purpose has an effect upon level of fruit and vegetable consumption. This can have different implications for the individual consumer, and depending on the motivation behind consumption display different relationships with fruit and vegetables. The interview data illustrated the opportunity for potential change in consumption may also be different, and different approaches from health professionals may be required depending upon motivation and both the trigger and opportunity for high levels of consumption. It also identifies that the motivations and goals therein may also be interrelated. In support of this relationship, Exercise, has also been highlighted as associated with high fruit and vegetable consumption in this context.

The interpretation of the factors highlights the importance of these for the respondent group of high consumers. In addition Aims/Goals are often associated with a general motivation and represent specific long term and short term benchmarks. Examples amongst interview participants were target weight and clothing size, to satisfy motivations such as weight loss (related to body identity, Bisogni et al 2002) or for curative or preventive health reasons. Other, sports related benchmarks, might be measured against performance such as sporting ability or ranking. A number of these can be seen in relation to the food choice process model (such as Devine et al, 1998). Sobal & Bisogni (2009) highlight several dynamic processes such as trajectories, transitions, turning points.

For consumers, 'Triggers/Trigger Points' represent a cue or opportunity for the incorporation of fruit and vegetables within their ideology and diet. A number of examples were demonstrated by high consumers, new family make-up, clothing no longer perceived to fit, reaching an abnormal weight, as well as medical issues such as new diagnosis or threat to well-being. This supports the findings of Wing & Phelan (2005) where 'trigger events' are indicated as important to healthy behaviour (successful weight loss maintenance), including 'medical', 'reaching an all time high

weight' and 'seeing a picture or reflection of themselves in the mirror'. As Wing & Phelan (2005) identified, there are periods where there is an 'opportune time' to initiate behaviour change, and this is important for supporting behaviour change and opportune times for intervention (in line with the opportunity led approach outlined in the policy document, Healthy People, Healthy Lives, 2010).

Although the triggers/trigger points can be identified and researched in isolation it is important to view them in the context in which they appear for some people, and why they may not for other successful high consumers. Thus contextualising (Devine et al, 1998) the appearance of triggers and maintenance thereafter (transtheoretical notions such as Stages of Change, and other 'change' models like Protection Motivation theory). For simple illustration; one interviewee indicated clothing size was a trigger to change to a healthier behaviour (which included an increase in fruit and vegetables) but they were in a heightened state of awareness of general health as they were employment in a health promotion field.

The research also identified that triggers/trigger points can compound and they do not necessarily need to go from a negative position to an aspirational positive, but can feature as a trigger from one high consumption position to another. This is related to the contextualisation of an alteration in motivation and a new goal, and may affect the way in which high consumption is managed (such as different meal structures and different fruit and vegetable types for example). For example, one area where this was prominent was in relation to the health arena, in particular recover from ill health. A number of interviewees experienced a change in the motivation to consume high levels of fruits and vegetable for a different reason altogether, for one, no longer necessarily just about every day consumption but about eating healthily. The impact was such that fruit and vegetables represented a specific aim, and the relationship between fruit and vegetable and other dietary components altered. Fruit and vegetables now represented a different role, such as a main meal, having reduced meat consumption, or to fill up on, and hence the management of fruits and vegetables in the diet was altered.

The implication of this is important as it highlights the complexities evident even with people who may maintain a similar level of fruit and vegetables but the influences upon that consumption have altered, thus supporting food choice process notions of negotiation and context (Devine et al 1998). If using the same example consumer, the food choices they made now included 'health' as an important value, and fruits and vegetables would be balanced and prioritised along these lines (such as incorporation within the diet). For policy makers it highlights the importance of not only dietary recognition but motivational recognition. Linking with 'Types of High Consumers' (where awareness and enthusiasm feature as variables), as well as contextualised consumption, some interviewees displayed high consumption for different reasons during their food trajectory, for example switching

between eating high levels of fruit and vegetables without motive or trigger (awareness), to consuming them having a trigger of reactive health. Thus the consumer has changed their food ideology, and perhaps any further increase in fruit and vegetables (now seen as synonymous with health) may have to be related to the new motivation, or incorporate the new motivation along with other issues such as taste. This is supportive of Jastran (2009), where the context of consumption is particularly important (motivations), as well as social support/pressure, and the food patterns therein should be recognised, with links to the complexity and repertoire of eating routines.

### *7.3 Types of High Fruit and Vegetable Consumer*

The thesis indicates it is possible to categorise types of high fruit and vegetable consumers. This was achieved using different methods of segmentation within the research; the typology relating to enthusiasm and consciousness, and the utilisation of attitude and behaviour factors to cluster fruit and vegetable consumers. These are important in addressing multiple factors that are apparent in high fruit and vegetable consumption, but also homogeneity in consumer groups exist, and distinction between these groups based on certain factors.

#### *7.3.1 Segmenting High Consumers Based on Enthusiasm and Consciousness*

Segmentation was derived from interviews with high consumers based on level of enthusiasm towards consuming fruit and vegetables as well as the degree of consciousness in doing so. Amongst the interviews conducted six identifiable types of high consumer groups were presented (and two low). With further investigation other categories of high consumers may be identifiable by relationship with these two variables, or with larger numbers interviewed other differentiating variables may be important. The groups were WANT TO, HAVE TO (MADE TO and NEED TO), WILL DO (STAPLE and NOVEL) and CAN DO as outlined in Chapter 5. Paisley et al (2001), as part of their research into meanings associated with fruits and vegetables, identified notions of 'have to' and 'should syndrome' in the internalisation of a fruit and vegetable morality, and in particular a sense of awareness of consumption as synonymous to good health and positive force. Identification of the pressure involved (in the form of Paisley et al, 2001, description of 'have to') is similar to the nature of Have To, as the consumers identify the usefulness of consumption to themselves, however engage somewhat less enthusiastically. Thus this is divided into those that require further direct support from others (MADE TO) and those where the need is sufficient for high consumption is to be

achieved (NEED TO). In both cases however there is a description of preference for non-fruit and vegetables in the diet if possible. The groups identified within the research go further than the Paisley et al (2001) description, primarily in that its focus is not only health related (which can describe a reactionary or proactive orientation within this research), there are further motivations in evidence.

The research also describes both 'active' and 'passive' consumption by high fruit and vegetable consumers. Not in the same way as Kilcast et al (1996) description between high and low vegetable consumers, but rather that high consumers themselves demonstrated an active or passive relationships to their high consumption. This was based upon the level of awareness in their consumption of fruits and vegetables, and associated with active or passive strategies of consumption. For example WANT TO and HAVE TO consumers are aware of the reason behind the consumption of fruits and vegetables as it is linked with reasons for doing so and the properties that can be derived from their consumption. Alternatively WILL DO consumers, as well as CAN DO (when in high consumption status) are passive in their consumption in that it is done so without an active connection to a particular motivation or goal.

The importance for practitioners and interested others in these findings is that despite a range of factors being attributed to high consumption above, there is a further differentiation of how they may be experienced by levels of consciousness and goal orientation, and importantly the enthusiasm in doing so. For example, taste and enjoyment factors being important to those within CAN DO and WILL DO types, and motivation specific orientation for other groups. The 'reasons' for consumption would look very different for the different groups highlighted. This is illustrative of important issues. In terms of management, different strategies, and opportunities for strategies are required for high consumption, and second that the different high consumer groups offer a different level of stability of the achieved high consumption (hence type of internal and external support required).

Consumers from the different groups display characteristics that suggest there is a different level of risk to their high consumption. To illustrate, CAN DO consumers spend some time as low fruit and vegetable consumers, HAVE TO consumers display less enthusiasm (requiring differing levels of support) and very focussed on a goal. What would happen when the current goal or motivation has lessened or ended? Would a HAVE TO consumer require a shift towards a WANT TO position for further high consumption to be maintained? This reiterates the nature of changing position between groups (and connected reasons for high consumption) based upon enthusiasm and consciousness. The groups also demonstrate that there are those that consume high levels of fruits and vegetables both comfortably and regularly without explicit goal or motivation (though recognised that influences and pressures exist).

### 7.3.2 Segmentation Based on Attitude and Behaviour

A further categorisation of fruit and vegetables consumers is based on the importance of differential factors of consumption (utilising the attitude and behaviour factors). This produced six clusters, four of which relate to an average factor consumption of a high level (with average consumption ranging from 6 to 8 portion consumed daily). It is useful in presenting factors important in distinguishing high consumer respondent groups (as well as comparison with low consumers).

Table 7.2 below summarises cluster profile and defining factors. The clusters reflect partial representation of the described typology above, featuring evidence of both different levels of consciousness and varying enthusiasm. In terms of consciousness, the Reason Led Success (RLS) cluster identifies a number of motivation based factors with an effect upon consumption such as in line with weight control or specific health issue. Interestingly for RLS there is little consideration or agreement with Mood or other attitudinal factors, the cluster appears to be focussed on consumption for purpose (without a sense of high levels of derived enjoyment), similar to Have To (Need To) consumers mentioned above. There is no time based measure in place that would categorise RLS in terms of neither how long successful consumption has been achieved nor a constant pattern of consumption, however there is a sense of 'actionability' (as derived from Stages of Change).

The Busy Persuadable (BP) consumer, with the lowest level of high consumption amongst the clusters (6 portion per day), also indicates certain motivation for consumption, such as health conscious (informational) and with a specific health concern. However for this group the attitude factors Mood and Self Esteem feature (where fruit and vegetables are seen as an attitudinal decision), and Work, as well as Free Time feature as an effect upon consumption (and indicate a certain familiarity with the contextual nature of Protection Motivation Theory), these perhaps interfere with daily consumption. There are low levels of General Happiness displayed and lower value for money seen with fruits and vegetables. The BP as a cluster definition, like RLS could justifiably represent a similar typology as HAVE TO (NEED TO) in that there is a demonstration of consciousness of consumption and awareness of the need to consume for health reasons, as well as a little (or partial) enthusiasm in doing so. However it is also possible to argue that the cluster may represent part of HAVE TO (NEED TO) but with a variation across a further variable to RLS, i.e. there seems to be a greater level of interference with the action of fruit and vegetable consumption. For example there is the inherent conflict between motivations relating to health being balanced with the consumer's mood (perhaps 'intention'). This may indicate either a further sub group or dimension, or new typology in evidence based upon interference to possible consumption. The BP

cluster does feature certain elements similar to the typology CAN DO, in terms of being positioned on the cusp of high consumption and a high level of vulnerability to consistent high consumption. However there seems to be, at least for some of the cluster, a sense of consciousness related to consumption (health) which is not a truism for CAN DO consumers. Some evidence of this can be drawn from individual interviewees; who exhibit partial motivation-led diet and fractured fruit and vegetable consumption, for example a division between week day/weekend diets and more sporadic examples. It perhaps represents a group with some intention to consume but variability in success, in a way that is not that dissimilar to 'preparation' level of Stages of Change Theory (Conner & Armitage, 2002).

The cluster Active Structured Happy (ASH), like RLS and BP, also demonstrate strong levels of agreement with consumption relating to motivations and drivers but exercise and weight control rather than a Specific Health Concern (RLS and BP). The cluster displays contentment in themselves and a derived enjoyment and recognition from their fruit and vegetable consumption. Unlike BP there is low price sensitivity and the low interference of Mood to high consumption and thus a sense that consumption is relatively stable (i.e. more likely to be high), hence an average cluster consumption of eight portions of fruit and vegetables daily. There is an active nature to the consumption in that they exhibit an awareness of purposeful consumption, as well as a sense of derived enjoyment from their consumption, and therefore most closely related to the WANT TO description from interviewee typology. Thus the cluster appears to combine the positivity of both an active nature to consumption and derived enjoyment of their diet, unaffected by interferences or barriers (hence an importance of dietary strategies in their own consumption and achievement). The nature of the cluster perhaps would be identified in similar terms to an achievement of 'maintenance', and certainly 'action' if compared to positive behaviour change in relation to the drivers and motivations (though obviously time was not measured).

Whereas specific and general drivers appear important to the three clusters approached previously (RLS, BP and ASH), the cluster Positive-Generally Content/Non-specific Driver (PGC/NSD) does not place importance for high consumption of fruits and vegetables upon them. It identifies a potential cluster where the consumption of high levels of fruit and vegetable consumption is based upon the derived, passive, enjoyment of consumption itself. The consumer is generally happy, and engaged in the Origins of fruits and vegetables. The consumption appears not only important in itself but seems to be generally easy for the consumer.

Table 7.2 Attitude and Behaviour Cluster Summaries

	Cluster 1 (27)		Cluster 2 (82)		Cluster 3 (68)		Cluster 4 (44)		Cluster 5 (11)		Cluster 6 (7)	
Cluster Name	<b>Positive-Generally Content/Non-specific Driver</b>		<b>Non-Important/Low Priority Unmanaged</b>		<b>Reason-Led Success</b>		<b>Active Structured Happy</b>		<b>Busy Persuadable</b>		<b>Happy Deliberate Non-Consumer</b>	
	<i>Av. FVC/day</i> 7.7	<i>Av. Age</i> 50	<i>Av. FVC/day</i> 4.4	<i>Av. Age</i> 43	<i>Av. FVC/day</i> 7.7	<i>Av. Age</i> 53	<i>Av. FVC/day</i> 8.1	<i>Av. Age</i> 50	<i>Av. FVC/day</i> 6.0	<i>Av. Age</i> 40	<i>Av. FVC/day</i> 1.9	<i>Av. Age</i> 38
Defining Factors	Positive image of consumption. Generally Happy, Content and importance recognition, particularly vegetables. Ease of Preparation and Snacking behaviour. Origin of food and fruits and vegetables is important. - Low importance of Mood, Self Esteem, and specific drivers not important (e.g. Weight Control)		Has to be in the correct frame of mind to consume e.g. Mood. Consumption seen as more generally as hassle; Free Time, Wastage, Holiday Differences. Display greater price sensitivity. - Not pre-planners or interested in specific drivers for consumption.		Specific drivers important to this cluster, e.g. Specific Health Concern, Weight Control, (to a certain extent Exercise) as well as Health Conscious. Tendency to pre-plan consumption of fruit and vegetables. Snacking behaviour displayed, and interest in the origin of food.		Pre planners of consumption, where exercise is important as well as weight control. The consumers show high importance on General Contentment, and are generally happy in themselves and their diet (Fruit Importance & Enjoyment). Dietary Change is evident. - Free Time is not important, nor price or Wastage. Not price sensitive or sensitive to significant others. Mood does not affect high consumption		Social others important to consumption as is the amount of Free Time and Work. Pre planners and price sensitive. Mood can interfere with consumption as can Self Esteem. Food is a Prominent Thought. Health features, both for a Specific Concern, and Health Conscious. - Low General Happiness and little Similarity of the Household Diet. Snacking behaviour is not conducted, and Fruits and Vegetables are not seen as good Value for money. Fruits and vegetables are seen with low Ease of Preparation.		Consumers Generally Happy, with Fruit and Vegetables seen as good Value, but consumed only when the Mood allows. Prominence of Food Thought. - Little enjoyment derived from fruit. Little preplanning behaviour for fruit and vegetable consumption. No importance place upon healthfulness; either for a Specific Health Concern or from health advice. Weight Control not prominent. Self Esteem does not affect consumption.	
Other Profiling Features	- There are less shop prepared food consumers than expected. - Greater balance in proportion of Fry-up Accompaniment and Composite (lower than other clusters) dishes consumed. - Lower than expected numbers of Traditional Fleshy Fruit consumers.		- Greater number of heavy takeaway users and shop prepared food users than expected. - Higher number of Traditional Fleshy Fruit consumers.		- Fewer Traditional Fleshy Fruit consumers and greater number of Easy Basic Healthy Eating than expected		- There are less shop prepared food and take away food consumers than expected.		- More consumers consume shop prepared food than expected.		- Greater percentage of Traditional Meat Accompaniment as part of fruits and vegetables in diet. Hence greater vegetable consumption as part of FVC.	

(Source: Author Construction)



The passivity of consumption aligns with the typological description of WILL DO consumers, where the context of consumption is not related to progressive motivations. As a result the fruit and vegetable consumption cannot be compared to the Stages of Change as such due to little want to change, and diet not aligned to betterment per se, although could reflect a post or removed 'maintenance' stage.

There are interestingly points that can be derived the clusters relationship with fruit and vegetables, with implication for behaviour change or supporting high consumption in a targeted fashion based on the consumer type. In terms of vulnerability to the stability of high consumption, BP consumers appear to be most at risk, as motivations are only part effective (possibly linking with intention versus achievement), and barriers to consumption appear to have greater impact upon this group. The vulnerability to RLS instead lies in the focus upon motivations themselves, where perhaps the diet is only as strong in consumption as the focus upon a goal; questions could perhaps be asked about the potential problem when either the goal is achieved or motivation diminishes. Both PGC/NSP and ASH seem less vulnerable regarding the barriers of consumption as reported here, and both appear to have foundation of consumption based in derived enjoyment.

Different opportunities for support are also evident for different clusters. For the BP consumer approaches to either help the management of barriers, such as make practical consumption easier and better value. The approach could also utilise an increase in the happiness of the consumer, or tap into the importance of social others for support. The RLS consumers may require an approach that introduces an element of positive enjoyment in not only the result of fruit and vegetable consumption but the consumption itself and thus less detrimental effects of goals being reached, but at the same time reinforce motivations. For ASH as well as RLS and BP there are probable opportunities to intervene or support consumption as a result of likely institutional contact, e.g. exercise, weight loss, specific health concern, health. The usefulness of practical intervention has been reported by Kilcast et al (1996) for example as well as trial based research such as Wrieden et al (2007) and via information by Luszczynska et al (2007).

Although there are characteristics important to each of the clusters, there are a few further that suggest a possible comparative difference between high and low consumer groups. Firstly from the management of fruit and vegetable consumption, the pre-planning of fruits and vegetables in the diet feature as important to RLS, ASH, and BP, in particular those clusters where there is some level of driven motivation, and not important to both low consumer clusters. Snacking is a feature of PGC/NSD and RLS as well as interest in Origin. The factor Mood features in the three lowest consumption clusters, both low consumer clusters and the lowest of the high consumer group, and unimportant to ASH and PGC/NSD clusters. This supports the findings as identified by particular

factors above. A further profiling characteristic is that PGC/NSD and ASH demonstrate a lower than expected number of high shop produced food users.

It is practical to assume that perhaps a different sample may elicit a different basis of fruit and vegetable consumption and a different number of clusters, or as an extension of those on display above; particularly with a greater number of variables and a representative sample. Both the consumers within the typology and attitude and behaviour clusters present certain similarities.

#### *7.4 Coping, Strategies and Management of High Consumption*

How fruit and vegetable consumption is achieved has been inferred by a number of studies, and more deeply dealt with by others. For example Falk et al (1996) highlight a range of strategies utilised for simplifying food choices; the focussing on one value over another, routinisation, elimination, limitation, substitution, addition, and modification. Similarly Crawford et al (2007) also examined behaviours that are associated with healthier intakes of fruits and vegetables highlighting shopping behaviour (such as shopping lists), food preparation behaviours (e.g. not finding food a chore, planning), meal behaviour (e.g. regularity of where meals consumed), and eating behaviours (e.g. time influences, use of dinner table). This indicated the role of organisation and planning, such as what would be eaten well in advance of mealtime and before going shopping. Likewise those with higher intakes of fruit and vegetables as demonstrated an enjoyment and willingness to engage with foods, such as enjoying cooking and did not find food issues a chore. Strategies of consumption are extremely important to the successful achievement of high consumption and highlight ways in which consumption can be achieved for interested policy makers.

The management of consumption for some is general, yet the technique may also be employed by another consumer with a specific barrier in mind and utilising it in a reactionary fashion. For example, for reasons of availability of a 'healthy' lunch while at work, seasonal soup was prepared (perhaps then frozen and defrosted) and taken with the consumer, as alternatives within easy access were considered not suitable. In this instance access was a barrier to healthy eating (where fruits and vegetables were considered important), however the same technique could also be applied by another high consumer without recognising the existence of a barrier. Importance is placed upon the reasons behind consumption despite similar strategy and management and ultimately similar consumption for the consumers. The implication of this is that any potential marketing of interventions may need to take account of different consumer motivations, despite consumption of fruit and vegetables being similar. It also demonstrates that a similar level of consumption may be

exhibited for different reasons, thus if soup has a similar degree of vegetable content, it may not have similar fat or salt levels. It perhaps reflects information from the initial interviews, where for diabetes sufferers the management of fruits and vegetables may utilise different foods to deal with, for example, banana avoidance.

The research undertaken highlights points at which strategising and management have been utilised effectively for the purpose of consumption, sometimes in line with particular motivations, such as active weight loss strategies, or ensuring an effective level of fruit is consumed for sports based nutritional purposes. As described in relation to strategies in the consumer interview results often strategies were balanced against conflicting values (in line with food choice process frameworks, such as health, taste, cost for example). Particular strategies have been identified as specific to a certain context, or particular environment, or as mentioned above in relation to barriers that occur in particular places, such as availability. Devine et al (2006) highlight, for example, the importance of the relationship between work life and home life and in particular the impact that they have on each other in relation to time and the resulting management that is required for food consumption. This supports the notion of contextual strategies, and interviewees demonstrated such behaviour. The role of particular fruits advocated in relation to convenience (and taste) was prominent for dietary management where food was often eaten 'on the run' or in between other daily activities (as highlighted by nurses or lorry drivers).

The home is also an important environment for the management of fruit and vegetable consumption, and reflected the diversity of family eating patterns (not to mention those strategies adopted to get food from the shop). Related to this, high fruit and vegetables consumers responded with more agreement to statements referring to the factor Primary Responsibility for Food Process, such as the decision of household food purchase, shopping, and preparation and cooking.

Kilcast et al (1996) identify high vegetable consumers to be 'active'; in part this is to have a sense of control over food consumption. Likewise Shafer et al (1999) refer to non-helplessness being related to engagement in successful healthy consumption. This relates to notions of self-efficacy and control. For Kilcast et al (1996) the 'active' description includes a tendency for high consumers to 'Plan Ahead'. In support of this, Preplanning of Daily Intake as a derived factor is a differential characteristic within the research with high consumers agreeing more strongly that they plan the amount of fruits and vegetables they consume during the day. This advocates a sense of preplanning in the diet of the high consumer. It was indicated from the factor data that significance of social others was also important in this respect (Sorensen, 2007), it also represented a successful management, such as meeting the needs of others, as well as the support gained.

Varying degrees of social support were in evidence. Provision by another person in the form of social support or moral support not only practical solutions, collective information gathering strategies were also employed to increase ones repertoire of recipes. Some interviewees however demonstrated that they had handed control of their diets to others, especially their spouse. Support could also be provided by social groups such as exercise classes or weight loss groups. Another interviewee utilised a change in attitude and food trajectory, then supported this with a variety of management processes, such as daily measurement by food diary, formal healthy eating courses, and incorporated novelty so as not to get bored, but these were run concurrently with the promotion of self-worth. Tu Quan et al (2000) highlight the variety of opportunities for the inclusion of fruits and vegetables in the diet by illustrating the behaviours that low income mothers utilise, for example the importance of fruit juice, fruit with lunch, fruit as desert. The meal based strategies are also continued with vegetable consumption in the study, such as ensuring each evening type meal has two vegetables, salad stuffs for lunch, and snacking, but also general availability to increase easy access. Another strategy was to ensure that three meals were eaten daily and therefore providing appropriate opportunity throughout the day.

For some interviewees dietary management in line with particular goals or a greater level of engagement in food was corroborated by the factor Origin. This highlights both a physical and thoughtful interaction with the process of consumption that high consumers display. In the interviews, for example; high fruit and vegetable consumers were often involved in the production of fruit and vegetables in some way or were related to someone who allowed them to be a part of production and consumption of home grown food (supported by Friel et al, 2005).

Didsdall et al (2003) indicated '...perhaps people are more likely to cite lack of money as a barrier...than to consider more complex explanations' (pg166). Budget did feature within interviews. In particular budget was mentioned with a priority placed upon fruit and vegetable inclusion despite the budget being described as 'not well-off'. In this instance the budget was managed and balanced so that fruit and vegetables of some description (where fresh was an important as an ideology) was incorporated, and supportive of 'value negotiations'. Both meal planning and practical shopping were incorporated in the provision of fruits and vegetables for long term health, and with family and child considerations. For the latter a number of purchases were made in bulk and shared with sibling, thus joined shopping trips; seasonal foods were considered less expensive and price awareness also featured so that items across different shops could be compared. Ingredients which served multiple functions were considered valuable, and therefore shopping for single meals was considered wasteful and of low value to weekly consumption as it would become too expensive, this also meant that fruit and vegetable availability was important to

allow ease of access. Although restriction was placed upon certain fruits and vegetables because of a child's intolerances choice and novelty also featured within the interviewee's food ideology, the diet of the family was managed and the interviewee achieved high consumer status.

Snacking itself featured as a further factor from the analysis where high consumers, comprising of statements regarding both behaviour and preference towards fruit and of vegetables as a snack item. Although LRFA (1996) found interventions utilising fruits and vegetables as snacks less useful in practice than meal based in the improvement strategies, interviews from this research do highlight the role for snacks, either of fruit, vegetables or both in achieving consumption of five or more portions per day, both from those who deliberately do so (especially as a substitute for less healthy snack food) and those that enjoy doing so.

Although 'Taste' as a factor did not exhibit significant difference between high and low consumers, certain preferences and associated behaviours were shown by high consumers towards fruit and vegetables, such as Snacking. On this point, the interviews drew interesting differences between consumers regarding taste. A feature of the low consumer interviews was that fruit and vegetables were not disliked, i.e. the taste of fruit and vegetables were not given as reasons of low consumption. Preference for non-fruit and non-vegetable foods, emotional avoidance and further attitudinal decisions were regarded as reasons for low consumption, as well as a few situational factors, particularly work related. For high consumers during the interview phase, many described the taste of fruits and vegetables important to consumption, and often supported this liking by recalling of having always enjoyed eating fruits and or vegetables, or having found recent enjoyment (to their surprise in some cases). These indicate the factors of General Contentment & Importance, Fruit Importance & Enjoyment, and Vegetable Prominence.

In terms of food strategies and management taste for a number of interviewees represented a more naturalistic and easy decision of which fruit and vegetable type to consume in larger amounts. This often coincided with accessibility, such as seasonality and home production. For some, in relation to weight loss and healthy eating, certain preferences were utilised in line with particular strategies to ensure that their diet ensured they ate the foods they enjoyed, or ate foods that they tolerated (but not those they did not like) so that 'nicer unhealthy' items could also be eaten. However some of the interviews also demonstrated that there were those who did not like the taste or enjoy fruit and vegetables, they would prefer other foods, but consume high amounts of fruits and vegetables because of the prominence of other reasons for consumption. In many cases this was seen with the support of others, lesser control over their own diet and a driven motivation (their own or supported) towards a particular goal. A further variant indicated consumption of fruits

and vegetables as a necessary component with no real interest in taste per se, for example with competitive sport in mind.

A further complication can be found when applying dynamics of food consumption, and in particular the notion of trajectories as identified by Devine et al (1998) for example. For those who had shown a dislike of the taste of fruits and vegetables, or had not eaten them as a preference, there was sometimes an acceptance in a change of diet, particularly with those with explicit ill health or want for healthfulness. For these contemporary high consumers there featured a phase of dislike, and a conversion associated with a new eating regime; hence for those consumers good taste at particular points did not feature as a prerequisite to high consumption (and associated dietary change). In possible support of this, Changing Diet features as a factor for high consumers. Consumption of fruits and vegetables is not necessarily static over time. The implication of this is not only a greater complexity in consumption between not being and being a high fruit and vegetable consumer, but also points to the importance of transtheoretical models such as Stages of Change (Connor & Armitage 2002, Greene et al 2004, Ma et el 2002, for example). Taste for policy makers, however, represents a complex theme for fruit and vegetable consumption and offers a variety of opportunities for individuals to manage fruits and vegetables.

#### *7.4.1 Types of Fruit and Vegetables Consumed*

Related to strategy of consumption, the type of fruits and vegetables are important in their utilisation, for example the importance of recognition of composite meals as a strategy for food incorporation, or to make dishes more appealing with vegetables (Paisley, 2005). Rather than a single figure for daily consumption, the research discussed with high consumers a range of fruit and vegetable consumption patterns and preferences, as well as requiring respondents of the survey to demonstrate their consumption across a range of fruit, vegetable and composite dish types. The findings are useful for the purpose of identifying how fruit and vegetables are consumed, and the opportunities of 'how' they might be consumed (potentially increasing an individual's daily consumption).

For individuals' involved in the interview stages difference and similarities could be identified, for example for some there was a wide spread of items relating to their diet and thus their high consumption was spread across a range of produce and consumption styles. Some took pride in their range of item consumed as well as a search for novel foods and ingredients. For others, their consumption was more concentrated upon certain items, for example specific items e.g. grapes, or vegetables as opposed to fruit, the implication of which is high consumption is achieved utilising a

range of patterns and therefore these preferences offer different opportunities to strategise and manage fruit and vegetables within the diet. A number of interviewees identified a standardised range of items that they consumed regularly. It thus displays how high consumption is achieved, but may also infer the popularity of certain diets relating to reasons for such consumption.

Factor analysis of vegetable consumption in Nijmeijer et al (2004) investigation led to six factors (salad, boiled, cruciferous, root, frozen, and starchy) from twenty four regularly eaten items. The research result of the survey utilised for the thesis demonstrated the suitability of twelve derived fruit and vegetables dietary factors; Traditional Meat Accompaniment, Salad Lunch Bar, Salad Accompaniment, Fry-up Accompaniment, Composite Meal, Soft Fruits & Berries, Non-Convenient Fruits, Convenient Health Mix, Rich High Fashion Foods, Summer Garden Fruits, Convenience Fruit, and Juicy Fruits. The individual items demonstrate a 'Sunday effect', when factor consumption aggregate is shown these are generally grouped to Traditional Meat Accompaniment where a third of total consumption is on the one day. However they also make an important contribution throughout the week (comparatively so) for the respondents. Rich High Fashion Foods shows a similar trend, but lesser figures (mainly as a result of broccoli). The other factors are relatively similar throughout the week, with perhaps Fry-up Accompaniment, Salad Lunch Bar, and Salad Accompaniment showing a reduction in consumption on a Sunday. It indicates for some a different consumption pattern for these vegetables between week and Sunday.

The day for consuming highest levels of Juicy Fruits and Composite Meals is also Sunday but marginally over the rest of the week which represent a stable numerical consumption for respondents. Importantly weekly figures suggest that these are numerically very important to the respondents across the week in make-up of fruit and vegetable consumption (with Traditional Meat Accompaniment third highest as a comparison). Juicy Fruits seem to be a popular staple throughout the week, and often provide the consumer with the opportunity to eat as a meal (breakfast), or even a course at meal time. The popularity of Composite Meals is interesting in that the elements of the composite meal go towards a meal in itself. The processes involved in the delivery of portions of fruits and vegetables was described by interviewees; where mainly vegetables were either the basis or addition to a recipe, for example Shepherd's pie, Bolognese, or curries where mushrooms, peppers, onions were included. Soups, with vegetables featured very strongly with interviewees. Incidental inclusions such as pizza toppings were also included. This demonstrates a strongly utilised opportunity for the inclusion of fruits and vegetables by respondents (either actively or passively) and acknowledges the possible usefulness of 'recipe tips'.

The other important point is that such meals can be a substitute at the expense of other types of fruit and vegetables that may be consumed. However, as also demonstrated by interviewees, they

can also provide the basis of additional such as salad with curry and rice, or more often adopted further vegetables alongside the composite. For the respondents (as a group) this is further emphasised with Composite Meals representing fifteen percent of total portions consumed, the remainder is made approximately equally fruits and vegetables. For fruits, factors made entirely from fruit based items (as recorded on the questionnaire), other than Juicy Fruits, include Convenience Fruit, Summer Garden Fruits, Non-Convenient Fruits, and Soft Fruits. According to interviewees conducted they can offer different strategies to their consumption depending on the nature of the consumer, for example Soft Fruits & Berries are made from fruits with a strong seasonal sense, and some interviewees adopted a seasonal approach to consumption, either from interest in production or in relation to associated price. They also represent fruits that can be eaten in similar ways.

### *7.5 Chapter Summary*

The chapter has discussed a number of key findings of the research in relation to the outlined aims. It has brought together findings from the different stages of the research to identify a range of influential factors for the consumption of fruit and vegetables in excess of the recommended daily consumption (5 portions per day). It also identifies differences between high and low consumers. The chapter has also indicated that these are important in relation to supporting those findings of other empirical investigation, and drawing policy implications from this.

The chapter indicates that the determinants themselves are useful in the investigating influences, but also the complexities of the factors to the individuals thus highlighting the role that a high consumer may take in relation to enthusiasm of consumption and level of active awareness in that consumption. The chapter has also drawn attention to the importance of fruit and vegetable consumers belonging to particular segments, and as such are positioned differently in relation to the identified factors. The chapter also reiterates the importance not only of identifying determinants to consumption, or the relationship that high consumers have with their fruit and vegetable consumption, but also the practical methods that are utilised in the management and strategising of high consumption, whether related to specific places or contexts, or instrumental in overcoming perceived barriers.



## Chapter Eight

### Conclusion

#### *8.1 Introduction*

The final chapter presents a summary of the main findings relative to the research objectives outlined in the introductory chapter. The fundamental aim was to explore the factors affecting how people achieve at least '5 A Day' levels of fruit and vegetable consumption, and to consider the policy implications of this. The thesis draws upon the experiences of high fruit and vegetable consumers (by interview and survey). It also presents a comparative analysis of what is different about those who achieve high consumption levels and identifies different high consumption groups. In addition the chapter reflects upon the research process and the implications for further research.

#### *8.2 Research Objectives*

##### ***8.2.1 To describe the policy context driving the 5 A Day public health message.***

Chapter 2 reviews the main policy developments under "New Labour" relating to 5 A Day fruit and vegetable policy and associated health policies. It covers policies to address health inequality and policy recommendations. The chapter plots the character of 5 A Day being a 'nutritional guideline', 'daily target', 'pilot study', 'logo and promotional tool', 'umbrella of community intervention' and finally part of a 'joined-up food strategy of well-being'. 5 A Day represented national promotion as well as local level intervention.

The chapter indicates that 5 A Day featured as part of fruit and vegetable policy in relation to reducing particular types of ill health, cancer, and later as part of tackling obesity. Policies targeted illness in different ways, ranging from a nutrition-based 'unit' approach (such as inherent chemicals in particular fruit and vegetables) to broad concepts of lifestyle with health and fitness incorporated. However despite greater awareness across consumers of the benefits of fruit and vegetable consumption, only partial successes in the increasing of daily intakes have been observed. Some criticism is levied at the programmes in the forms taken and investment spent.

***8.2.2 To examine the empirical findings and approaches to the investigation of fruit and vegetable consumption and derive the contribution of theoretical approaches to food choice research and therefore the conceptual approach driving this thesis.***

The introductory chapter describes the conceptual framework utilised for this research, and this is further explored in subsequent chapters. The thesis is linked with epidemiology and health, in particular health and health behaviour, relating this to policy frameworks. It is also underlined by the relationship between health and consumption. The thesis recognises that there are many factors which impact on health behaviours, and that this is reflected in fruit and vegetable consumption.

Chapter three identifies the state of knowledge of research in this area. The chapter presents the importance of factors relating to different environments, such as those encountered at home, at work, and whilst shopping. These include general issues of food access, as well as specific issues within households, for example children and 'significant food-others'. Associated socio-demographic characteristics are also explored in relation to fruit and vegetable consumption. In addition to external influences, internal influences are examined. These include sensory issues such as taste, but also psychosocial and attitudinal dimensions, such as perceived health consequences, self efficacy, and personal food systems.

Of particular importance to the research frame is the role of the Food Choice Process Model description of consumption behaviour. Proponents of the model stress the importance of multiple influences upon consumption for an individual, from the simplistic to more complex decision making. Important conceptualisations include personal, environmental, and social 'influences' alongside personal food systems and the development of particular food choice values. The model encompasses the dimensions and processes involved in consumption decisions such as the 'negotiations' between values and prioritisation of these. Therefore the model is particularly useful at describing the complex interplay between factors influencing fruit and vegetable consumption.

The Food Choice Process Model is also important as it incorporates the influence of 'time' on consumption. The model offers a 'life-course' approach, where an individual's 'food trajectory' is linked to 'turning points' and 'transitions', with past, present and future consumption linked to the impact of described influences. The model indicates that the management and behaviour process of consumption is also important and this is discussed, in relation to aids to practical consumption and dietary management, within the third chapter.

The body of knowledge concerning fruit and vegetable consumption reports a variety of research methods and conceptual frameworks, with the Food Choice Process Model approach employing different research strategies. It is therefore suited to bringing together the complexities of consumption with the dynamic food relationships between consumers and their fruit and vegetable intake. The model has been influential in the conduct of practical techniques, as well as in its guidance of the nature of consumption (although it is important to recognise the contribution of alternative food behaviour and health models, as described in Chapter 3). A mixed methods approach has been undertaken, utilising qualitative and quantitative research techniques, and celebrating their integration (described in Chapter 4).

***8.2.3 To explore, utilising qualitative means, the relationship consumers have with the fruit and vegetables they purchase and eat, and the way in which consumers of over five servings of fruit and vegetables daily manage to incorporate them into their diet.***

Chapter 5 comprises three main sections relating to important determinants of fruit and vegetable consumption, based on interviews with professionals from the field and with high fruit and vegetable consumers. A thematic analysis of associations with fruit and vegetables indicates that such foods were included within the diets of high consumers for a number of reasons. Grouped by theme, the influences are procurement of fruits and vegetables, lifestyle, home life, working environments, concerns of health, dieting behaviour and weight control. In addition to these, sporting activity and competitiveness, taste, values and strategies of achievement were also identified.

From further analysis, a typology relating to enthusiasm and awareness, supported by attitudes and behaviours, was derived. WANT TO (WT), HAVE TO (HT); MADE TO and NEED TO, WILL DO (WD); STAPLE and NOVEL, and CAN DO (CD) consumer types were developed in relation to high fruit and vegetable consumption. Further analysis also developed a range of how fruit and vegetable consumption was 'experienced' (such as link to situational contexts, past experiences, and existing/future values). The findings are labelled as Motivation(s), Information(s), Environment(s), Trigger/Trigger Point and Strategies & Management.

***8.2.4 To formulate the relationship identified in the qualitative work into a set of hypothesis as a guide for the quantitative analysis.***

The interviews with consumers achieving five or more portions of fruit and vegetables per day (along with previous literature, and information from the professional interviews), indicated a range of key issues. Certain attitude and behaviours were important influences upon the level of fruits and vegetables consumed and importantly these also reflected particular environments and personal/social contexts. This led to the broad hypothesis proposed that ‘high consumers would exhibit some attitudinal and behavioural differences to low consumers’ for testing in a quantitative survey. These key attitudinal and behaviour issues were conceptualised into a series of 130 agreement statements as a basis for further analysis.

A second broad hypothesis was developed to explore in a quantitative survey. It was evident from the consumer interview data that particular values were attached to fruit and vegetable consumption, with varying levels of enthusiasm and degree of active engagement in their high consumption. Based on these variables, the analysis of consumer interviews developed a typology. Therefore the second hypothesis was ‘Different fruit and vegetable consumer groups will be recognisable amongst respondents, based on identified factors important to consumption’, with some groups featuring higher levels of consumption compared with others.

***8.2.5 To explore and examine, using quantitative methods, the attitudinal and behavioural factors affecting fruit and vegetable intake of over five servings per day and to profile consumers achieving these intake levels.***

The quantitative analytical methods applied to the consumer survey data revealed a number of factors which displayed statistically significant difference between high and low fruit and vegetable consumers. These factors are; General Contentment and Importance, Health Conscious, Changing Diet, Fruit Importance & Enjoyment, Origin, Primary Responsibility for Food Process, Snacking, Weight Control, Exercise, Specific Health Concern, Prominence of Food Thought, Significance of Social Others, Ease of Preparation, Vegetable Prominence, Preplanning of Daily Intake and Mood.

Further analysis identified common clusters of consumers differentiated by attitude and behaviour factors. The clusters differed accordingly to relative derived enjoyment with their diet, ease of overcoming barriers, and the strategies and management used to incorporate high volumes of fruit and vegetables in the diet, in particular preplanning and snacking. The four identified clusters with a high average level of fruit and vegetable consumption were labelled ‘Positive-Generally

Content/Non-specific Driver' (7.7 portions per day), 'Reason-Led Success' (7.7 portions per day), 'Active Structured Happy' (8.1 portion per day), and 'Busy Persuadable' (6 portions per day).

### ***8.2.6 To discuss the policy implication of the key findings.***

Reflecting the discussion in chapter seven, and each results chapter, the implications for fruit and vegetable policy makers (and those who have an interest in increasing consumption at national and local level) are now outlined. This is of particular importance to the area of public health and associated bodies. The policy implications are described in relation to the key findings of the thesis. The thesis has demonstrated that consumers with high levels of fruit and vegetables can be identified, even in areas where contextually they may have been considered low in number. Individuals who, within their daily diet, consume on average at least five portions of fruit and vegetables are a strong source of data, both in terms of their individual journeys and collective experiences.

#### ***8.2.6.1 The existence of multiple factors associated with high fruit and vegetable consumption.***

A range of consumer 'attitudes' and 'behaviours' has been identified, describing not only 'why' they consumed high levels of fruits and vegetables, but also 'how'. It is important for policy to reflect the complexity involved in the consumption process, and the involvement of what the thesis has described as 'reasons' associated with high consumption. Eating high levels of fruit and vegetables can be supported by a drive towards a 'goal', with a certain 'motivation' behind that, related to particular 'values'. These can sometimes be accounted for by particular 'triggers' at 'trigger points'. At the same time 'information' and support from 'environment' sources can have a bearing upon actioning a behaviour. From the outset, the complexity involved in the consumption process should not been seen as problematic by those interested in encouraging and sustaining higher levels of fruit and vegetable consumption, but rather as an opportunity to work with the identified complexity and the relationships between 'reasons'. It is the complexities that are useful in identifying the appropriate targeting of health promotions and interventions. It is also the complexities that allow us to profile the discerning characteristics of different high consumer groups.

The identification of the characteristics of 'reasons' behind high fruit and vegetable consumption is useful as it illuminates the ways in which each component part is experienced, and therefore provides opportunities to aid trajectories towards high consumption. For example, in relation to the evidence of triggers and trigger points amongst some high consumers, it supports the potential

'opportune time' (Wing & Phelan, 2005) for behaviour change and links with the opportunity led approach outlined in *Healthy People, Healthy Lives* (2010). Multilevel interventions are supported by the research (such as those that target both information and access).

It is important to acknowledge that, for an individual, a similar consumption level can be achieved and maintained, while the 'reasons' behind that consumption change. A consumer can continue to maintain high levels of fruit and vegetable consumption as a result of changing their motivation, for instance as part of a weightloss programme to healthy living or fitness. Alternatively, a high consumer who has undergone behavioural change may reach a point where they are able to continue this level of consumption without being connected to a specific motivation. This is described as the 'maintenance stage' in Stages of Change (De Vet et al, 2006) behaviour theory.

The profile of a high level consumer could be a useful basis for a diagnostic tool for health professionals so as to apply a suitable framework of consumption behaviour. It could be applied almost as a checklist to identify the 'reasons' that are missing or barriers that could be overcome.

#### *8.6.2.2 High fruit and vegetable consumers vary in enthusiasm and degree of consciousness.*

A typology of high fruit and vegetable consumption was developed, based on the individual's awareness of the reason behind consumption and the level of enthusiasm towards that consumption. Four distinct types were encountered, with two of them having further differentiation based on additional characteristics.

Much of healthy eating policy is directed by a desire to reduce long term conditions associated with poor diet. As such, much emphasis is put on the links between healthy eating and disease prevention. Many of the health messages promoted around poor diet are hard hitting in relation to long term ill health. As discussed in the results (derived from consumer interviews) the consumer types WANT TO and HAVE TO require high levels of motivation in order to consume high levels of fruit and vegetables. In addition HAVE TO, because of its low levels of enthusiasm, is more likely to require sustained or repeated motivation. Both groups commonly cite health, whether reactive or proactive, as a major reason to consume high levels of fruit and vegetables. The research therefore supports the emphasis on the connection between poor future health and poor diet for these groups of consumers, and justifies public spending on these public health campaigns.

The recognition of the role of fruits and vegetables, motivation, and associated enthusiasm also indicates the continued provision of information of what fruit and vegetables positively do for particular people in particular situations. For example WANT TO consumers must recognise the role of fruits and vegetables towards their aim to be enthusiastic in consumption. HAVE TO consumers

must also identify the role of fruits and vegetables within their diet, whether they themselves recognise it or someone who is motivated on their behalf (NEED TO and MADE TO).

However, the segmentation also highlights that some fruit and vegetable consumers are passive in their consumption, that is, consume high levels without connection to particular motivations or goals. This describes the WILL DO group. It may be speculated that some of this group are in the maintenance phase of the stages of change and this has become the norm; while others in the group may have never made a change and “this is how they eat”. CAN DO consumers are willing to eat high levels of fruit and vegetables as long as they are convenient, tasty, and accessible.

A CAN DO consumer requires the development of simple management strategies. A WILL DO consumer could have been a WANT TO or HAVE TO type in a ‘maintenance’ stage (no longer in need of motivation or goals), or that they are simply “doing what they have always done”. Policy surrounding these two groups may be best focussed on education. These policies should be targeted to create a norm of high fruit and vegetable consumption that is easy to maintain, and provides tasty food that is easily accessible. This should be developed as early in life as possible. This conclusion would suggest that the recently announced Dumbleby and Vincent (LACA, 2012) review into school meals should use its far reaching powers to introduce into schools, how to successfully incorporate high levels of fruit and vegetable consumption into everyday life. For these consumer types, programmes such as Sure Start may have proved useful in the targeting of fruit and vegetables at a young age.

The results link the interest in the ‘origin’ of food with high fruit and vegetable consumption, both from interviews and as a discerning factor between high and low consumers. This indicates the importance of interest and involvement with production. This can be applied to young consumers, but also as the interviews suggested that interests can be formulated or consolidated at a variety of ages. The positive additional benefit could be seen often in connected others (family, friends etc).

It should be recognised by policy makers that some groups are vulnerable to diminishing levels of fruit and vegetable intake as a result of either falling levels of motivation or perceived increase in difficulty of consumption. For these groups, policy that is designed to support ease of high consumption levels is likely to produce positive outcomes. Policy concerned with fruit and vegetables has been aimed at increasing low consumers to high, but rarely targeted at maintaining high levels easily. Benefit may be derived from further research in this area. For some consumers, where motivations or greater ongoing support are important to continued consumption, lessons may be drawn from successful ‘weightloss’ programmes such as Slimming World.

### 8.6.2.3 *'How' high consumers achieve 5 A Day.*

The 'how' behind consumption is linked with the behaviours in enacting 'strategies' to increase fruit and vegetable levels within the diet, and 'manage' high levels of fruit and vegetable intake.

Strategies and management were found to be important for many high consumers' (both active and passive) in achieving high consumption. Identified from the factor analysis results, snacking and preplanning were prominent indicators of high consumption. Preplanning took many forms in relation to lifestyle, but incorporation of seasonality seemed important. Food preparation particularly soup for lunches, and fruit and vegetable preplanning for shopping, indicate opportune times and events that could be utilised by policy.

It has been important to identify the potential lifestyle and dietary points where consumption of fruit and vegetables are included; these reflect high consumer strategies within and across certain environments. The behaviours relate to both procurement and consumption, with environment specific factors such as 'significant others' or time availability. The thesis indicates the particular importance of the home and the workplace as environments where strategies are implemented (or could be implemented) and barriers to consumption are overcome. Common amongst consumers interviewed was the importance of shopping (as a tool and own environment).

Health Policies aimed at increasing fruit and vegetable consumption need to acknowledge that these areas provide the opportunity for low consumers to develop more robust systems for high fruit and vegetable inclusion. For example a number of consumers indicated a transformation following attitudinal acceptance of a motivation, or changing food ideology, such as reacting to health becoming important. Likewise strategies were often the result of various trade-offs between competing values. While it is important to recognise the context and complexity of individuals in a management of consumption, the policy frame requires common strategies, such as information gathering, seasonality, shopping techniques, snacking and meal based consumption.

Drawing upon the business sector, where a focus on 'success' is important, more of this thought could be utilised for the consumption field. This in part reflects earlier research into food strategies and techniques, but more can be made of this. Recognition is given in industry to developments and strategies that increase productivity and then these are identified as 'exemplars', or 'flagship stores' that other stores try to emulate in their own context. Certain dieting groups utilise 'exemplar' losers, holding certain key dieters' and their methods of achievement in high regard.

The recorded consumption demonstrates the importance of certain fruit and vegetable items and opportunities for consumption. A range of dietary preferences were expressed, with some consumers stating the importance of novelty and variety, and others a concentration in the fruit



and/or vegetables they consumed. The utilisation of composite meals was implicated in the research. Vegetables would often be the basis to a meal, or added incidentally to a recipe.

Composite Meal also featured as a derived fruit and vegetable factor, along with Traditional Meat Accompaniment, Soft-Fruits & Berries, Non-Convenient Fruits, Convenient Health Mix, Salad Accompaniment, Salad Lunch Bar, Rich High Fashion Foods, Summer Garden Fruits, Convenience Fruit, Fry-up Accompaniment and Juicy Fruit. The factors were labelled based on ways in which such fruits and vegetables are experienced. Not only can certain strategies be attached to these (recipe cards for example), but the preference and scheduling of the consumption can be illustrated. For example there is the 'Sunday Effect', versus products associated with more regular consumption across the days of the week (e.g. Juicy Fruits). They also suggest to policy makers the fruit and vegetable factor types that can be further explored, and those that are under and over utilised during the week.

As high fruit and vegetable consumers are not a homogeneous group, the thesis supports a more tailored approach in food policy. Further research should focus on identifying the approaches that best suit each group, for example those that link fruit and vegetable consumption to ongoing motivations (or require motivations to increase uptake). Similarly, in relation to the food type factors identified, those where STAPLE or NOVEL features offered by fruits and vegetables is sought.

#### *8.6.2.4 Individual factors associated with consumption of high levels of fruits and vegetables.*

The thesis aimed to identify attitude and behaviour factors that are associated with high levels of fruit and vegetable consumption. The consumer interviewee experiences were formed into a list of statements for consumers to rate their level of agreement. Of the original 130 statements, 57 of them displayed a statistically significant difference between high and low fruit and vegetable consumers. The 130 statements were reduced to 34 factors, of which 16 exhibited significant differences between high and low consumers.

The significant factors are; General Contentment and Importance, Health Conscious, Changing Diet, Fruit Importance & Enjoyment, Origin, Primary Responsibility for Food Process, Snacking, Weight Control, Exercise, Specific Health Concern, Prominence of Food Thought, Significance of Social Others, Ease of Preparation, Vegetable Prominence, Preplanning of Daily Intake and Mood. Some of the factors are derived solely from attitudes for example Mood. Influences on diet can be seen in Specific Health Concern and Weight Control. Many of the others are derived from both attitude and behaviours, such as Fruit Importance and Enjoyment and Health Conscious. Primary Responsibility for Food Process is specific to behaviour.

The variety of factors implies the need for a targeted approach, where particular factors associated with high fruit and vegetable consumption would be suited for examination by those interested in increasing consumption or for those interested in specific differences between high and low consumers. The factors are also important as a basis for further analysis from which clusters have been derived. The policy implications of this are discussed in the next section.

#### *8.6.2.5 Grouping fruit and vegetable consumers by attitudes and behaviours.*

This chapter has indicated the policy implications of approaching high fruit and vegetable consumers as a heterogeneous group. This was identified from the qualitative research and is supplemented by the quantitative research. The thesis successfully segments the survey respondents in relation to their responses towards fruit and vegetable consumption, clustering consumers by their attitudes and behaviours (based on the 34 derived factors). The thesis identified the suitability of a six cluster model; four of these are considered high, with average daily consumption of five or more portions of fruit and vegetables.

The findings reiterate that different attitudes and behaviours are important to different high consumers, but importantly these differences are integral in formulating groups of likeminded and like-acting high consumers. The clustering presents the various factors which are more and less important to particular high consumer groups, advocating a more targeted approach to the associations of high fruit and vegetable consumption. The clusters identify, like the typology above, a sense of differing enthusiasm and consciousness, as well as inherent potential vulnerability to consumption change.

It indicates that a “one size fits all” approach will not benefit every consumer. To be most effective and efficient, mass campaigns need to target consumer types that have certain relationships with consumption. It is implied from the research that traditional socio-demographic targeting may not be useful. Similarly, geographical targeting may not be effective but could work in conjunction with targeting particular consumer types, based on attitudes, behaviours and relationships with food/lifestyle types. These may cross more traditional boundaries, and perhaps the aim of reducing health inequalities based on food poverty has blurred the effectiveness of targeting.

Though the clustering is not based on a representative sample, and indeed more high consumers than low, the model identifies a greater fragmentation between high consumer segments in attitudes and behaviour toward fruit and vegetables compared with low. Of the four high clusters the highest average daily consumption of members is ‘Active Structured Happy’. The group derive

enjoyment from fruit and vegetable consumption, showing general contentment in themselves, but exercise and weight control are relatively important as is the pre-planning of consumption.

The 'Reason-Led Success' high consumers identify specific drivers as important to consumption, such as specific health concern, weight control, and health conscious. The group find snacking and preplanning important as well as an interest in food origin. Conversely, specific drivers such as weight control are not important to the 'Positive-Generally Content/Non-Specific Driver' cluster. This cluster displays a positive image of consumption, finding ease in preparing fruits and vegetables, and find fruit and vegetables generally important.

The 'Busy Persuadable' cluster holds social others important to consumption, as well as free time and work. The group identified preplanning as important and are also more price sensitive, allowing mood and self esteem to interfere with consumption. Food is prominent as thoughts, and health features both as specific concern and general health. Members of the cluster exhibit lower general happiness, with little similarity in household diet. Snacking does not seem important and fruits and vegetables are not seen as good value for money, with less ease of preparation.

The thesis has developed the clusters in line with a non-generalisable population, but the information echoes some of that from the interpretation of the earlier qualitative analysis regarding typologies. In particular, it indicates the variety in the characteristics of high consumer groups, and role of factors in the make-up of the clusters.

With reference to the typology, the segments identified highlighted vulnerability to change in different circumstance, whether change from one group to another (as with the development or loss of motivations and goals), or the vulnerability of actual consumption based on the relationship between attitudes, behaviours and consumption. For example, in the case of a more 'active' consumption group, 'Reason-Led Success'; where would such a consumer move to if they no longer were driven by a specific health motivation? Or, is a member of the 'Busy Persuadable' more at threat to a decrease in consumption (than other clusters) if interferences become problematic. The variety in attitude and behaviour is likely to suggest that different strategy (or the same strategies with different meanings) is utilised by each of the segments. Additional profiling also indicates differences between groups in consumption preferences, such as consuming shop prepared food and takeaways.

Clustering also allows a classification of groups with low average consumption, being useful for policy developers to recognise the ability to target specific groups with action that holds meaning for members. Low consumers have a larger group (82 members) named 'Non-Important/Low Priority Unmanaged', where the correct frame of mind needs to be in place for fruit and vegetable consumption, and other factors are more likely to interrupt consumption. The group seem

uninterested in preplanning consumption or linking consumption with specific reasons. The second low consumer group is much smaller in the survey population (7 members, average daily consumption of 2 portions). They seem much happier with the low amounts of fruit and vegetables they eat, with little enjoyment derived from fruit in particular. The group require being in the right mood to consume, but recognise fruit and vegetable as good Value. For this group, little importance is placed on their healthfulness in general, with low importance of specific concerns or health advice.

### ***8.2.7 To reflect upon the research process and make recommendations for future research***

This section reflects upon the research process undertaken in the thesis. The section will illustrate the academic contribution of the thesis, both in terms of research findings and the methods employed. In so doing, the section outlines recommendations for future research. There is widespread interest in the consumption behaviour surrounding fruit and vegetables as a result of the importance of the food item within the diet and what it represents towards a healthy lifestyle. The food item has also featured as part of large scale promotion and effort from public policy to increase consumption and therefore has generated a high level of academic interest. Despite this, fruit and vegetables remain under consumed across the population (i.e. substantially lower than the recommended level of 5 portions per day).

#### ***8.2.7.1 Contribution of research findings***

The thesis embraces the breadth and depth of academic interest and findings on the subject, in particular the body of knowledge concerning the determinants of fruit and vegetable consumption and influences upon food choice. The thesis acknowledges the importance of a number of reviews, with differing foci, relating to published research of fruit and vegetable consumption associations (for example, Pollard et al 2002, Kamphuis et al 2006, Shaikh et al 2008).

The research conducted applies a positive framework upon the consumption of fruits and vegetables, that is, a deliberate focus on those consumers that do eat above the recommended daily intake (as does Quan et al 2000, and Kilcast et al, 1996). Most recent research has focussed on the 'barriers' associated with low consumption. In so doing it reapplies the complexities of consumption behaviour to an underutilised group to explore the factors involved in high levels of consumption.

The research represents a novel conceptual framework applied to the area of fruit and vegetable consumption, bringing together conceptual understanding and advancing methodological usage. The use of a mixed methods approach, in line with embracing the Food Choice Process Model

framework, encourages comprehensive description. It recognises the role of change and time, as well as internal and external influences. It has provided an alternative position to explore and examine high fruit and vegetable consumption.

As was outlined in the key findings relevant to policy, a number of areas were identified as important for determinants of high fruit and vegetable consumption. These contribute to the academic understanding of such consumption. The Food Choice Process Model is supported by the research, not only in forming part of the research frame, but also the indication of the complexities involved in consumption. It was possible to illustrate a wide range of thematic factors that affected the experience of fruit and vegetables consumed, drawn from particular environments and related to past experience. Thus food trajectories, transitions, and turning points were important to current consumption (Sobal & Bisogni, 2009).

The thesis in part presents the determinants (or 'personal and environmental forces' as described by Devine et al, 1998) as 'reasons'. The research has initially identified the influences and characteristics of these influences, and subsequently categorised them as Motivation(s) (often linked with goals), Information(s), Environment(s), Trigger/Trigger Point and Strategies & Management. The thesis builds on the work of Connors et al (2001) on internal strategies, where negotiations are important in balancing and prioritising competing values in relation to consumption. The findings extend the important processes involved in the relationship between identified 'reasons'. This examines the way in which the expressed factors represent a particular 'reason', based on how it is experienced, and how the reasons interact with each other. For example the expression of the relationship between particular triggers, motivations, environments and dietary strategies.

Further research into this area could offer more detailed and thorough investigation of the identified 'reasons' with an emphasis on the relationship(s) with the concepts described by the Food Choice Process Model as food systems/ideologies and values. This could further add to our understanding of often complex interactions, but also identify additional 'reasons' or recomposed 'reasons' with a different, even generalisable, population. Such an exploration should develop particular 'reasons' associated with certain groups of high consumers. More specific groups should be targeted for further investigation, based on their relationship with certain 'reasons', such as those high consumers with children.

The thesis has identified Strategies & Management as one of the important 'reasons' incorporated into successful achievement of high level of fruits and vegetables being consumed. It contributes by emphasising links between successful strategies and particular food contexts and environments (e.g. home/work), building on Quan et al (2000). It also indicates the further importance of 'shopping' in high fruit and vegetable consumption like Crawford et al (2007).

The thesis identifies, from factor analysis, the factors of 'snacking', 'preplanning of daily intake', 'origin', 'primary responsibility for food process', 'ease of preparation', 'changing diet', 'fruit importance & enjoyment' and 'vegetable prominence' as wholly or partly related to strategy. These importantly feature as significant differentiating factors between high and low consumption. This is linked to a further important finding of the thesis, the clustered groups relating to high fruit and vegetable consumption. A number of studies have linked strategies of consumption with a particular predefined groups, for example women or particular income groups (e.g. Crawford et al, 2007). Greene et al (2004), Luszczynska et al (2007) and Baker & Wardle (2002) link particular strategies of consumption to those in particular 'stages' of behaviour change. This thesis contributes a different segmentation of fruit and vegetable consumers, identifying four high consumer groups (and two low) based on factors relating to attitudes and behaviours. Of the attitude and behaviour factors 'preplanning of daily intake', 'ease of preparation' and 'snacking' feature in the interpretation and differentiation between clusters. The clustering also indicates certain important environments and different relationships with other 'reasons', and therefore indicate the potential for other strategies to be looked at in relation to the identified groups. It would be useful to investigate potential common group strategies further.

The identification of groups of like-minded and like-acting high fruit and vegetable consumers is important. It indicates that not all high consumers are the same in relation to attitude and behaviour. Differentiating characteristics between groups are useful, as well as the factor makeup and interpretation of the cluster profiles, for example the sense of happiness with consumption, their relationships with particular and general motivations and the importance of environmental and social contexts. It is important for future research to approach the groups as they appear in a generalisable sample, to explore if such groups and other groups exist in the wider population. It is also important to examine the reaction of the clusters to the role of time. The vulnerability of the high consumption status of particular groups was noted in relation to policy, but for further research it would be possible to explore degree of movement between groups and reasons behind this. By doing so it could be questioned whether the groups are distinct, or do they relate to a sense of progress or tenets incorporated in Stages of Change behaviour theory?

#### *8.2.7.2 Usefulness of research methodology*

The research utilised a mixed method approach. "Mixing methods is an important tool for answering complex questions" (Sosulski & Lawrence, 2008 pg143). This thesis has demonstrated that it is an important tool for exploring simple questions with complex answers. The approach (complemented

by the Food Choice Process Model) has been important in linking with the size and variety of the body of knowledge, which is made up of the findings from both qualitative and quantitative means.

The mixed methods approach proved valuable for the investigation behind factors of high fruit and vegetable consumption. The research utilised a sequential process, with an overview linking qualitative findings into further quantitative exploration. In line with the practice of mixed methods research, this is diagrammatically represented, with an overview frame driving the direction of the research, but incorporating both the detail and analysis as separate but interactive layers. Thus the research design is reflexive. The design incorporated a number of points at which 'mixing' took place. In addition to literature review; the development of a food frequency questionnaire provided guidance to explorative consumer interviews, which in turn developed the hypotheses and content for consumer survey and analysis. Further 'mixing' was involved in the comparative discussion of the research findings.

The sequential process and flexibility allowed practical targeting of an underrepresented group of consumers i.e. high fruit and vegetable consumers. The interviews with health professionals and community workers helped identify the potential attached to the use of local institutions, both those linked thematically with health, and those linked with geographical position. Thus a sample could be gathered through snowballing and utilising gatekeepers. The sampling approach utilised flexibility in the way institutions and individuals were targeted, with the consumer interviews having a focus upon predominantly high consumers of fruits and vegetables. This approach was useful in that it accommodated varying degrees of relationship building.

The research approach planned a disproportionate response from high consumers during the stages. This means that the results are limited in terms of their generalisability to the population as a whole, but offer important indicators in exploration of the participants and respondents. Further investigation could develop the findings into additional research on individual aspects or test the findings in a representative population. The investigation focussed on adults, those of 18 years of age and above. It would be interesting to identify whether under 18s would offer types of consumers to be identified, and whether they are influenced by different attitudes and behaviours.

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## Appendix 1 (Expert Interviews)

### **Interview Schedule**

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The interview schedule is primarily a prompt, where predominantly open-ended questions are employed, and exploration and probing may be used upon the response of the interviewee.

#### ***Position/Role in Health or Fruit & Vegetable Consumption***

Could you tell me your position.

Could you tell me in what ways is your employment related to people's diet, health and/or fruit and vegetables.

- either as direct or indirect result of your position
- is your connection as part of employment and/or volunteer/social activity outside of employment.

Who do you work with? Do you work directly with consumers/patients?

(Where applicable) For what reason do patients/consumers see you?

#### ***'5-A-Day'***

What knowledge do you have of health/food consumption targets, in particular and for example '5-A-Day'?

- initiative/policy level
- 'message' level – how do you interpret this?

How are you aware of this?

What is the implication of the message or message itself upon you and your role?

Is the fruit and vegetable message consistent with other health messages?

#### ***Viewed/Experienced Consumption Behaviour***

In your opinion, in relation to your experience from your role, and any interaction with patient/consumer:

Do people meet the fruit and vegetable consumption target?

- which people? How many?
- which people do you make contact with? – e.g. mother, daughter, father, child, whole families etc.

\*Are there 'types' of people more likely to eat sufficient regular fruit and vegetables than others?

\*Are there any characteristics that may influence the amount of fruit and vegetables consumed by a person?

- work/employment
- time
- interests/hobbies
- location
- affordability
- choice
- personality – outlook – expectancy – esteem?

(Where applicable) For what reason do patients/consumers see you?

(Where applicable) Which people do you not make contact with- Do you think this has any bearing on the way in which you answered the above questions?

Have you noticed a 'change' in food habits (FV consumption):

- in the individual – patterns and fluctuations
- in general / aggregate
- what would you attribute this to? – significant events?

## Fruit & Vegetable Frequency Questionnaire

### Respondent Details

Respondent Number \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact Number \_\_\_\_\_

Email \_\_\_\_\_

Follow up arrangements \_\_\_\_\_

### How to complete the questions PART 1

*Most of the questions can be answered by ticking a box. For example:*

1. Fruit ( 1 fruit or medium serving)	None	Once a week	2 per week	3 per week	4 per week	5 per week	6 per week	Once per day	2 per day	3 per day	4 per day	5 per day	6+ per day
Apple (each)					√								

Please put a tick in the box ( √ ) which best describes the number of times in the last week (where yesterday was the last of the seven days) that you have eaten each food. As shown in the example above; four apples were eaten in the last week. If two apples were eaten every day (14 in total) over the seven days then a tick would be put into the '2 per day' box e.g.

1. Fruit ( 1 fruit or medium serving)	None	Once a week	2 per week	3 per week	4 per week	5 per week	6 per week	Once per day	2 per day	3 per day	4 per day	5 per day	6+ per day
Apple (each)									√				

- Put only **ONE** tick per food (line)
- Do not leave **ANY** lines blank
- Include all appropriate food from the last seven days including take-a-way and food eaten outside of the house

In sections 1 and 2 **do not** include any fruit or vegetables that were eaten as an ingredient in a larger dish.

FOODS & AMOUNTS	AVERAGE NUMBER OF TIMES EATEN IN THE LAST WEEK												
	None	Once a week	2 per week	3 per week	4 per week	5 per week	6 per week	Once per day	2 per day	3 per day	4 per day	5 per day	6+ per day
1. Fruit ( 1 fruit or medium serving)													
Apple (each)													
Pears (each)													
Oranges (each)													
Bananas (each)													
Satsumas, manderines, tangerines, kiwi fruit, plums (all 2x)													
Grapes, cherries, gooseberries, blackberries (per handful)													
Strawberries (7x)													
Raspberries, Blackcurrants, blueberries (3-4 heaped tablespoons)													
Peach, nectarine (each)													
Melon (1x 2 inch slice), mango (2x 2 inch slices), pineapple (large slice)													
Fruit salad, tinned fruit (both 3 heaped tablespoons)													
Fruit juice, fruit smoothie (small glass)													
Dried fruit, e.g. raisins, prunes, figs, dates (per small handful)													
Other fruit not mentioned													
1													
2													
3													
4													

2.Vegetables ( <i>fresh, frozen or tinned</i> )	None	Once a week	2 per week	3 per week	4 per week	5 per week	6 per week	Once per day	2 per day	3 per day	4 per day	5 per day	6+ per day
Carrots (3 heaped tablespoons)													
Onion (per medium onion), leeks (1, white portion only)													
Peas (3 heaped tablespoons)													
Cabbage (2 handfuls)													
Parsnip, turnip, swede (3 heaped tablespoons)													
Spinach, sweetcorn - or 1 cob (2 heaped tablespoons)													
Curly kale, spring greens (4 heaped tablespoons)													
Beetroot, radishes (2-3 tablespoons)													
Mushrooms (3-4 heaped tablespoons or 3 handful of slices)													
Cauliflower (8 florets)													
Broccoli (3 small florets) , asparagus (5 spears)													
Marrow, courgettes (2-3 tablespoons)													
Pepper, avocado ( 1/2 )													
Chickpeas, Lentils, Beans - kidney, black eye, broad, butter (3 heaped tablespoons)													
Lettuce, beansprouts (3 heaped tablespoons)													
Cucumber (2 inch piece), celery (3 sticks), spring onions (8 onions)													

Tomato (2 medium, or 1/2 tin), baked beans (1/2 tin)													
Mixed vegetables (3 tablespoons), mixed salad (per cereal bowl)													
Other vegetables not mentioned													
1													
2													
3													
4													

The questions in section 3 ask you to tick how often in the last seven days you have eaten a food that has fruit and/or vegetables as an ingredient in it. How often have you eaten a food that contains HIGH, MEDIUM, and LOW amounts of fruit and/or vegetables? (examples of each are shown in the question). Only include those dishes which contain fruit or/and vegetables.

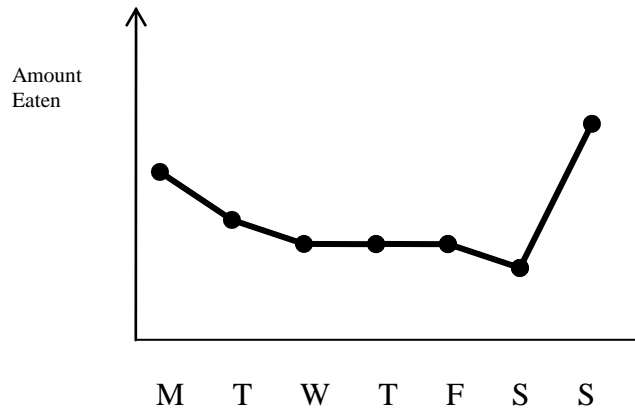
3. Fruit & Vegetables as part of a composite meal ( <i>per 3-4 tablespoons of the dish</i> )	None	Once a week	2 per week	3 per week	4 per week	5 per week	6 per week	Once per day	2 per day	3 per day	4 per day	5 per day	6+ per day
Food where there is a <b>high</b> proportion of fruits or vegetables e.g. <i>cauliflower cheese, vegetable casserole, vegetable curry, coleslaw</i>													
Food where there is a <b>medium</b> proportion of fruits or vegetable e.g. <i>meat and vegetable casserole, meat stir-fry, fruit or vegetable pies</i>													
Food where there is a <b>low</b> proportion of fruits or vegetables e.g. <i>a pizza topping, shepherds pie, Bolognese, lasagne, dried fruit in cereals (e.g. muesli)</i>													



## How to complete the questions PART 2

Question 4 asks for you to draw a line to show roughly the amount of each food type eaten on each of the past seven days.

In the example below, the amount of food eaten on Sunday is more than on Monday, the amounts eaten on Tuesday, Wednesday and Thursday are less, on Saturday roughly half the amount of the food that was eaten on Monday.

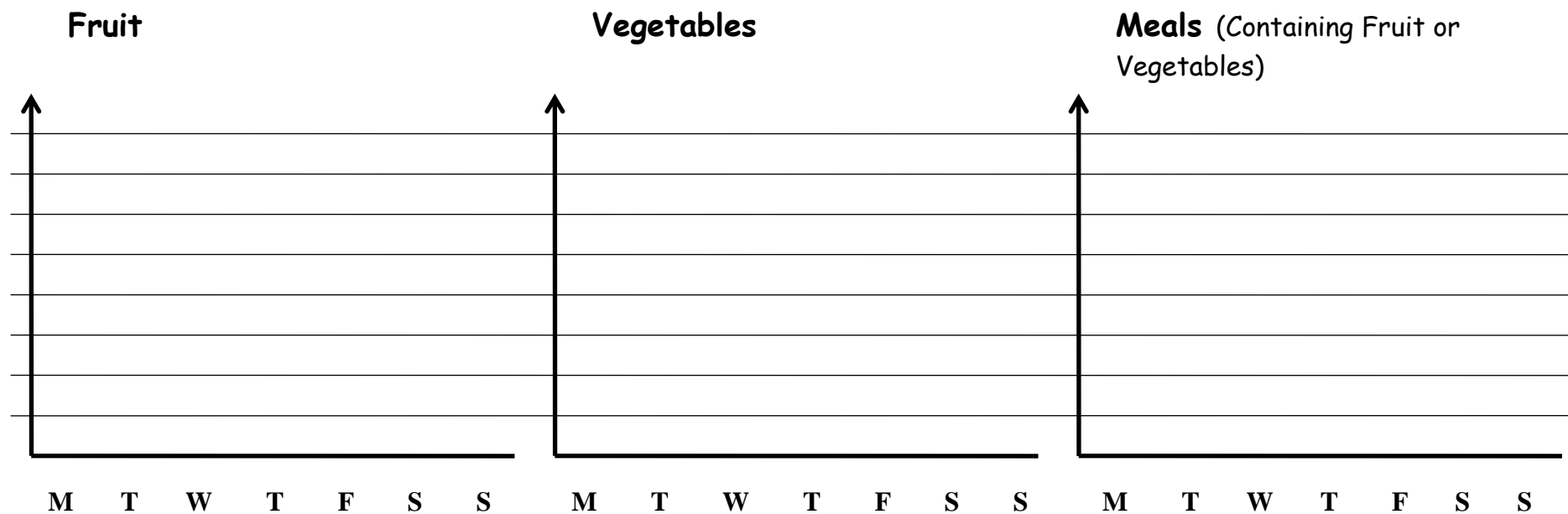


The last question asks you to tick a box for a yes or no answer

Yes      No

4. Please draw a line to show roughly the amount of the food that was eaten daily over the seven days for each of the food types.

M = Monday, T = Tuesday, W = Wednesday, T = Thursday, F = Friday, S = Saturday, S = Sunday



5. Have you had a typical, or average, seven days in the amount and way that you eat fruit and vegetables? (please tick)

Yes      No

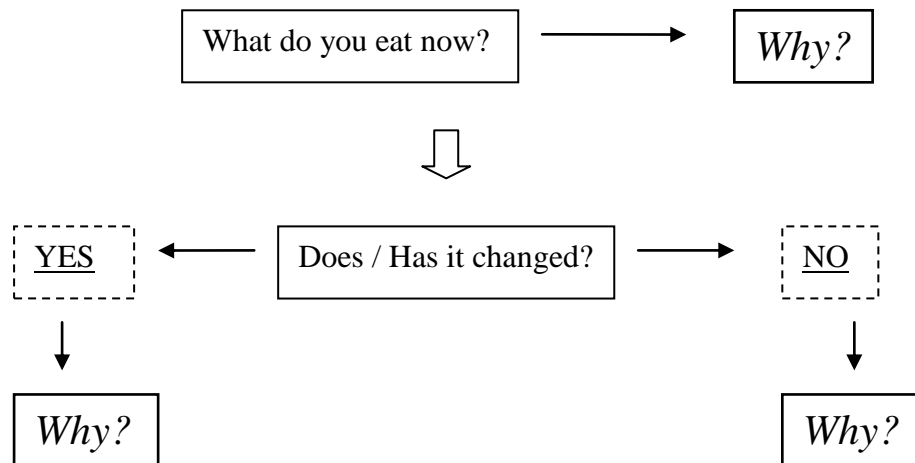
    

Thank you for taking the time to fill in this questionnaire.

### Appendix 3 (Consumer)

**Interview Schedule** (*Very Open: for exploration*) LINK to screening Questionnaire where appropriate

*Fig.1. nb In relation to Fruit and Vegetables (but linked with other food where necessary)*



#### Probe Items relating to Schedule

**Diet** - *description of the diet;*

- how is fruit / vegetables consumed.
- Amounts, patterns – when, where, different days, times, with what / alone. Ways in which fruit and veg are part or isolated in the diet.
- How is fruit and vegetable accessed.

**Hobbies / Interests / Lifestyle / Routine** (may link with how food FV is eaten or not)

**Has / does this pattern change?** (if not incorporated in current diet)

Over what time periods

Dynamics of the change: significant events / regular, fluctuating, routine / age

- associated factors

Appendix 4 (Consumer)

Interview: *Participant Additional Questions*

Name.....

Age.....

Employment Status (*including* homemaker, unemployed etc.).....

.....

Marital Status (*including* cohabitation).....

.....

People you live with.....

.....

.....

## Fruit & Vegetables Questionnaire

Hello, I would very much like to thank you for taking an interest in this questionnaire. I would be very grateful if you could spare a small amount of your time to take part in a survey.

This questionnaire has been created as part of an investigation into the fruit and vegetables that people eat and some of the reasons why they are eaten. The questionnaire can be completed by anyone over the age of 18. It does not matter how much or how little fruit or vegetables you eat or have eaten, all information is very useful for the purpose of the research.

The questions are separated into different sections. The first is about the fruit and vegetables that you have eaten recently. The second asks you to show how strongly you agree with a list of statements. The final section asks you to answer some general questions about yourself and your household.

I am interested in **your** opinions and there are no "right" or "wrong" answers.

I want to emphasise that all information you provide is protected by the Data Protection Act of 1998, is strictly confidential and you will be identified only by a code number.

Information about how and where to return the questionnaire is found on page 15.

Please fill in all the questions, according to the instructions provided. I hope that you find the questionnaire interesting and enjoyable, and thank you once again.



This study forms part of a research degree based at University of Newcastle in the School of Agriculture, Food and Rural Development.

# Fruit & Vegetables Questionnaire

## How to complete the questions in Section 1

In this section; over the last seven days (where yesterday was the last of the seven days), please write in the available box the number of portions of the indicated fruit or vegetables that you have eaten on each of the days. In the example; below 1 apple was eaten on every day except Friday, and 2 pears were eaten on Wednesday

Food & (Portion Guide)	Number of portions eaten over the last seven days						
2. Fruits ( 1 fruit or medium serving)	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Apple (each)	0 <b>1</b>	0 <b>1</b>	0 <b>1</b>	0 <b>1</b>	0	0 <b>1</b>	0 <b>1</b>
Pears (each)	0	0	0 <b>2</b>	0	0	0	0

Where you have not eaten the indicated fruit or vegetable on that day do not write a number, the '0' will show this on your behalf. All boxes left blank (except for '0') will show that none of the indicated fruit or vegetable was eaten on that day.

**What is a portion?** The size of 1 (or single) portion is stated in brackets next to the fruit or vegetable, e.g. (3 heaped tablespoons) for 'Parsnip, turnip, swede'. If a fruit or vegetable has been eaten but not in the same amount as the portion guide shows then round up the amount eaten to the nearest  $\frac{1}{2}$  (half) portion. For example; in the box below 1 heaped tablespoon of turnip was eaten on Monday, which is rounded **up** to the next half portion on the portion guide. On Sunday 1 heaped tablespoon of turnip and 1 heaped tablespoon (or equivalent size) of parsnip was eaten, each item is rounded up to half portion and together a 1 is entered into the box. Do not count very small amounts of a fruit or vegetable unless this small amount is eaten a number of times to add up to a half portion.

Food & (Portion Guide)	Number of portions eaten over the last seven days						
3. Vegetables (fresh, frozen or tinned)	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Parsnip, turnip, swede (3 heaped tablespoons)	0 $\frac{1}{2}$	0	0	0	0	0	0 <b>1</b>

Include all appropriate food from the last seven days including take-a-ways and food eaten outside of the house such as at work or at a restaurant.

In section 1 parts 2 and 3; **do not** include any fruit or vegetables that were eaten as an ingredient in a larger food dish such as vegetable soup or vegetable curry. These foods are dealt with separately in section 1 part 1. If a vegetable lasagne was eaten with lettuce at the side, the lettuce would be included in part 2, and the lasagne in part 1.

[Start of questions]

## Section 1 What fruit and vegetables have you eaten over the last seven days?

**Part 1** For each of the last seven days, please write the number of 'average' portions you have eaten fruit and vegetable dishes with HIGH, MEDIUM, and LOW amounts of fruit(s) and / or vegetable(s) in them. That is a dish where some of the ingredients are vegetable(s) or fruit(s) (examples are shown in each question, such as vegetable casserole). Only include those dishes that contain some fruit or/and vegetables.

For **Part 1** an 'average' portion of a fruit or vegetable dish is roughly the same as 4 heaped tablespoons, half a cup, one and a half serving spoons, or a large handful.

Round **up** to the nearest  $\frac{1}{2}$  portion (as shown in the instructions above) if smaller than 1 average portion is eaten of that dish.

All the days of the week have been provided. For example, if you are filling the questionnaire in on a Wednesday then 'Tuesday' (yesterday) would be the last full day, 'Monday' would be 2 days ago, 'Sunday' would be three days ago.....and 'Wednesday' would be the last of the seven previous days (7 days ago).

Part 1. Fruit & Vegetables as an ingredient in an item of food ( <i>per average portion of the dish</i> )	Number of portions eaten over the last seven days						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Food dish where there is a <b>high</b> proportion of fruits or vegetables e.g. <i>cauliflower cheese, vegetable casserole, vegetable curry, coleslaw, vegetable soup</i>	0	0	0	0	0	0	0
Food dish where there is a <b>medium</b> proportion of fruits or vegetable e.g. <i>meat and vegetable casserole, meat stir-fry, fruit or vegetable pies</i>	0	0	0	0	0	0	0
Food dish where there is a <b>low</b> proportion of fruits or vegetables e.g. <i>a pizza topping, shepherds pie, Bolognese, lasagne, dried fruit in cereals (e.g. muesli)</i>	0	0	0	0	0	0	0

In **Part 2** and **Part 3** below do not include fruit and vegetables you have eaten that have been used as an ingredient in a larger dish (as these have been counted above in Part 1). Count all other fruit and vegetables that have been eaten, for example served **with** a meal or dish, or as snacks. If there is a type of fruit or vegetable that you have eaten in the last seven days and it does not appear in either the fruit or vegetable tables then please write the name of the fruit or vegetable and write the number of portions on the correct day(s).

Food & (Portion Guide)	Number of portions eaten over the last seven days						
<b>Part 2. Fruits ( 1 fruit or medium serving)</b>	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Apple (each)	0	0	0	0	0	0	0
Pears (each)	0	0	0	0	0	0	0
Oranges (each)	0	0	0	0	0	0	0
Bananas (each)	0	0	0	0	0	0	0
Satsumas, mandarins, tangerines, kiwi fruit, plums (2 of each)	0	0	0	0	0	0	0
Grapes, cherries, gooseberries, blackberries (per handful)	0	0	0	0	0	0	0
Strawberries (per 7)	0	0	0	0	0	0	0
Raspberries, Blackcurrants, blueberries (4 heaped tablespoons)	0	0	0	0	0	0	0
Peach, nectarine (each)	0	0	0	0	0	0	0
Melon (1x 2 inch slice), mango (2x 2 inch slices), pineapple (large slice)	0	0	0	0	0	0	0
Fruit salad, tinned fruit (both 3 heaped tablespoons)	0	0	0	0	0	0	0
Fruit juice, fruit smoothie (small glass)	0	0	0	0	0	0	0
Dried fruit, e.g. raisins, prunes, figs, dates (per small handful)	0	0	0	0	0	0	0
Other fruits not mentioned							
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

Food & (Portion Guide)	Number of portions eaten over the last seven days						
<b>Part 3. Vegetables (fresh, frozen or tinned)</b>	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Carrots (3 heaped tablespoons)	0	0	0	0	0	0	0
Onion (per medium onion), leeks (1, white portion only)	0	0	0	0	0	0	0
Peas (3 heaped tablespoons)	0	0	0	0	0	0	0
Cabbage (2 handfuls)	0	0	0	0	0	0	0
Parsnip, turnip, swede (3 heaped tablespoons)	0	0	0	0	0	0	0



Food & (Portion Guide)	Number of portions eaten over the last seven days						
<b>Part 3. cont'd. Vegetables</b> ( <i>fresh, frozen or tinned</i> )	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Spinach, sweetcorn - 1 cob or (2 heaped tablespoons)	0	0	0	0	0	0	0
Curly kale, spring greens (4 heaped tablespoons)	0	0	0	0	0	0	0
Beetroot, radishes (3 tablespoons)	0	0	0	0	0	0	0
Mushrooms (4 heaped tablespoons or 3 handful of slices)	0	0	0	0	0	0	0
Cauliflower (8 florets)	0	0	0	0	0	0	0
Broccoli (3 small florets) , asparagus (5 spears)	0	0	0	0	0	0	0
Marrow, courgettes (3 tablespoons)	0	0	0	0	0	0	0
Pepper, avocado ( $\frac{1}{2}$ )	0	0	0	0	0	0	0
Chickpeas, Lentils, Beans - kidney, black eye, broad, butter (3 heaped tablespoons)	0	0	0	0	0	0	0
Lettuce, beansprouts (3 heaped tablespoons)	0	0	0	0	0	0	0
Cucumber (2 inch piece), celery (3 sticks), spring onions (8 onions)	0	0	0	0	0	0	0
Tomato (2 medium, or $\frac{1}{2}$ tin), baked beans ( $\frac{1}{2}$ 400g tin)	0	0	0	0	0	0	0
Mixed vegetables (3 tablespoons), mixed salad (per cereal bowl)	0	0	0	0	0	0	0
Other vegetables not mentioned							
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

[More questions on next page]

## Section 2 How far do you agree with these statements?

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column; from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
I eat <i>fruit</i> as a meal or as part of a meal							
I eat <i>vegetables</i> as a meal or as part of a meal							
I eat <i>fruit</i> as a snack							
I eat <i>vegetables</i> as a snack							
I eat <i>fruit</i> rather than sweets, crisps or chocolate							
I eat <i>vegetables</i> rather than sweets, crisps or chocolate							
I would prefer to eat <i>fruit</i> or <i>vegetables</i> as a snack rather than crisps or sweets/chocolate							
I like to try <i>fruit</i> and <i>vegetables</i> that I am not used to							
I am happy with the <u>amount</u> of <i>fruit</i> that I eat							
I am happy with the <u>amount</u> of <i>vegetables</i> that I eat							
I am happy with the <u>variety</u> of <i>fruit</i> I eat							
I am happy with the <u>variety</u> of <i>vegetables</i> I eat							
I am happy about the food I eat							
<i>Fruit</i> is important to my diet							
<i>Vegetables</i> are important to my diet							
I enjoy eating <i>fruit</i>							
I enjoy eating <i>vegetables</i>							
Food is important to my daily life							
I am always thinking about food							

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column; from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
I look forward to meal times							
I eat with a person / or people (other than those who live within the house) regularly							
Other people (other than those I live with) have an affect on the food I eat							
The <u>amount</u> of <i>fruit</i> I eat is affected by me alone							
The <u>amount</u> of <i>vegetables</i> I eat is affected by me alone							
I am responsible for the preparation, and cooking of the food within the household.							
I decide what is eaten and bought to eat within the household							
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by a specific health concern							
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by a specific health concern							
I eat the <u>amount</u> of <i>fruit</i> I do for general health well-being							
I eat the <u>amount</u> of <i>vegetables</i> I do for general health well-being							
I eat the <u>amount</u> of <i>fruit</i> I do as part of reducing or controlling my weight							
I eat the <u>amount</u> of <i>vegetables</i> I do as part of reducing or controlling my weight							
I exercise regularly							
I exercise regularly for health reasons							
I exercise regularly to lose or control my weight							
I compete in sport regularly							
The food I eat is affected by competing in sport							
The <u>amount</u> of <i>fruit</i> I eat is affected by playing or competing in sport							

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column; from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
The <u>amount</u> of <i>vegetables</i> I eat is affected by playing or competing in sport							
I play a part in growing or collecting some of the <i>fruit</i> and <i>vegetables</i> I eat							
I am interested in where the <i>fruit</i> & <i>vegetables</i> I eat come from & how they are grown							
Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>amount</u> I eat							
Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>type</u> I eat							
The food I eat or cook is usually processed when bought (e.g. from a packet, ready meal)							
<i>Fruit</i> is easy to prepare and use							
<i>Vegetables</i> are easy to prepare and use							
The amount of free time I have affects the <u>amount</u> of fruit I eat							
The amount of free time I have affects the <u>amount</u> of <i>vegetables</i> I eat							
The possible waste of <i>vegetables</i> affects the <u>amount</u> bought (from preparation, and food thrown out not eaten)							
The possible waste of <i>fruit</i> affects the <u>amount</u> bought (from preparation and from having to throw out food)							
The possible waste of <i>fruit</i> affects the <u>type</u> bought (from preparation and from having to throw out food)							
The possible waste of <i>vegetables</i> affects the <u>type</u> bought (from preparation and from having to throw out food)							
The <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste							
The <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste							
I have a varied diet							
I plan the <u>amount</u> of <i>fruit</i> I eat during the day							
I plan the <u>amount</u> of <i>vegetables</i> I eat during the day							

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column; from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
I eat the same <i>fruit</i> in the same amounts every week							
I eat the same <i>vegetables</i> in the same amounts every week							
The season affects the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat							
The season affects the <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat							
I am responsible for doing the food shopping							
The food for the household is bought with a plan of what meals are to be made and what will be eaten before the next shopping trip							
I eat meals at the same time each day							
I generally eat the same food(s) every day							
The <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is different on a Saturday & Sunday to the rest of the week							
The <u>amount</u> of <i>fruit</i> I eat is affected by what I am doing on that day							
The <u>amount</u> of <i>vegetables</i> I eat is affected by what I am doing on that day							
Health advice/promotion/information affects the food I eat							
Health advice/promotion/information affects the <u>amount</u> of <i>fruit</i> I eat							
Health advice/promotion/information affects the <u>amount</u> of <i>vegetables</i> I eat							
I listen and act on health advice/promotion/information in other general areas such as smoking or exercise							
The only time I will eat <i>fruit</i> is when I fancy them							
The only time I will eat <i>vegetables</i> is when I fancy them							
The only time I will eat <i>fruit</i> is when I can be bothered							

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column; from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
The only time I will eat <i>vegetables</i> is when I can be bothered							
<i>Fruit</i> is an important part of my food shopping budget							
<i>Vegetables</i> are important part of my food shopping budget							
The price of <i>fruit</i> affects the <u>amount</u> of <i>fruit</i> I eat							
The price of <i>vegetables</i> affects the <u>amount</u> of <i>vegetables</i> I eat							
The price of <i>fruit</i> affects the <u>type</u> of <i>fruit</i> I eat							
The price of <i>vegetables</i> affects the <u>type</u> of <i>vegetables</i> I eat							
<i>Fruit</i> is cheap to buy							
<i>Vegetables</i> are cheap to buy							
<i>Fruit</i> is good value for money							
<i>Vegetables</i> are good value for money							
I have always eaten lots of <i>fruit</i>							
I have always eaten lots of <i>vegetables</i>							
I have good self esteem (feel good about myself generally)							
The way that I feel about myself affects the food I eat							
The way I feel about myself affects the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat							
I would like to eat out at restaurants more than I do							
I would like to eat takeaway food more than I do							
Restaurant and takeaway food is different to that which I eat/make at home							

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column from 'Strongly Disagree' to 'Strongly Agree'.

Please tick only 1 box for each statement.

Please answer all statements.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
My diet is different when I am on holiday							
When on holiday the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different							
When on holiday the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different							
The <u>amount</u> of <i>fruit</i> I eat has changed over my adult life							
The <u>amount</u> of <i>vegetables</i> I eat has changed over my adult life							
The <u>type</u> of <i>fruit</i> I eat has changed over my adult life							
The <u>type</u> of <i>vegetables</i> I eat has changed over my adult life							
I have deliberately changed the food I eat							
I have deliberately changed the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat							

The statements continue on the following page.

An extra 'Does not Apply to me' column has been added on the right hand side. The 'Does not Apply to me' box should be ticked where the statement does not fit your situation. For example where the statement mentions 'your children' and you do not have any children, or another example might be where a statement refers to 'everyone in the house' and you live by yourself.

As above, for each of the statements please indicate the extent to your agreement or disagreement by placing a tick into the appropriate column from 'Strongly Disagree' to 'Strongly Agree'.

In the section below 'spouse and partner' also includes those that you would consider boyfriend or girlfriend whether you live with them or not.

For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column from 'Strongly Disagree' to 'Strongly Agree'. Please tick the 'Does not Apply to me' box where the statement does not fit your situation. Please tick only 1 box for each statement.

Please answer all statements.

In this section 'spouse and partner' also includes those that you would consider boyfriend or girlfriend whether you live with them or not.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree	Does not Apply to me
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different to when I lived with parents/guardians								
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different to when I lived with parents/guardians								
My diet is different to that when I lived at home with parents/guardians								
My eating patterns (type, amounts, regularity of food) are different when I am at work to when I am not at work								
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by being at work								
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by being at work								
The <u>amount</u> and <u>type</u> of <i>fruit &amp; vegetables</i> I eat is affected by how available they are at work								
I generally bring food from home to eat while at work								
I eat <i>fruit</i> at work								
I eat <i>vegetables</i> at work								
My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat								
My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat								
My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat								
The <u>amount</u> of <i>fruit</i> I eat is affected by my spouse's or partner's <b>eating habits</b> .								
The <u>type</u> of <i>fruit</i> I eat is affected by my spouse's or partner's <b>eating habits</b> .								
The <u>amount</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's <b>eating habits</b>								
The <u>type</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's <b>eating habits</b>								
My spouse or partner affects the <u>amount</u> of <i>fruit</i> I eat								
My spouse or partner affects the <u>type</u> of <i>fruit</i> I eat								



For each of the statements below, please indicate the extent of your agreement or disagreement by placing a tick in the appropriate column from 'Strongly Disagree' to 'Strongly Agree'. Please tick the 'Does not Apply to me' box where the statement does not fit your situation. Please tick only 1 box for each statement.

Please answer all statements.

In this section 'spouse and partner' also includes those that you would consider boyfriend or girlfriend whether you live with them or not.

Statement	Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree	Does not Apply to me
My spouse or partner affects the <u>amount</u> of <i>vegetables</i> I eat								
My spouse or partner affects the <u>type</u> of <i>vegetables</i> I eat								
Everyone in the house eats similar <u>amounts</u> of vegetables								
Everyone in the house eats similar <u>types</u> of vegetables								
Everyone in the house eats similar <u>types</u> of <i>fruit</i>								
Everyone in the house eats the same foods generally								
The foods I eat are affected by those that I live with								
Everyone in the house eats similar <u>amounts</u> of <i>fruit</i>								

### Section 3 How often do you eat food prepared outside of the house?

On average how often do you eat out at restaurants, pubs or cafes (please tick one box only):

- 3 or more times a week.....
- Twice a week.....
- Once a week.....
- Once a fortnight.....
- Once a month.....
- Once every two months .....
- Almost never.....

On average how often do you eat hot food from takeaways, such as pizzas, curries or chips (please tick one box only):

- 3 or more times a week.....
- Twice a week.....
- Once a week.....
- Once a fortnight.....
- Once a month.....
- Once every two months .....
- Almost never.....

[More questions on next page]

### Section 3 (cont.)

On average how often do you have a meal that has been prepared at a shop, for example sandwiches, pasties, or pies (please tick one box only):

- 3 or more times a week.....
- Twice a week.....
- Once a week.....
- Once a fortnight.....
- Once a month.....
- Once every two months .....
- Almost never.....

### Section 4 Some general questions about you and your household

Qu1 I am (please tick):    Male.....            Female.....

Qu2 In years, what is your age? \_\_\_\_\_

Qu3 Who of the following do you live with (Please tick as many as fits your situation)?:

- I live alone.....
- Partner / Spouse / Boyfriend / Girlfriend...
- Children (under 18 years old).....            How many (please write)?\_\_\_\_\_
- Dependent relative(s) (over 18yo).....            How many (please write)?\_\_\_\_\_
- Independent relative(s) (over 18yo).....            How many (please write)?\_\_\_\_\_
- I share a house/flat with other  
non-relative (e.g. flat mate).....

Qu4 What is your main occupation (including homemaker, unemployed, retired)?\_\_\_\_\_

---

Qu5 What are the hours of your main job (please tick one)?:

- Full Time.....
- Part Time.....

Qu6 How are these hours arranged (please write the pattern of your working hours, for example Monday-Friday 9am to 5pm, or the type of shift pattern you work)\_\_\_\_\_

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Qu7 If different from the question above, please write the pattern of hours worked during the seven days you used to answer Section 1 (including if you were on holiday at any time)

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Qu8 Do you have an additional part-time job (please tick one box only)    Yes.....    No.....

**Section 4 (cont.)**

Qu9 What is the occupation of your partner/spouse (including homemaker, unemployed, retired)? \_\_\_\_\_  
\_\_\_\_\_

Qu10 How are your partner's / spouse's hours arranged (please write the pattern of working hours, for example Monday-Friday 9am to 5pm, or the type of shift pattern they work) \_\_\_\_\_  
\_\_\_\_\_

Qu11 What is your Postcode (please write)? \_\_\_\_\_

Qu12 Do any of the following apply to your situation (please tick as many as fits you situation)?;

I am vegetarian.....

My spouse / partner / boyfriend / girlfriend is vegetarian.....

Someone else in my household is vegetarian.....

[End of questions]

**Please make sure that all questions have been completed as the instructions indicate.**

I would like to thank you for taking the time to complete the above questions and taking part in the survey. I want to emphasise that all information you have provided is protected by the Data Protection Act of 1998, is strictly confidential and you will be identified only by a code number.

Please return the completed questionnaire to either the designated collection area if one has been shown to you or by post if a stamped address envelope has been provided.

If you have been given a stamped addressed envelope but it has been lost please could you write out the address below on another envelope and please send second class delivery or for further information please contact Mr. Watson on 07971390510.

POSTAL ADDRESS: Fruit & Veg Questionnaire  
Centre for Rural Economy (CRE)  
Agriculture Building  
University of Newcastle  
Newcastle upon Tyne  
NE1 7RU

**Be entered to WIN a £20 HMV Voucher by completing and returning this questionnaire.** This slip of paper has a code number on it; the number matches a number on the 'Fruit and Vegetables Questionnaire'. To enter please complete and return the questionnaire, keeping hold of this slip. The winner of the voucher will be drawn from the returned complete questionnaires from Northumberland College respondents, and the winning number made available for the prize to be collected at the College. Only one questionnaire to be completed per person, this slip must be presented to collect the prize.

**Be entered to WIN £20 of Vouchers by completing and returning this questionnaire (£10 Fruit & Veg Vouchers, £10 Woolworth's Voucher).** This slip of paper has a code number on it; the number matches a number on the 'Fruit and Vegetables Questionnaire'. To enter please complete and return the questionnaire, keeping hold of this slip. The winner of the voucher will be drawn from the returned complete questionnaires from Ashington Children's Centre respondents, and the winning number made available for the prize to be collected at the Centre. Only one questionnaire to be completed per person, this slip must be presented to collect the prize.

**Be entered to WIN £20 of Vouchers by completing and returning this questionnaire.** The voucher prize will be discussed with the winner of the draw to what they might enjoy or find useful. This slip of paper has a code number on it; the number matches a number on the 'Fruit and Vegetables Questionnaire'. To enter please complete and return the questionnaire, keeping hold of this slip. The winner of the prize will be drawn from the returned complete questionnaires from Hirst Welfare Centre respondents, and the winning number made available for the prize to be collected at the Centre. Only one questionnaire to be completed per person, this slip must be presented to collect the prize.

**Be entered to WIN £5 of Vouchers by completing and returning this questionnaire.** The vouchers can be used at VideoWorld rental, café, or stand 'n' tan. This slip of paper has a code number on it; the number matches a number on the 'Fruit and Vegetables Questionnaire'. To enter please complete and return the questionnaire, keeping hold of this slip. The winner of the prize will be drawn from the returned complete questionnaires from VideoWorld respondents, and the winning number made available for the prize to be collected at the Centre. Only one questionnaire to be completed per person, this slip must be presented to collect the prize.

**Be entered to WIN a £10 Voucher, redeemable at the gym, by completing and returning this questionnaire.** This slip of paper has a code number on it; the number matches a number on the 'Fruit and Vegetables Questionnaire'. To enter please complete and return the questionnaire, keeping hold of this slip. The winner of the prize will be drawn from the returned complete questionnaires from the ladies' gym respondents, and the winning number made available for the prize to be collected at the gym. Only one questionnaire to be completed per person, this slip must be presented to collect the prize.

## Appendix 7 Screening Food Frequency Questionnaire Results

The screening food frequency questionnaire refers to 4.2.2b of the model presented in Figure 4.2. As discussed in the methodological chapter it was utilised to identify whether an individual consumer achieved five portions per day, and could be as such categorised as a high consumer for the purpose of this study. It also provided information about the individual's diet of fruits and vegetables, such as evenness of consumption over the week and preferences for types of fruit and vegetables that could inform the interviews. At an aggregated level, there are noteworthy results.

Table Appendix 7 Fruit, Vegetable and Composite Consumption

	Fruit	Vegetable	Composite	Total
Weekly Portions	1293	1514	157	2964
Percentage	43.62	51.08	5.30	100.00
Individual Daily Portions	3.85	4.51	0.47	8.82

The method deliberately sought those of high consumption, and certainly higher than normal levels of fruit and vegetable consumption. As such the institutions that were investigated presented a number of people who achieved this. These consumers were also more enthusiastic in many cases to participate within the research because it was something that they were actively involved in, enthusiastic about achieving, and quite often enthusiastic about having achieved.

The results of 48 usable questionnaires are presented. Importantly the method identified the existence of a group of high consumers, with an average daily consumption of 8.82 portions (with a standard deviation of approximately four portions). Of the consumers question 40 had a daily of five or more. The information shows a general preference for vegetable consumption, though fruit and vegetables are not too dissimilar in their consumption rates and similar standard deviations. Composite meals where fruit and vegetables are in evidence feature relatively little in contribution to the daily portions consumed. Although apples, oranges, bananas and fruit juice feature quite strongly for fruit, and broccoli and tomatoes/baked beans for vegetables are popular the patterns of consumption show a variety of types consumed.

Limited demographic data was available for analysis. However, there were more women than men who responded (thirty-one and seventeen respectively). Women consumed an average of 9.75 portions daily, whereas men consumed less at 7.13 portions, but both higher than 5 portions. Though low in number this offers a significant difference between the two groups.

**Appendix 8 High & Low Consumption of Fruit and Vegetable Types**

Type		Monday	%	Tuesday	%	Wednes	%	Thursday	%	Friday	%	Saturday	%	Sunday	%	Weekly	%
<b>high</b>	<b>(T)otal</b>	<b>160</b>		<b>148.5</b>		<b>149</b>		<b>142</b>		<b>118</b>		<b>124.5</b>		<b>210</b>		<b>1052</b>	
	(L)ow	18	11.25	15.5	10.44	15	10.07	21.5	15.14	8	6.78	8	6.43	31	14.76	117	11.12
	(H)igh	142	88.75	133	89.56	134	89.93	120.5	84.86	110	93.22	116.5	93.57	179	85.24	935	88.88
<b>med</b>	<b>T</b>	<b>42.5</b>		<b>44.25</b>		<b>50.5</b>		<b>53</b>		<b>50.75</b>		<b>44.25</b>		<b>49.25</b>		<b>334.5</b>	
	L	8.5	20.00	9.5	21.47	11	21.78	10.25	19.34	8	15.76	8.25	18.64	10.25	20.81	65.75	19.66
	H	34	80.00	34.75	78.53	39.5	78.22	42.75	80.66	42.75	84.24	36	81.36	39	79.19	268.75	80.34
<b>low</b>	<b>T</b>	<b>34.67</b>		<b>35.83</b>		<b>34.34</b>		<b>33.83</b>		<b>32</b>		<b>34.5</b>		<b>27.17</b>		<b>232.34</b>	
	L	9.67	27.89	8.83	24.64	7.17	20.88	8.5	25.13	7.33	22.91	7.5	21.74	6.17	22.71	55.17	23.75
	H	25	72.11	27	75.36	27.17	79.12	25.33	74.87	24.67	77.09	27	78.26	21	77.29	177.17	76.25
<b>ap</b>	<b>T</b>	<b>107.5</b>		<b>88.5</b>		<b>92</b>		<b>86.5</b>		<b>80.5</b>		<b>58.5</b>		<b>47.5</b>		<b>561</b>	
	L	19.5	18.14	20.5	23.16	24	26.09	17.5	20.23	13	16.15	5	8.55	6	12.63	105.5	18.81
	H	88	81.86	68	76.84	68	73.91	69	79.77	67.5	83.85	53.5	91.45	41.5	87.37	455.5	81.19
<b>pear</b>	<b>T</b>	<b>29</b>		<b>30</b>		<b>36</b>		<b>34</b>		<b>31</b>		<b>28</b>		<b>33</b>		<b>221</b>	
	L	7	24.14	7	23.33	7	19.44	7	20.59	8	25.81	8	28.57	5	15.15	49	22.17
	H	22	75.86	23	76.67	29	80.56	27	79.41	23	74.19	20	71.43	28	84.85	172	77.83
<b>ornge</b>	<b>T</b>	<b>45.5</b>		<b>45.5</b>		<b>38.5</b>		<b>44.5</b>		<b>35</b>		<b>35.5</b>		<b>31.5</b>		<b>276</b>	
	L	6	13.19	7	15.38	6	15.58	5	11.24	4	11.43	0	0.00	3	9.52	31	11.23
	H	39.5	86.81	38.5	84.62	32.5	84.42	39.5	88.76	31	88.57	35.5	100.00	28.5	90.48	245	88.77
<b>ban</b>	<b>T</b>	<b>119.5</b>		<b>104.5</b>		<b>114</b>		<b>119</b>		<b>106.5</b>		<b>84.5</b>		<b>74</b>		<b>722</b>	
	L	26.5	22.18	22.5	21.53	29.5	25.88	29.5	24.79	29.5	27.70	12.5	14.79	13	17.57	163	22.58
	H	93	77.82	82	78.47	84.5	74.12	89.5	75.21	77	72.30	72	85.21	61	82.43	559	77.42
<b>sats</b>	<b>T</b>	<b>38</b>		<b>54</b>		<b>43.5</b>		<b>43.5</b>		<b>36</b>		<b>43.5</b>		<b>31</b>		<b>289.5</b>	
	L	6.5	17.11	13	24.07	9.5	21.84	4	9.20	2.5	6.94	5	11.49	1.5	4.84	42	14.51
	H	31.5	82.89	41	75.93	34	78.16	39.5	90.80	33.5	93.06	38.5	88.51	29.5	95.16	247.5	85.49
<b>grpe</b>	<b>T</b>	<b>74.5</b>		<b>81.5</b>		<b>76</b>		<b>62.5</b>		<b>52</b>		<b>73.5</b>		<b>63</b>		<b>483</b>	
	L	5	6.71	11	13.50	12.5	16.45	6.5	10.40	7	13.46	7.5	10.20	6	9.52	55.5	11.49
	H	69.5	93.29	70.5	86.50	63.5	83.55	56	89.60	45	86.54	66	89.80	57	90.48	427.5	88.51
<b>straw</b>	<b>T</b>	<b>47.5</b>		<b>51.5</b>		<b>40.5</b>		<b>43</b>		<b>35.5</b>		<b>46.5</b>		<b>55.5</b>		<b>320</b>	
	L	10	21.05	5	9.71	6	14.81	9.5	22.09	6	16.90	3	6.45	10	18.02	49.5	15.47
	H	37.5	78.95	46.5	90.29	34.5	85.19	33.5	77.91	29.5	83.10	43.5	93.55	45.5	81.98	270.5	84.53
<b>rasp</b>	<b>T</b>	<b>27.5</b>		<b>21.5</b>		<b>23</b>		<b>20</b>		<b>18</b>		<b>18</b>		<b>22</b>		<b>150</b>	
	L	1	3.64	3.5	16.28	2	8.70	1	5.00	1	5.56	1	5.56	1	4.55	10.5	7.00
	H	26.5	96.36	18	83.72	21	91.30	19	95.00	17	94.44	17	94.44	21	95.45	139.5	93.00
<b>peach</b>	<b>T</b>	<b>18</b>		<b>21</b>		<b>14</b>		<b>16</b>		<b>16</b>		<b>15</b>		<b>13</b>		<b>113</b>	
	L	7	38.89	4	19.05	4	28.57	5	31.25	3	18.75	3	20.00	3	23.08	29	25.66
	H	11	61.11	17	80.95	10	71.43	11	68.75	13	81.25	12	80.00	10	76.92	84	74.34

<b>meIn</b>	<b>T</b>	<b>35</b>		<b>37</b>		<b>38</b>		<b>33.5</b>		<b>37</b>		<b>30</b>		<b>35</b>		<b>245.5</b>	
	L	5.5	15.71	7	18.92	3	7.89	2	5.97	5	13.51	4.5	15.00	8	22.86	35	14.26
	H	29.5	84.29	30	81.08	35	92.11	31.5	94.03	32	86.49	25.5	85.00	27	77.14	210.5	85.74
<b>frSid</b>	<b>T</b>	<b>12.5</b>		<b>11.5</b>		<b>15.5</b>		<b>10.5</b>		<b>10</b>		<b>3</b>		<b>12</b>		<b>75</b>	
	L	3.5	28.00	2.5	21.74	5.5	35.48	2.5	23.81	2	20.00	0	0.00	1	8.33	17	22.67
	H	9	72.00	9	78.26	10	64.52	8	76.19	8	80.00	3	100.00	11	91.67	58	77.33
<b>FJ</b>	<b>T</b>	<b>100.5</b>		<b>103</b>		<b>102</b>		<b>97</b>		<b>96</b>		<b>103</b>		<b>104</b>		<b>705.5</b>	
	L	23	22.89	23	22.33	19	18.63	17	17.53	18	18.75	17	16.50	16	15.38	133	18.85
	H	77.5	77.11	80	77.67	83	81.37	80	82.47	78	81.25	86	83.50	88	84.62	572.5	81.15
<b>Dried</b>	<b>T</b>	<b>34.5</b>		<b>34.5</b>		<b>39.5</b>		<b>40.5</b>		<b>36.5</b>		<b>35</b>		<b>36.5</b>		<b>257</b>	
	L	6.5	18.84	8.5	24.64	7.5	18.99	8.5	20.99	8.5	23.29	4	11.43	3	8.22	46.5	18.09
	H	28	81.16	26	75.36	32	81.01	32	79.01	28	76.71	31	88.57	33.5	91.78	210.5	81.91
<b>OthF</b>	<b>T</b>	<b>12</b>		<b>8</b>		<b>9.5</b>		<b>5.5</b>		<b>8.5</b>		<b>9.5</b>		<b>9</b>		<b>62</b>	
	L	2	16.67	0	0.00	2.5	26.32	0.5	9.09	2.5	29.41	2.5	26.32	2	22.22	12	19.35
	H	10	83.33	8	100.00	7	73.68	5	90.91	6	70.59	7	73.68	7	77.78	50	80.65
<b>Car</b>	<b>T</b>	<b>80</b>		<b>73</b>		<b>55.5</b>		<b>67</b>		<b>45</b>		<b>46</b>		<b>146</b>		<b>512.5</b>	
	L	14.5	18.13	18.5	25.34	11	19.82	14	20.90	8	17.78	9	19.57	44	30.14	119	23.22
	H	65.5	81.88	54.5	74.66	44.5	80.18	53	79.10	37	82.22	37	80.43	102	69.86	393.5	76.78
<b>Onions</b>	<b>T</b>	<b>61</b>		<b>63</b>		<b>55</b>		<b>57.5</b>		<b>40.5</b>		<b>44</b>		<b>43</b>		<b>364</b>	
	L	9.5	15.57	11	17.46	8.5	15.45	9	15.65	7.5	18.52	8.5	19.32	5	11.63	59	16.21
	H	51.5	84.43	52	82.54	46.5	84.55	48.5	84.35	33	81.48	35.5	80.68	38	88.37	305	83.79
<b>Peas</b>	<b>T</b>	<b>51</b>		<b>64.5</b>		<b>51.5</b>		<b>47</b>		<b>36.5</b>		<b>47</b>		<b>107</b>		<b>404.5</b>	
	L	9.5	18.63	19	29.46	11	21.36	10.5	22.34	8.5	23.29	8.5	18.09	29.5	27.57	96.5	23.86
	H	41.5	81.37	45.5	70.54	40.5	78.64	36.5	77.66	28	76.71	38.5	81.91	77.5	72.43	308	76.14
<b>Cabge</b>	<b>T</b>	<b>23</b>		<b>25</b>		<b>16.5</b>		<b>18</b>		<b>7.5</b>		<b>14.5</b>		<b>94.5</b>		<b>199</b>	
	L	1	4.35	7	28.00	2.5	15.15	2.5	13.89	2	26.67	2.5	17.24	23	24.34	40.5	20.35
	H	22	95.65	18	72.00	14	84.85	15.5	86.11	5.5	73.33	12	82.76	71.5	75.66	158.5	79.65
<b>Prsnp</b>	<b>T</b>	<b>32.5</b>		<b>29</b>		<b>23.5</b>		<b>23.5</b>		<b>15.5</b>		<b>26</b>		<b>122.5</b>		<b>272.5</b>	
	L	10	30.77	9	31.03	5.5	23.40	5.5	23.40	3.5	22.58	4.5	17.31	32	26.12	70	25.69
	H	22.5	69.23	20	68.97	18	76.60	18	76.60	12	77.42	21.5	82.69	90.5	73.88	202.5	74.31
<b>Spnch</b>	<b>T</b>	<b>14</b>		<b>32.5</b>		<b>20</b>		<b>25.5</b>		<b>12.5</b>		<b>17.5</b>		<b>25.5</b>		<b>147.5</b>	
	L	0	0.00	9.5	29.23	2	10.00	3	11.76	2.5	20.00	5	28.57	5	19.61	27	18.31
	H	14	100.00	23	70.77	18	90.00	22.5	88.24	10	80.00	12.5	71.43	20.5	80.39	120.5	81.69
<b>Ckale</b>	<b>T</b>	<b>8.5</b>		<b>3</b>		<b>6.5</b>		<b>6.5</b>		<b>1</b>		<b>3</b>		<b>15</b>		<b>43.5</b>	
	L	1.5	17.65	0	0.00	1	15.38	0	0.00	0	0.00	0	0.00	4	26.67	6.5	14.94
	H	7	82.35	3	100.00	5.5	84.62	6.5	100.00	1	100.00	3	100.00	11	73.33	37	85.06

<b>Beet</b>	<b>T</b>	<b>33.5</b>		<b>36</b>		<b>19</b>		<b>16</b>		<b>22</b>		<b>26</b>		<b>11</b>		<b>163.5</b>	
	L	7.5	22.39	8	22.22	2	10.53	2	12.50	2	9.09	4	15.38	0	0.00	25.5	15.60
	H	26	77.61	28	77.78	17	89.47	14	87.50	20	90.91	22	84.62	11	100.00	138	84.40
<b>Mush</b>	<b>T</b>	<b>41.5</b>		<b>36</b>		<b>46</b>		<b>46</b>		<b>34.5</b>		<b>43.5</b>		<b>25.5</b>		<b>273</b>	
	L	10	24.10	8	22.22	4	8.70	10.5	22.83	9	26.09	9	20.69	7.5	29.41	58	21.25
	H	31.5	75.90	28	77.78	42	91.30	35.5	77.17	25.5	73.91	34.5	79.31	18	70.59	215	78.75
<b>Cauli</b>	<b>T</b>	<b>27.5</b>		<b>25.5</b>		<b>28.5</b>		<b>21</b>		<b>10</b>		<b>12.5</b>		<b>83</b>		<b>208</b>	
	L	4.5	16.36	4.5	17.65	10	35.09	5	23.81	1	10.00	4	32.00	25	30.12	54	25.96
	H	23	83.64	21	82.35	18.5	64.91	16	76.19	9	90.00	8.5	68.00	58	69.88	154	74.04
<b>Broc</b>	<b>T</b>	<b>37.5</b>		<b>25.5</b>		<b>33</b>		<b>31</b>		<b>22</b>		<b>20</b>		<b>83.8</b>		<b>252.8</b>	
	L	10	26.67	8	31.37	6.5	19.70	7.5	24.19	3	13.64	5	25.00	25	29.83	65	25.71
	H	27.5	73.33	17.5	68.63	26.5	80.30	23.5	75.81	19	86.36	15	75.00	58.8	70.17	187.8	74.29
<b>Marr</b>	<b>T</b>	<b>3.5</b>		<b>0.5</b>		<b>5.5</b>		<b>5</b>		<b>3.5</b>		<b>4</b>		<b>6</b>		<b>28</b>	
	L	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	16.67	1	3.57
	H	3.5	100.00	0.5	100.00	5.5	100.00	5	100.00	3.5	100.00	4	100.00	5	83.33	27	96.43
<b>Pepper</b>	<b>T</b>	<b>29</b>		<b>28</b>		<b>34</b>		<b>27</b>		<b>21</b>		<b>23</b>		<b>9.5</b>		<b>171.5</b>	
	L	3	10.34	4.5	16.07	4	11.76	2	7.41	3.5	16.67	2	8.70	1	10.53	20	11.66
	H	26	89.66	23.5	83.93	30	88.24	25	92.59	17.5	83.33	21	91.30	8.5	89.47	151.5	88.34
<b>ChickP</b>	<b>T</b>	<b>23</b>		<b>16.5</b>		<b>14</b>		<b>10</b>		<b>17.5</b>		<b>12</b>		<b>7</b>		<b>100</b>	
	L	4	17.39	3	18.18	2	14.29	3	30.00	3	17.14	1	8.33	1	14.29	17	17.00
	H	19	82.61	13.5	81.82	12	85.71	7	70.00	14.5	82.86	11	91.67	6	85.71	83	83.00
<b>Lettuce</b>	<b>T</b>	<b>64</b>		<b>51.5</b>		<b>59.5</b>		<b>43.5</b>		<b>48.5</b>		<b>57</b>		<b>22.5</b>		<b>346.5</b>	
	L	13	20.31	9	17.48	11	18.49	3	6.90	5	10.31	8	14.04	3.5	15.56	52.5	15.15
	H	51	79.69	42.5	82.52	48.5	81.51	40.5	93.10	43.5	89.69	49	85.96	19	84.44	294	84.85
<b>Cucum</b>	<b>T</b>	<b>60.5</b>		<b>52</b>		<b>48</b>		<b>48.1</b>		<b>50</b>		<b>49.5</b>		<b>21</b>		<b>329.1</b>	
	L	10.5	17.36	8	15.38	7	14.58	6	12.47	5	10.00	6	12.12	2	9.52	44.5	13.52
	H	50	82.64	44	84.62	41	85.42	42.1	87.53	45	90.00	43.5	87.88	19	90.48	284.6	86.48
<b>Tm/BB</b>	<b>T</b>	<b>91.5</b>		<b>87</b>		<b>83</b>		<b>84.5</b>		<b>78</b>		<b>81.5</b>		<b>31.8</b>		<b>537.3</b>	
	L	18.5	20.22	13.5	15.52	15	18.07	16	18.93	13	16.67	16	19.63	4.5	14.15	96.5	17.96
	H	73	79.78	73.5	84.48	68	81.93	68.5	81.07	65	83.33	65.5	80.37	27.3	85.85	440.8	82.04
<b>Mix</b>	<b>T</b>	<b>31</b>		<b>37</b>		<b>38.5</b>		<b>40</b>		<b>24.5</b>		<b>30</b>		<b>31.5</b>		<b>232.5</b>	
	L	9	29.03	6.5	17.57	7	18.18	7	17.50	3.5	14.29	4	13.33	5	15.87	42	18.06
	H	22	70.97	30.5	82.43	31.5	81.82	33	82.50	21	85.71	26	86.67	26.5	84.13	190.5	81.94
<b>OthV</b>	<b>T</b>	<b>6</b>		<b>8</b>		<b>7</b>		<b>8</b>		<b>4.5</b>		<b>11</b>		<b>10</b>		<b>54.5</b>	
	L	0	0.00	2	25.00	0	0.00	0	0.00	0.5	11.11	2	18.18	2	20.00	6.5	11.93
	H	6	100.00	6	75.00	7	100.00	8	100.00	4	88.89	9	81.82	8	80.00	48	88.07



## Appendix 9 Fruit, Vegetable, and Composite Factor Analysis Processes

The selected method used was Principal Component Analysis with Varimax rotation. The Kaiser Meyer Olkin measure was .720; a classification of above 'acceptable', with individual component communalities from .737 to .513, with only one of the 34 items falling below .5 at .437. On this basis no items were removed. Acceptable factorability was observed (correlation coefficients, anti-image correlations as presented in SPSS), and Bartlett's Test of Sphericity assumed correlated data, ( $0.000 < 0.05$ ; a rejection of  $H_0$  i.e the data is not correlated).

All 34 fruit and vegetable items featured as part of the derived factor solution (Table 6.9), where those items with above, or near, 0.4 factor loading on a particular component are included within that factor. Only 2 items were found to load on more than one factor. Table 6.8 presents the Total Variance explained for the factor solution by component, with a total explanation of 62.8 percent for a factor solution of 12 Factors, before the Eigenvalue reaches unity (criterion for number of factors derived). This represents a data reduction of 64 percent. The first component represents almost seven percent of the total variance explained in the rotated solution. The remainder range from 6.4 to 3.9 additional percentage of variance explained, through the twelve Factors. No one factor dominates the variance explained in the data, and a relatively small difference is observed between each successive factor.

The interpretation of the factors by those fruits and vegetables loaded upon them strongly is consistent with the dietary patterns, health and lifestyle identified from the earlier interviews. Factor 1 is loaded most strongly with five common vegetable items, including peas, carrots, and cabbage and reflects vegetables which are commonly consumed alongside meat, and hence named 'Traditional' Meat Accompaniment'. The second Factor also comprises five food items. In this instance they are predominantly salad vegetable items brought together (pepper/avocado, marrow/courgette, lettuce/beansprouts, cucumber/celery/spring onion, and spinach/sweetcorn) and interpreted as 'Salad Lunch Bar: 'High' Diet'; to reflect a perception of a more 'up market' type of salad, as opposed to Factors 3, 4 or 8.

Table Appendix 9 Total Variance Explained: Fruit Vegetable Composite Totals

Component	Initial	Rotation Sums of Squared Loadings		
	Eigenvalues	Total	% of Variance	Cumulative %
1	5.271	2.335	6.868	6.868
2	2.135	2.178	6.405	13.273
3	1.831	1.992	5.858	19.131
4	1.683	1.918	5.642	24.773
5	1.592	1.885	5.543	30.317
6	1.512	1.867	5.491	35.808
7	1.389	1.666	4.899	40.707
8	1.356	1.648	4.846	45.553
9	1.284	1.627	4.787	50.339
10	1.157	1.517	4.462	54.801
11	1.078	1.367	4.019	58.820
12	1.050	1.339	3.937	62.758
13	0.986			

The third Factor is described as a ‘Salad Accompaniment & Kale’ and is made up of three items; curly kale/spring greens, beetroot/radishes, and cucumber/celery/spring onions. Factor 4 is also composed of three items eaten as vegetables also, onion/leeks, mushrooms, and tomato/baked beans. These have been collectively named ‘Fry-up’ Accompaniment, as the items are often traditionally used as fried items or part of meals where fried food is evident; however it also denotes the often cooked nature of such foods. Factor 5 has been given the label ‘Composite Meals’, as it features all three composite meal items; high, medium, and low.

Factor 6 is comprised ‘strawberries’ and raspberries/ blackcurrants/blueberries, described as ‘Soft Fruits and Berries’. Factor 7 has three items; satsumas/manadrins/tangerines/kiwi fruit/plums, peach/ nectarine, and melon/mango/pineapple. The fruits are linked by their preparation properties, in general the need for some form of preparation before consumption and thus ‘Non-convenient Fruits’. The eighth factor has three items also, two directly refer to a mix of food items; mixed vegetables/ mixed salad, and fruit salad/tinned fruit. The third item is chickpeas/lentils/ beans (e.g. kidney, broad, butter), which can also regularly feature as a mix, but also, like the other two items feature as part of a healthy diet with ease of, or quick preparation; and hence interpreted as ‘Convenient Health Mix’. Factor 9, features three items that appear to have a common theme of items rich in particular vitamins (as well as ‘up market’ additions to a plate of food), and thus interpreted as ‘Rich ‘High’ Fashion Foods’ to reflect this.

The factors 10, 11, and 12 all have two items loaded strongly upon them. Factor 10 has both pears as an item, and grapes/cherries/gooseberries/blackberries as the other. Although some of those contain higher levels of fibre as a fruit, the items are linked to summer garden and hedgerow consumption, and thus named ‘Summer Garden Fruit’. The items on Factor 11 bring together the post war favourites of ‘Apples’ and ‘Bananas’, and is labelled in relation to the more immediate nature of their consumption; ‘Convenient Fruits’, these are also regularly utilised as snacking and meal replacement types. The final factor, Factor 12, is comprised of oranges, and fruit juice/smoothies and labelled interpretatively as ‘Juicy Fruits’.

Table Appendix 9a Communalities for the data

FVC Total	Initial	Extraction
HT1	1.000	.690
HT2	1.000	.660
HT3	1.000	.662
ApT	1.000	.611
PrT	1.000	.665
OrT	1.000	.732
BanT	1.000	.631
SatT	1.000	.513
GrpT	1.000	.598
StrwT	1.000	.676
RaspT	1.000	.737
PeachT	1.000	.628
MelT	1.000	.637
FrSldT	1.000	.673
JuiceT	1.000	.516
DrdT	1.000	.640
CarT	1.000	.582
OnT	1.000	.608
PeaT	1.000	.621
CabT	1.000	.437
ParsT	1.000	.636
SpinT	1.000	.581
KaleT	1.000	.712
BeeT	1.000	.691
MushT	1.000	.594
CaulT	1.000	.558
BroccT	1.000	.597
MarrT	1.000	.626
PeppT	1.000	.651
ChickT	1.000	.595
LetT	1.000	.618
CucT	1.000	.660
TomT	1.000	.684
MixT	1.000	.618

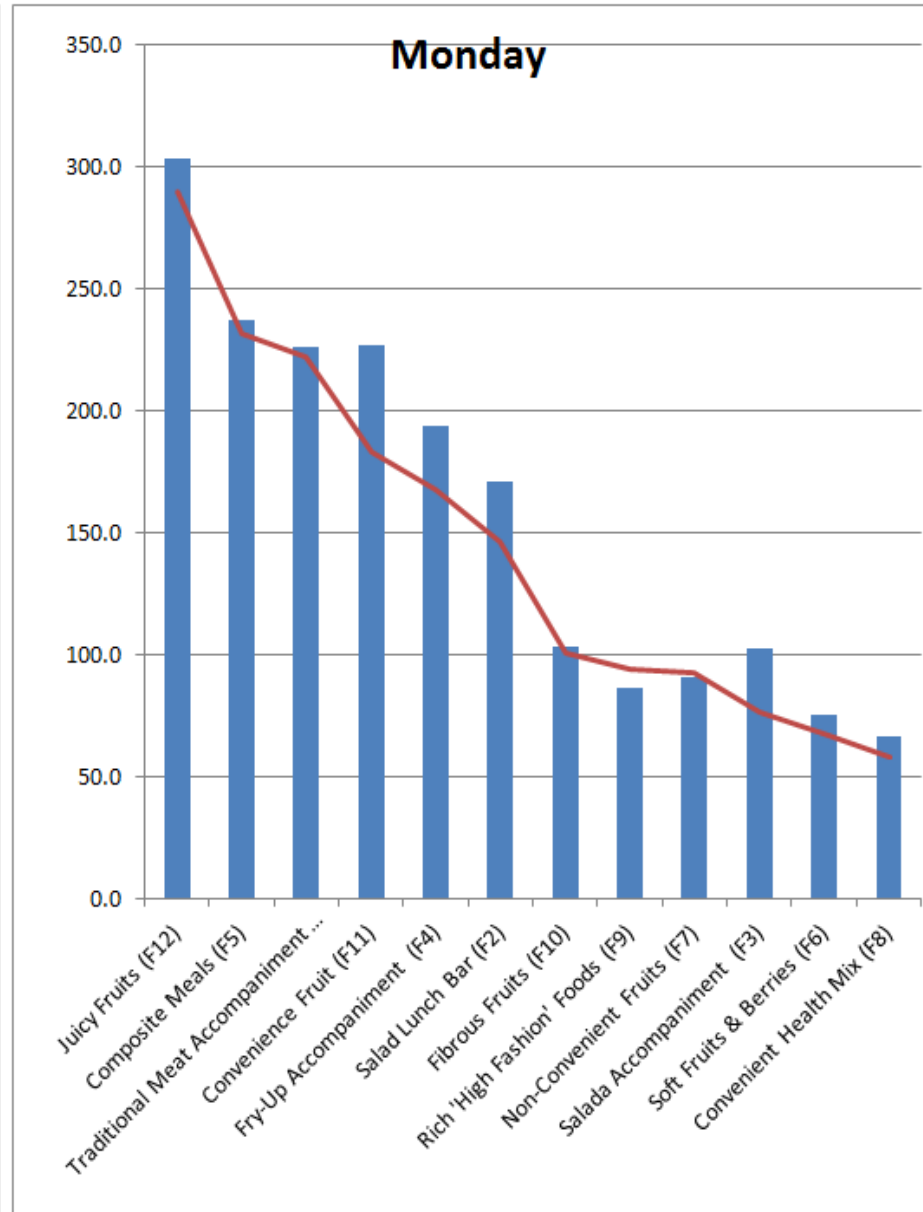
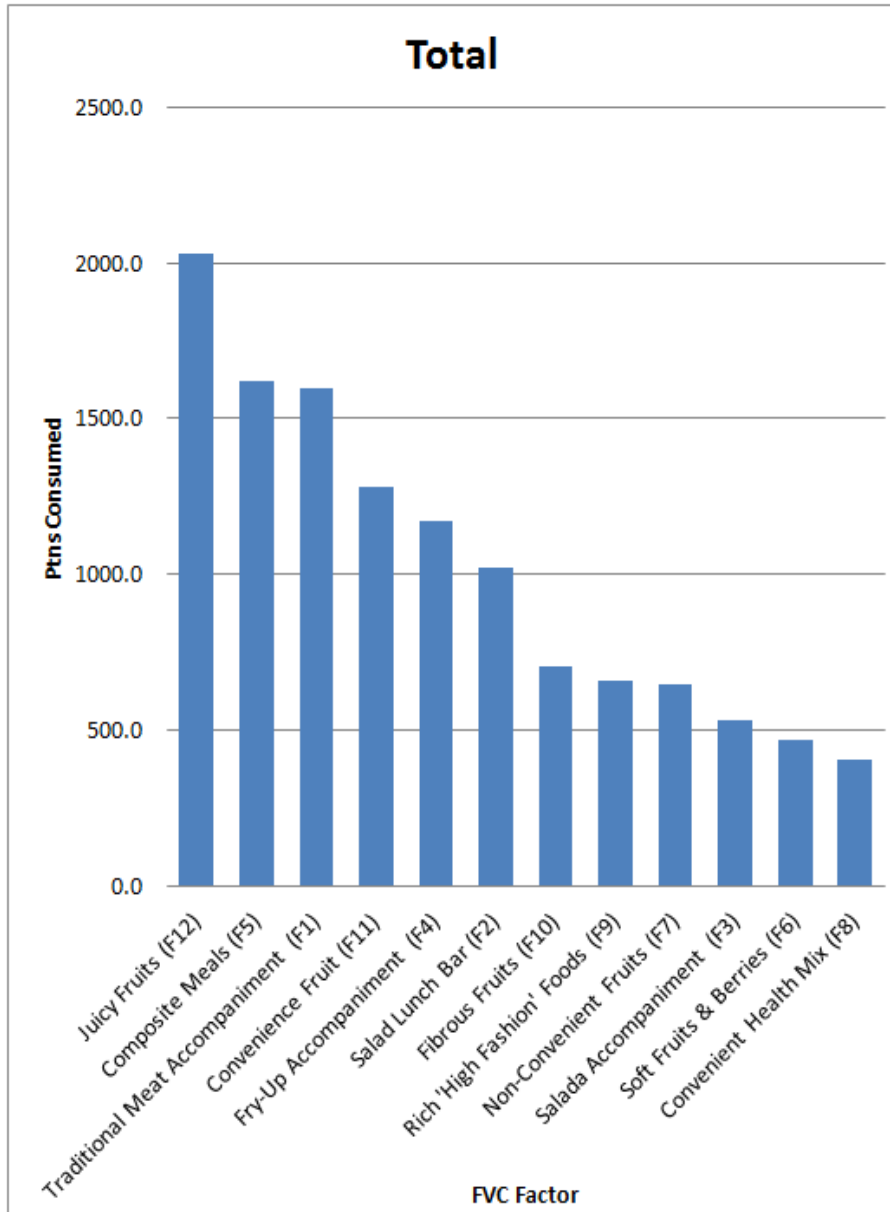
Extraction Method: Principal Component Analysis

**Complete Rotated Component Matrix for factor analysis (Fruit Vegetable Composite Consumption)**

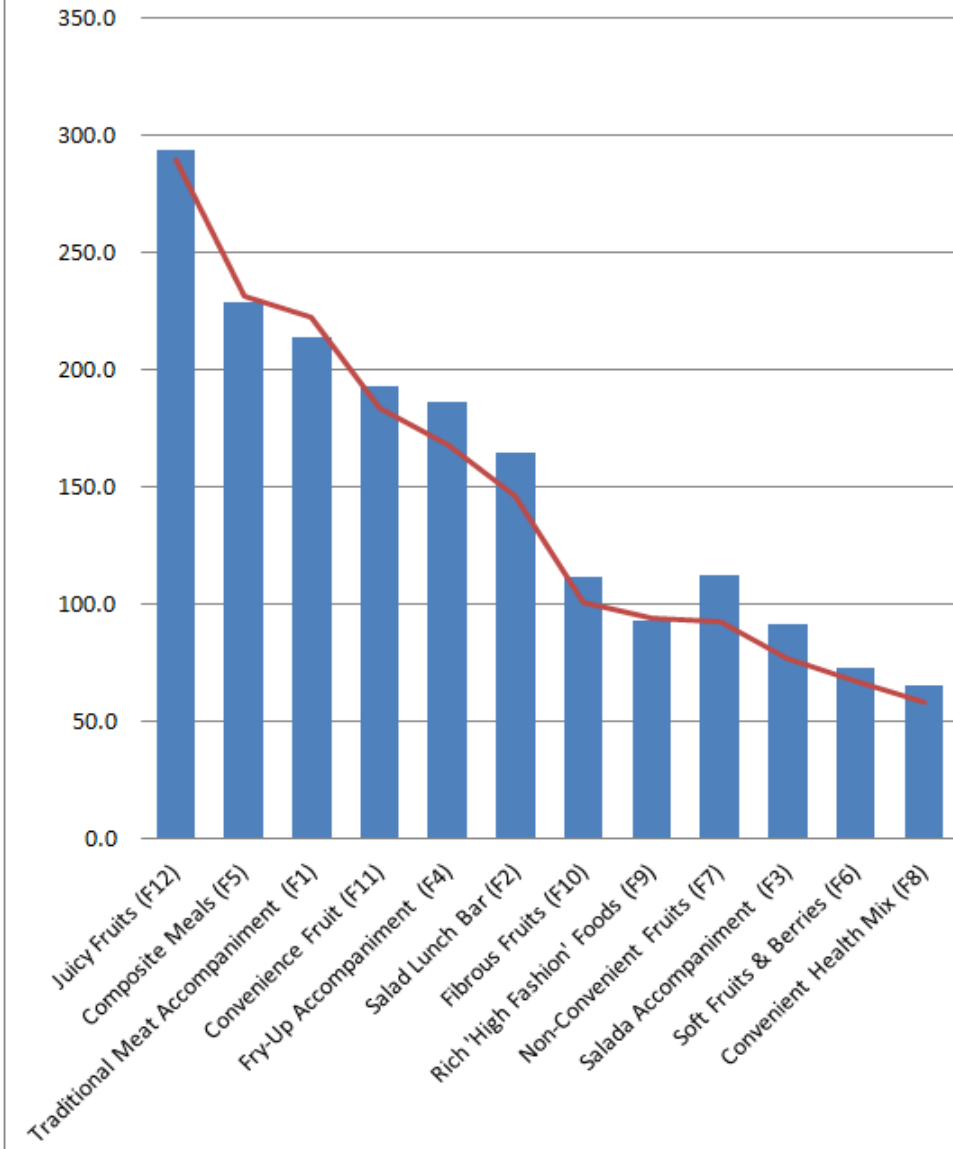
	1	2	3	4	5	6	7	8	9	10	11	12
HT1	.061	.094	.121	.353	.644	-.187	.038	-.009	.175	.031	.191	.139
HT2	.054	.019	-.018	.037	.794	-.010	.051	.084	-.029	-.066	-.022	.092
HT3	.133	.128	.095	-.187	.620	.340	.100	.202	-.096	.099	-.078	-.088
ApT	-.003	.248	-.146	.371	.064	-.031	-.122	.049	.115	.327	.497	-.029
PrT	.130	-.078	.027	.181	-.154	.006	-.035	.107	-.018	.756	.016	.000
OrT	.077	.033	-.054	-.022	.101	.020	.029	-.087	-.028	-.009	.018	.837
BanT	.074	.000	.178	-.042	.039	.242	.167	.198	-.094	.198	.638	.096
SatT	.052	.248	.152	.140	.106	.041	.554	.093	-.046	-.072	.007	.266
GrpT	.043	.191	.145	-.064	.193	.077	.141	-.089	.030	.643	.218	.042
StrwT	.018	.014	.086	.101	.017	.788	.090	.000	.112	.037	.098	.062
RaspT	.041	.037	.000	.045	.015	.849	.044	-.067	.064	.010	.018	.034
PeachT	.036	.007	-.075	.078	-.092	.118	.725	-.071	-.139	-.038	.089	-.182
MelT	.068	.019	.015	.002	.274	.032	.652	.106	.157	.245	-.052	.180
FrSldT	.018	-.127	.081	.063	.072	-.018	.113	.777	-.043	-.028	.094	.107
JuiceT	-.188	.127	.096	.017	.023	.235	.102	.271	.163	.115	.264	.453
DrdT	-.085	-.109	.096	.197	.116	.093	.049	.023	.737	.025	-.017	-.060
CarT	.678	.070	.099	.066	-.044	.206	-.076	-.017	.210	-.051	.083	-.006
OnT	.236	.111	.017	.728	.010	.029	.029	.012	-.012	.028	.078	.008
PeaT	.691	.138	.075	.096	.034	-.090	-.113	-.011	-.143	.114	.204	.109
CabT	.599	-.044	.024	.124	.073	.045	.135	.080	.031	.056	-.130	.086
ParsT	.683	-.028	.192	-.019	.140	-.099	.105	-.063	-.023	.207	-.182	-.105
SpinT	.071	.454	.333	-.128	-.040	-.081	.039	.019	.392	-.026	.275	-.049
KaleT	.199	-.069	.773	.223	.009	-.019	-.037	.036	.128	.003	.033	.011
BeeT	.139	.191	.777	-.088	.048	.086	.046	.070	-.036	.075	.007	-.033
MushT	.053	.021	.129	.657	.065	.131	.190	.120	.227	.092	-.096	-.044
CaulT	.501	.009	.139	.185	.074	.040	.285	.114	.125	-.251	.204	-.182
BroccT	.242	.166	-.064	-.016	-.116	.134	-.132	.054	.668	-.024	.010	.086
MarrT	-.013	.583	-.003	-.174	-.086	-.081	.286	-.003	.277	.157	-.189	.151
PeppT	.023	.773	.045	.181	.095	.044	.023	.062	-.020	.001	.039	.037
ChickT	.015	.178	-.057	.051	.095	-.058	-.073	.713	.135	.032	.035	-.103
LetT	.119	.507	.182	.347	.292	.179	-.014	.089	-.186	-.081	.163	.006
CucT	.040	.399	.474	.243	.290	.202	.070	-.205	.009	.199	.031	.051
TomT	.086	.361	.350	.389	.097	.161	.073	.134	-.195	.226	-.135	.325
MixT	.095	.330	.196	.064	.065	.056	.085	.442	-.100	.157	-.452	-.095

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 14 iterations.

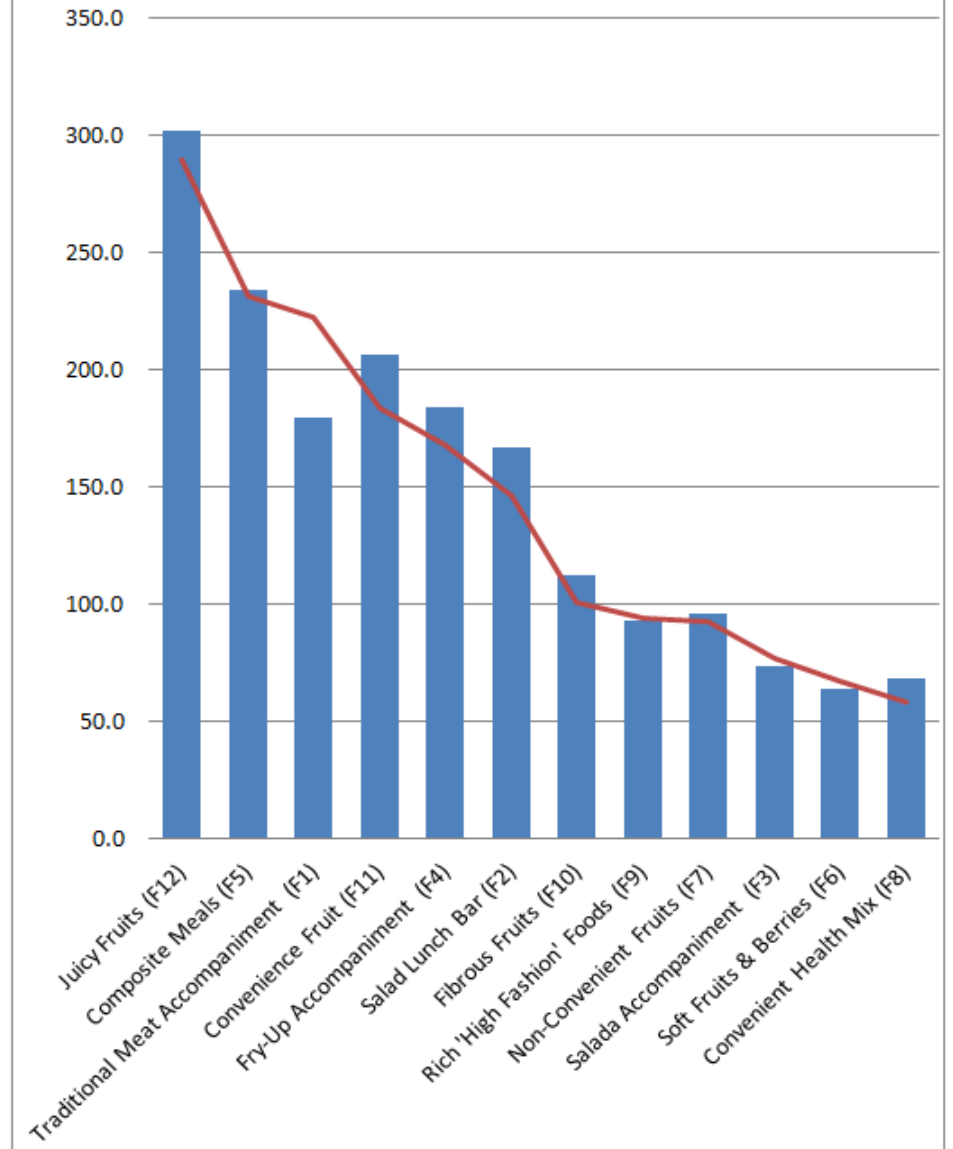
**Appendix 10** Monday – Sunday Fruit Vegetable Composite Factor Consumption

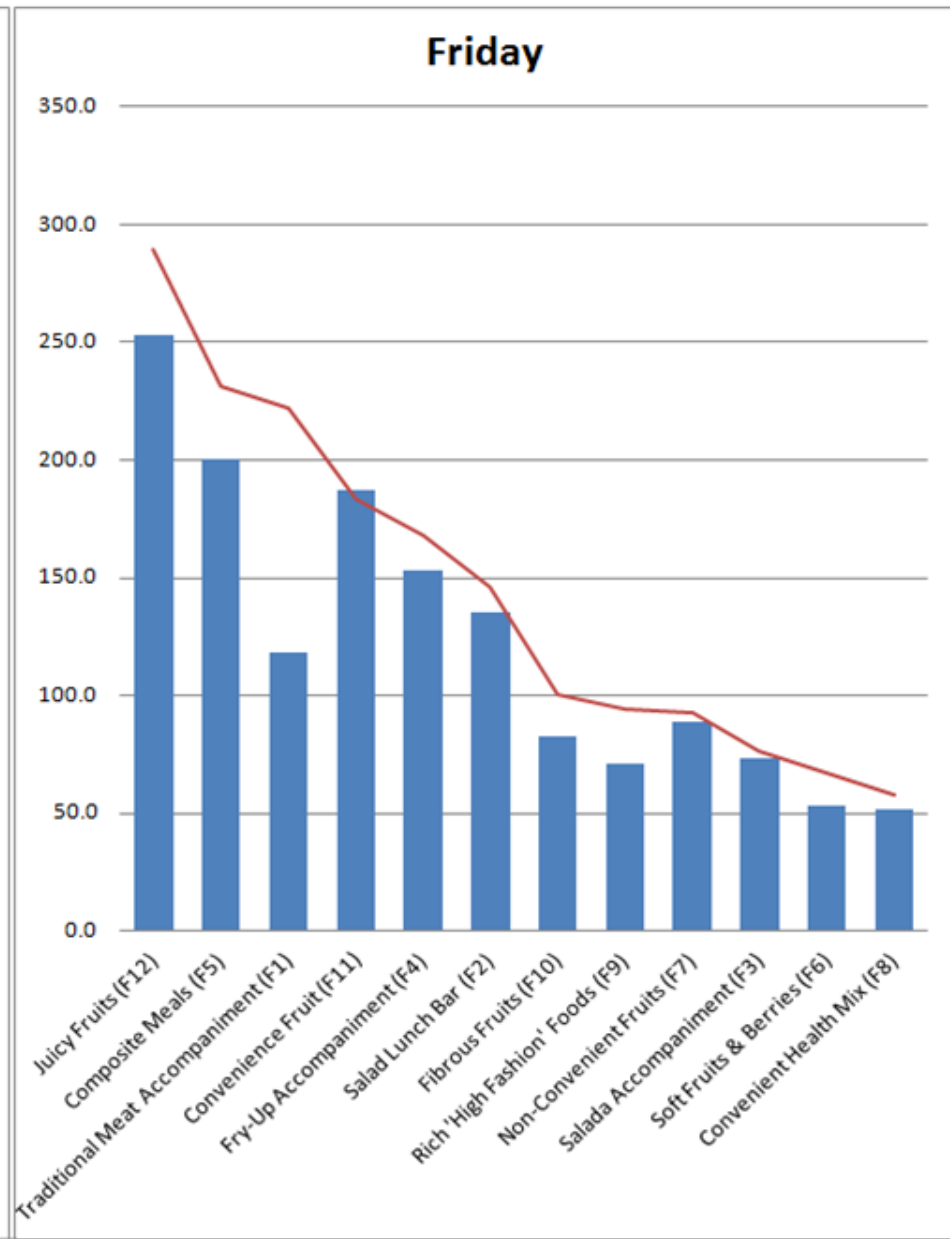
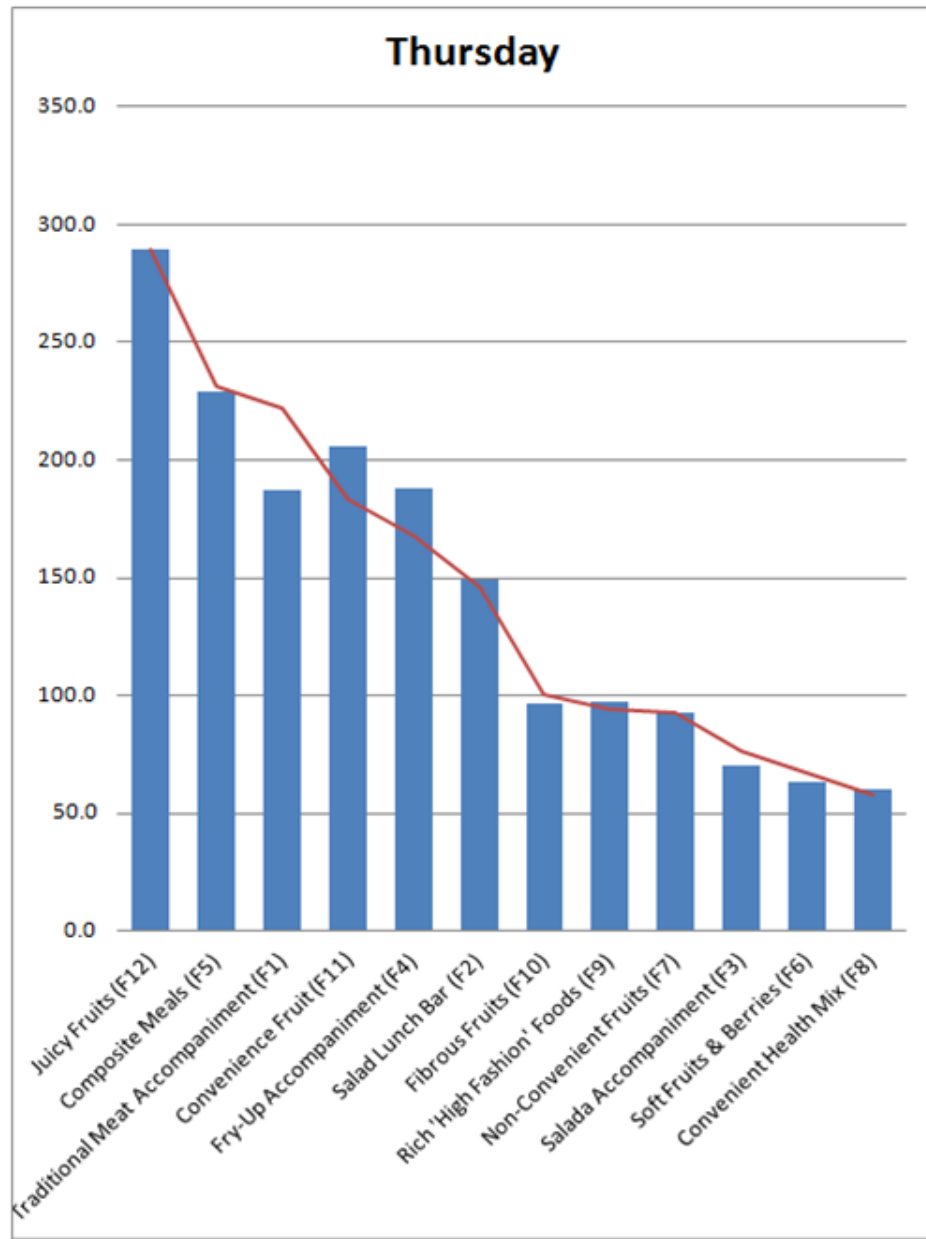


## Tuesday

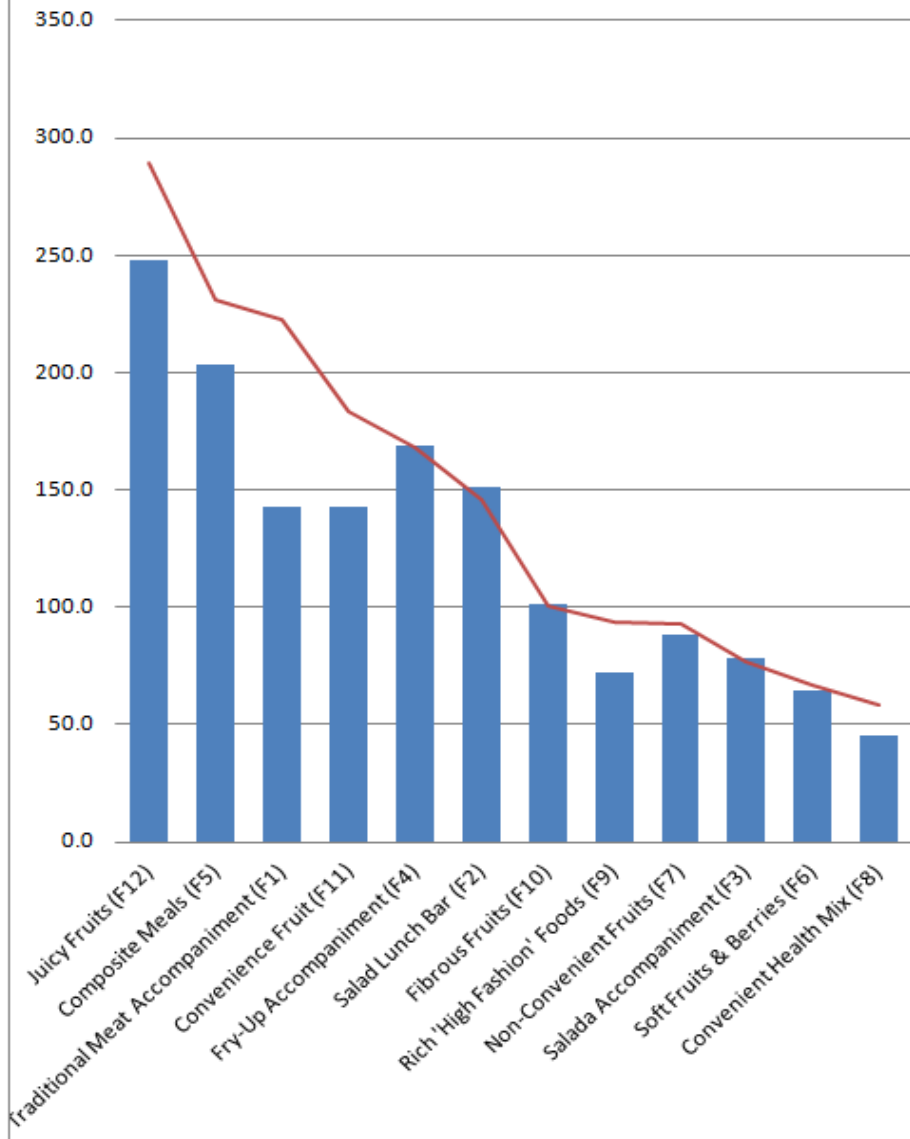


## Wednesday

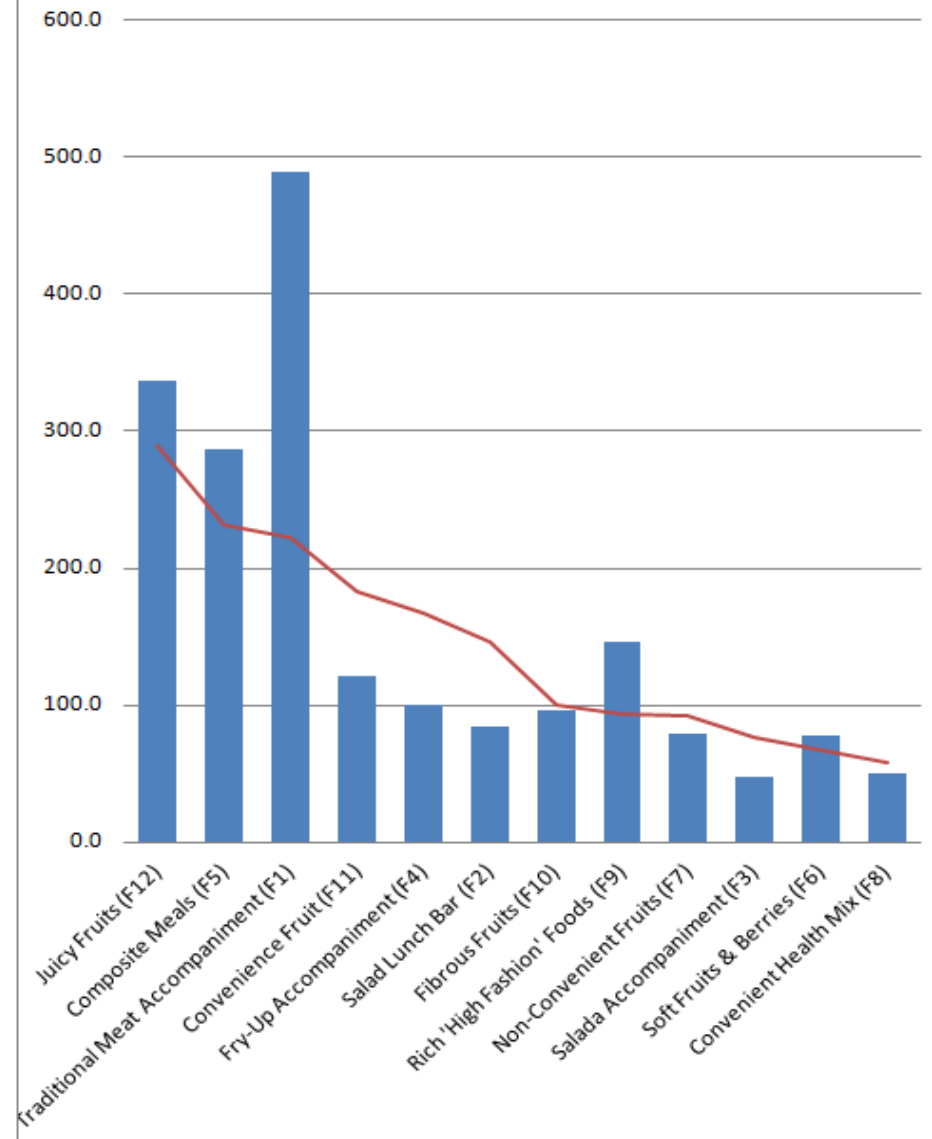




### Saturday



### Sunday





## Appendix 11 Frequency for Attitude & Behaviour Statements

Attitude & Behaviour Statement		Strongly Disagree	Disagree	Partly Disagree	Neither Agree or Disagree	Partly Agree	Agree	Strongly Agree
I eat fruit as a meal or as part of a meal	S21	15	34	13	23	41	68	45
I eat vegetables as a meal or as part of a meal	S22	5	5	2	5	15	99	108
I eat fruit as a snack	S23	8	9	6	16	29	98	73
I eat vegetables as a snack	S24	38	65	17	38	36	20	25
I eat fruit rather than sweets, crisps or chocolate	S25	15	36	30	47	40	39	32
I eat vegetables rather than sweets, crisps or chocolate	S26	33	79	25	38	21	17	26
I would prefer to eat fruit or vegetables as a snack rather than crisps or sweets/chocolate	S27	17	40	31	39	37	45	30
I like to try fruit and vegetables that I am not used to	S28	10	29	16	28	36	91	29
I am happy with the <u>amount</u> of fruit that I eat	S29	14	33	29	17	26	78	42
I am happy with the <u>amount</u> of vegetables that I eat	S210	9	34	27	14	24	88	43
I am happy with the <u>variety</u> of fruit I eat	S211	3	27	17	30	32	97	33
I am happy with the <u>variety</u> of vegetables I eat	S212	5	26	21	23	23	94	47
I am happy about the food I eat	S213	5	20	25	30	39	83	37
Fruit is important to my diet	S214	3	13	11	14	29	98	71
Vegetables are important to my diet	S215	2	10	6	9	25	112	75
I enjoy eating fruit	S216	6	7	9	15	26	111	65
I enjoy eating vegetables	S217	4	9	8	20	24	107	67
Food is important to my daily life	S218	0	4	3	21	18	88	105
I am always thinking about food	S219	19	55	21	55	28	27	34
I look forward to meal times	S220	4	9	10	38	33	102	43
I eat with a person / or people (other than those who live within the house) regularly	S221	13	64	11	23	35	67	26
Other people (other than those I live with) have an affect on the food I eat	S222	26	71	14	40	30	40	18
The <u>amount</u> of fruit I eat is affected by me alone	S223	1	11	9	15	31	110	62
The <u>amount</u> of vegetables I eat is affected by me alone	S224	4	13	11	16	32	106	57
I am responsible for the preparation, and cooking of the food within the household.	S225	13	26	12	30	39	61	58
I decide what is eaten and bought to eat within the household	S226	16	24	10	29	50	61	49
The <u>amount</u> and <u>type</u> of fruit I eat is affected by a specific health concern	S227	32	89	14	40	23	30	11
The <u>amount</u> and <u>type</u> of vegetables I eat is affected by a specific health concern	S228	31	94	13	45	17	27	12
I eat the <u>amount</u> of fruit I do for general health well-being	S229	7	31	10	33	44	84	30
I eat the <u>amount</u> of vegetables I do for general health well-being	S230	7	26	13	29	47	84	33
I eat the <u>amount</u> of fruit I do as part of reducing or controlling my weight	S231	20	60	7	42	39	48	23
I eat the <u>amount</u> of vegetables I do as part of reducing or controlling my weight	S232	19	59	11	43	36	48	23
I exercise regularly	S233	14	44	14	29	43	55	40
I exercise regularly for health reasons	S234	20	70	13	44	33	39	20

I exercise regularly to lose or control my weight	S235	27	65	19	37	32	33	26
I compete in sport regularly	S236	78	95	7	22	10	16	11
The food I eat is affected by competing in sport	S237	89	98	4	30	8	7	3
The <u>amount</u> of fruit I eat is affected by playing or competing in sport	S238	93	96	8	29	5	5	3
The <u>amount</u> of vegetables I eat is affected by playing or competing in sport	S239	86	100	9	30	6	5	3
I play a part in growing or collecting some of the fruit and vegetables I eat	S240	71	74	7	19	29	24	15
I am interested in where the fruit & vegetables I eat come from & how they are grown	S241	25	35	16	51	37	46	29
Where fruit and vegetables are grown & how they are grown affects the <u>amount</u> I eat	S242	33	84	13	66	19	13	11
Where fruit and vegetables are grown & how they are grown affects the <u>type</u> I eat	S243	30	75	14	64	22	20	14
The food I eat or cook is usually processed when bought (e.g. from a packet, ready meal)	S244	61	83	22	19	34	15	5
Fruit is easy to prepare and use	S245	1	2	4	14	18	129	71
Vegetables are easy to prepare and use	S246	2	3	8	15	33	115	63
The amount of free time I have affects the <u>amount</u> of fruit I eat	S247	26	65	10	56	19	40	23
The amount of free time I have affects the <u>amount</u> of vegetables I eat	S248	23	64	13	53	22	43	21
The possible waste of vegetables affects the <u>amount</u> bought (from preparation, and food thrown out not eaten)	S249	24	63	12	35	41	54	10
The possible waste of fruit affects the <u>amount</u> bought (from preparation and from having to throw out food)	S250	24	61	13	38	39	53	11
The possible waste of fruit affects the <u>type</u> bought (from preparation and from having to throw out food)	S251	22	60	13	39	43	52	10
The possible waste of vegetables affects the <u>type</u> bought (from preparation and from having to throw out food)	S252	21	62	12	39	41	54	10
The <u>type</u> of fruit and vegetables I eat is affected by how they taste	S253	2	2	4	17	23	128	63
The <u>amount</u> of fruit and vegetables I eat is affected by how they taste	S254	2	5	4	27	27	112	62
I have a varied diet	S255	4	13	9	22	37	102	52
I plan the <u>amount</u> of fruit I eat during the day	S256	15	71	11	59	24	41	18
I plan the <u>amount</u> of vegetables I eat during the day	S257	12	72	13	55	32	37	18
I eat the same fruit in the same amounts every week	S258	26	78	22	31	53	24	5
I eat the same vegetables in the same amounts everyweek	S259	24	74	18	33	60	24	6
The season affects the <u>amount</u> of fruit and vegetables I eat	S260	13	34	16	31	51	69	25
The season affects the <u>type</u> of fruit and vegetables I eat	S261	11	30	14	28	46	78	32
I am responsible for doing the food shopping	S262	14	24	9	30	28	72	62
The food for the household is bought with a plan of what meals are to be made and what will be eaten before the next shopping trip	S263	11	46	10	28	53	58	33
I eat meals at the same time each day	S264	21	57	20	20	55	53	13
I generally eat the same food(s) every day	S265	22	98	34	33	37	11	4

The <u>amount</u> and <u>type</u> of fruit and vegetables I eat is different on a Saturday & Sunday to the rest of the week	S266	9	32	11	19	47	86	35
The <u>amount</u> of fruit I eat is affected by what I am doing on that day	S267	9	45	13	30	45	81	16
The <u>amount</u> of vegetables I eat is affected by what I am doing on that day	S268	9	40	15	32	49	80	14
Health advice/promotion/information affects the food I eat	S269	14	50	20	53	51	39	12
Health advice/promotion/information affects the <u>amount</u> of fruit I eat	S270	15	51	19	59	50	36	9
Health advice/promotion/information affects the <u>amount</u> of vegetables I eat	S271	15	51	23	58	49	35	8
I listen and act on health advice/promotion/information in other general areas such as smoking or exercise	S272	13	34	11	41	61	59	20
The only time I will eat fruit is when I fancy them	S273	27	66	25	29	32	45	15
The only time I will eat vegetables is when I fancy them	S274	24	89	31	35	23	25	12
The only time I will eat fruit is when I can be bothered	S275	49	88	23	37	20	13	9
The only time I will eat vegetables is when I can be bothered	S276	51	100	20	35	15	12	6
Fruit is an important part of my food shopping budget	S277	6	16	13	25	35	89	55
Vegetables are important part of my food shopping budget	S278	0	15	11	18	40	95	60
The price of fruit affects the <u>amount</u> of fruit I eat	S279	19	66	19	22	53	43	17
The price of vegetables affects the <u>amount</u> of vegetables I eat	S280	21	69	21	28	46	38	16
The price of fruit affects the <u>type</u> of fruit I eat	S281	17	50	16	22	54	62	18
The price of vegetables affects the <u>type</u> of vegetables I eat	S282	17	54	17	29	52	54	16
Fruit is cheap to buy	S283	8	28	39	60	57	35	12
Vegetables are cheap to buy	S284	5	19	27	60	62	50	16
Fruit is good value for money	S285	5	14	18	54	63	64	21
Vegetables are good value for money	S286	4	13	11	54	57	75	25
I have always eaten lots of fruit	S287	11	35	25	32	42	63	31
I have always eaten lots of vegetables	S288	7	26	22	32	42	70	40
I have good self esteem (feel good about myself generally)	S289	9	13	18	43	48	81	27
The way that I feel about myself affects the food I eat	S290	10	36	15	53	51	60	14
The way I feel about myself affects the <u>amount</u> and <u>type</u> of fruit and vegetables I eat	S291	14	38	18	60	46	52	11
I would like to eat out at restaurants more than I do	S292	6	41	14	56	38	62	22
I would like to eat takeaway food more than I do	S293	34	94	28	44	18	13	8
Restaurant and takeaway food is different to that which I eat/make at home	S294	6	12	17	31	49	93	31
My diet is different when I am on holiday	S295	5	14	9	20	47	100	44
When on holiday the <u>amount</u> and <u>type</u> of fruit I eat is different	S296	7	23	6	16	46	108	33
When on holiday the <u>amount</u> and <u>type</u> of vegetables I eat is different	S297	6	22	9	18	46	107	31
The <u>amount</u> of fruit I eat has changed over my life	S298	11	26	13	34	41	91	23

The <u>amount</u> of vegetables I eat has changed over my adult life	S299	6	28	20	32	39	86	28
The <u>type</u> of fruit I eat has changed over my life	S2100	8	25	20	26	48	90	22
The <u>type</u> of vegetables I eat has changed over my adult life	S2101	7	24	18	24	44	92	30
I have deliberately changed the food I eat	S2102	10	51	16	58	35	46	23
I have deliberately changed the <u>amount</u> and <u>type</u> of fruit and vegetables I eat	S2103	11	53	10	59	33	51	22
The <u>amount</u> and <u>type</u> of fruit I eat is different to when I lived with parents/guardians	S2104	9	24	6	53	31	93	23
The <u>amount</u> and <u>type</u> of vegetables I eat is different to when I lived with parents/guardians	S2105	8	27	6	51	29	94	24
My diet is different to that when I lived at home with parents/guardians	S2106	4	19	7	45	39	94	31
My eating patterns (type, amounts, regularity of food) are different when I am at work to when I am not at work	S2107	3	11	6	58	27	94	40
The <u>amount</u> and <u>type</u> of fruit I eat is affected by being at work	S2108	6	25	5	70	33	80	20
The <u>amount</u> and <u>type</u> of vegetables I eat is affected by being at work	S2109	3	29	2	76	27	78	24
The <u>amount</u> and <u>type</u> of fruit & vegetables I eat is affected by how available they are at work	S2110	8	37	6	89	27	53	19
I generally bring food from home to eat at work	S2111	8	22	7	67	20	64	51
I eat fruit at work	S2112	6	16	4	71	21	71	50
I eat vegetables at work	S2113	17	45	18	81	22	32	24
My children's eating habits affect the <u>amount</u> and <u>type</u> of fruit I eat	S2114	10	31	8	152	11	15	12
My children's eating habits affect the <u>amount</u> and <u>type</u> of vegetables I eat	S2115	10	31	9	152	10	15	12
My children affect the <u>amount</u> of fruit and vegetables I eat	S2116	13	37	6	152	11	11	9
The <u>amount</u> of fruit I eat is affected by my spouse's or partner's eating habits.	S2117	20	55	9	94	30	21	10
The <u>type</u> of fruit I eat is affected by my spouse's or partner's eating habits.	S2118	21	57	13	90	32	18	8
The <u>amount</u> of vegetables I eat is affected by my spouse's or partner's eating habits	S2119	22	50	9	90	33	26	9
The <u>type</u> of vegetables I eat is affected by my spouse's or partner's eating habits	S2120	23	49	8	91	32	25	11
My partner affects the <u>amount</u> of fruit I eat	S2121	25	59	14	95	24	15	7
My partner affects the <u>type</u> of fruit I eat	S2122	25	60	14	96	22	15	7
My spouse or partner affects the <u>amount</u> of vegetables I eat	S2123	26	57	6	88	26	25	11
My spouse or partner affects the <u>type</u> of vegetables I eat	S2124	24	58	6	88	27	23	13
Everyone in the house eats similar <u>amounts</u> of vegetables	S2125	10	31	16	56	36	68	22
Everyone in the house eats similar <u>types</u> of vegetables	S2126	10	22	12	52	35	86	22
Everyone in the house eats similar <u>types</u> of fruit	S2127	13	24	15	52	34	76	25
Everyone in the house eats the same foods generally	S2128	8	18	19	59	41	73	21
The foods I eat are affected by those I live with	S2129	16	44	10	74	41	39	15
Everyone in the house eats similar <u>amounts</u> of fruit	S2130	17	37	19	61	33	51	21

All feature 239 responses. 'Does Not Apply To' Me recoded as 'Neither Agree or Disagree'

**Appendix 12** Attitude & Behaviour Statement Significance: Independent Samples Test

Statement	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig(2-tailed)	Mean Diff.
S21	19.26	0.00	-6.80	159.53	0.00	-1.65
S22	6.68	0.01	-2.52	139.48	0.01	-0.45
S23	18.26	0.00	-4.41	142.65	0.00	-0.92
S24	3.94	0.05	-3.94	213.72	0.00	-0.96
S25	0.33	0.57	-6.81	237.00	0.00	-1.50
S26	15.74	0.00	-5.33	226.44	0.00	-1.21
S27	0.02	0.90	-3.29	237.00	0.00	-0.80
S28	14.58	0.00	-4.31	161.84	0.00	-1.00
S29	8.03	0.00	-6.43	171.76	0.00	-1.56
S210	16.98	0.00	-4.95	164.00	0.00	-1.22
S211	15.63	0.00	-5.38	161.71	0.00	-1.14
S212	18.41	0.00	-4.51	160.46	0.00	-1.04
S213	14.68	0.00	-3.77	158.72	0.00	-0.83
S214	36.29	0.00	-6.03	135.60	0.00	-1.19
S215	16.72	0.00	-4.30	144.03	0.00	-0.77
S216	29.25	0.00	-5.13	137.80	0.00	-0.99
S217	15.61	0.00	-3.42	146.84	0.00	-0.67
S218	1.25	0.27	-2.24	237.00	0.03	-0.33
S219	0.52	0.47	-2.02	237.00	0.04	-0.51
S220	0.20	0.66	-1.73	237.00	0.08	-0.32
S221	0.84	0.36	-3.67	237.00	0.00	-0.93
S222	0.04	0.83	-0.79	191.64	0.43	-0.20
S223	0.88	0.35	-1.06	237.00	0.29	-0.19
S224	0.01	0.94	-0.67	188.03	0.51	-0.13
S225	0.65	0.42	-2.06	237.00	0.04	-0.50
S226	0.89	0.35	-2.36	237.00	0.02	-0.57
S227	9.76	0.00	-5.22	216.71	0.00	-1.14
S228	10.70	0.00	-4.96	216.63	0.00	-1.08
S229	17.18	0.00	-5.93	152.92	0.00	-1.31
S230	13.11	0.00	-5.66	159.01	0.00	-1.22
S231	0.13	0.71	-3.77	237.00	0.00	-0.93
S232	0.13	0.72	-2.99	237.00	0.00	-0.74
S233	4.78	0.03	-3.13	237.00	0.00	-0.78
S234	0.82	0.36	-3.57	237.00	0.00	-0.87
S235	0.04	0.83	-3.38	237.00	0.00	-0.86
S236	0.01	0.94	-0.11	237.00	0.91	-0.03
S237	3.46	0.06	-0.95	237.00	0.34	-0.18
S238	3.75	0.05	-1.58	223.80	0.11	-0.26
S239	0.39	0.53	-0.57	237.00	0.57	-0.10
S240	0.15	0.70	-0.16	237.00	0.88	-0.04
S241	0.80	0.37	-2.86	237.00	0.00	-0.71
S242	6.50	0.01	-4.28	237.00	0.00	-0.91

S243	0.20	0.66	-3.77	237.00	0.00	-0.85
S244	0.03	0.86	1.43	237.00	0.15	0.32
S245	1.39	0.24	-2.70	237.00	0.01	-0.35
S246	2.76	0.10	-3.11	237.00	0.00	-0.47
S247	0.06	0.81	0.00	237.00	1.00	0.00
S248	0.05	0.82	-0.01	237.00	0.99	0.00
S249	0.83	0.36	-0.23	237.00	0.82	-0.06
S250	1.71	0.19	0.36	237.00	0.72	0.09
S251	0.37	0.54	0.47	237.00	0.64	0.11
S252	1.23	0.27	0.34	237.00	0.74	0.08
S253	1.52	0.22	0.64	237.00	0.52	0.09
S254	0.05	0.82	0.36	237.00	0.72	0.06
S255	10.75	0.00	-4.86	154.69	0.00	-0.95
S256	0.04	0.84	-6.62	237.00	0.00	-1.46
S257	0.06	0.80	-6.18	237.00	0.00	-1.36
S258	0.15	0.70	-2.20	237.00	0.03	-0.49
S259	1.68	0.20	-1.68	237.00	0.09	-0.38
S260	0.46	0.50	-1.34	237.00	0.18	-0.31
S261	0.16	0.69	-1.12	237.00	0.26	-0.26
S262	0.58	0.45	-2.14	237.00	0.03	-0.53
S263	1.18	0.28	-1.50	237.00	0.13	-0.37
S264	0.97	0.32	-0.30	237.00	0.77	-0.07
S265	0.08	0.78	-0.56	237.00	0.57	-0.11
S266	0.01	0.90	-0.19	237.00	0.85	-0.04
S267	1.62	0.20	-0.27	237.00	0.78	-0.06
S268	4.72	0.03	-1.08	172.10	0.28	-0.25
S269	0.21	0.65	-2.52	237.00	0.01	-0.55
S270	0.24	0.62	-2.61	237.00	0.01	-0.56
S271	0.47	0.49	-2.74	237.00	0.01	-0.58
S272	0.14	0.71	-3.39	237.00	0.00	-0.75
S273	4.39	0.04	5.02	172.09	0.00	1.24
S274	5.46	0.02	2.69	237.00	0.01	0.61
S275	9.91	0.00	2.43	237.00	0.02	0.53
S276	9.80	0.00	3.20	164.19	0.00	0.68
S277	17.87	0.00	-6.84	152.60	0.00	-1.40
S278	6.76	0.01	-5.50	163.01	0.00	-1.00
S279	0.03	0.87	-0.22	237.00	0.82	-0.06
S280	0.03	0.86	-0.73	237.00	0.46	-0.18
S281	0.83	0.36	-0.48	237.00	0.63	-0.12
S282	0.07	0.79	-0.45	237.00	0.65	-0.11
S283	0.13	0.72	-0.34	237.00	0.74	-0.07
S284	0.80	0.37	-0.42	237.00	0.68	-0.08
S285	0.83	0.36	-1.47	237.00	0.14	-0.27
S286	1.36	0.24	-1.33	237.00	0.19	-0.24
S287	8.32	0.00	-6.43	167.34	0.00	-1.47
S288	5.23	0.02	-4.39	171.25	0.00	-0.99
S289	0.25	0.62	-0.77	196.34	0.44	-0.16

S290	0.19	0.66	-0.54	237.00	0.59	-0.12
S291	0.28	0.60	-0.64	237.00	0.52	-0.14
S292	0.63	0.43	0.93	237.00	0.36	0.21
S293	0.04	0.85	1.46	237.00	0.15	0.31
S294	3.66	0.06	-0.04	237.00	0.97	-0.01
S295	5.57	0.02	1.29	218.03	0.20	0.24
S296	0.07	0.80	-0.73	237.00	0.46	-0.15
S297	0.15	0.70	-0.03	237.00	0.97	-0.01
S298	1.29	0.26	-1.34	237.00	0.18	-0.30
S299	0.08	0.78	-0.04	237.00	0.97	-0.01
S2100	2.57	0.11	-1.82	237.00	0.07	-0.39
S2101	0.40	0.53	-1.06	237.00	0.29	-0.23
S2102	0.11	0.74	-3.30	237.00	0.00	-0.76
S2103	0.24	0.63	-2.59	237.00	0.01	-0.61
S2104	0.01	0.92	-0.25	237.00	0.80	-0.05
S2105	0.14	0.71	0.40	237.00	0.69	0.09
S2106	1.25	0.26	1.16	237.00	0.25	0.23
S2107	0.48	0.49	0.34	237.00	0.74	0.06
S2108	0.05	0.83	-1.71	237.00	0.09	-0.35
S2109	1.49	0.22	-2.00	237.00	0.05	-0.40
S2110	0.38	0.54	-0.73	237.00	0.47	-0.16
S2111	7.70	0.01	-0.97	161.33	0.33	-0.23
S2112	2.89	0.09	-3.14	237.00	0.00	-0.65
S2113	0.12	0.73	-3.67	237.00	0.00	-0.83
S2114	0.24	0.62	-0.33	237.00	0.74	-0.06
S2115	0.43	0.51	-0.46	237.00	0.65	-0.08
S2116	0.77	0.38	-0.26	237.00	0.79	-0.04
S2117	2.20	0.14	1.13	237.00	0.26	0.24
S2118	2.03	0.16	1.06	237.00	0.29	0.22
S2119	1.72	0.19	1.93	237.00	0.06	0.41
S2120	1.84	0.18	1.89	237.00	0.06	0.41
S2121	0.01	0.92	0.29	237.00	0.78	0.06
S2122	0.00	1.00	0.16	237.00	0.88	0.03
S2123	0.47	0.49	0.87	237.00	0.38	0.19
S2124	0.31	0.58	0.90	237.00	0.37	0.20
S2125	1.68	0.20	-0.52	237.00	0.61	-0.12
S2126	1.10	0.29	-0.43	237.00	0.67	-0.09
S2127	8.88	0.00	-1.86	165.76	0.06	-0.44
S2128	1.99	0.16	-1.22	237.00	0.22	-0.25
S2129	0.21	0.64	0.65	237.00	0.52	0.14
S2130	2.89	0.09	-3.21	237.00	0.00	-0.74

## Appendix 13 Attitude and Behaviour Differences Between High & Low Respondents

Differences Between High & Low Consumers' Mean Attitude and Behaviour, and Significant Male/Female Differences

Statement	Survey				Gender	Gender Mean
	No.	Total Mean	5ADay	5ADay Mean		
<b>I eat <i>vegetables</i> as a meal or as part of a meal*</b>	S22	6.13	Low High	5.86 6.30		
<b>Food is important to my daily life</b>	S218	6.08	Low High	5.88 6.21		
<b><i>Fruit</i> is easy to prepare and use</b>	S245	6.00	Low High	5.78 6.14		
The <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S253	5.90	Low High	5.96 5.86		
<b><i>Vegetables</i> are important to my diet*</b>	S215	5.85	Low High	5.37 6.14		
<b><i>Vegetables</i> are easy to prepare and use</b>	S246	5.81	Low High	5.52 5.99	<b>M*</b> <b>F</b>	5.53 5.93
The <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S254	5.74	Low High	5.78 5.72		
The <u>amount</u> of <i>fruit</i> I eat is affected by me alone	S223	5.69	Low High	5.57 5.76	<b>M*</b> <b>F</b>	5.33 5.84
<b>I enjoy eating <i>fruit</i>*</b>	S216	5.68	Low High	5.07 6.06		
<b>I enjoy eating <i>vegetables</i>*</b>	S217	5.68	Low High	5.26 5.93		
I eat <i>fruit</i> as a snack	S23	5.66	Low High	5.09 6.01	<b>M*</b> <b>F</b>	5.29 5.82
<b><i>Fruit</i> is important to my diet*</b>	S214	5.64	Low High	4.90 6.09		
<b><i>Vegetables</i> are important part of my food shopping budget*</b>	S278	5.54	Low High	4.92 5.93		
The <u>amount</u> of <i>vegetables</i> I eat is affected by me alone	S224	5.53	Low High	5.45 5.58	<b>M*</b> <b>F</b>	4.96 5.78
<b>I have a varied diet*</b>	S255	5.46	Low High	4.88 5.82		
My diet is different when I am on holiday	S295	5.37	Low High	5.52 5.28		
I look forward to meal times	S220	5.36	Low High	5.16 5.49		
<b><i>Fruit</i> is an important part of my food shopping budget*</b>	S277	5.32	Low High	4.45 5.85		



My eating patterns (type, amounts, regularity of food) are different when I am at work to when I am not at work	S2107	5.25	Low High	5.29 5.22	
When on holiday the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different	S296	5.21	Low High	5.11 5.26	
When on holiday the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different	S297	5.18	Low High	5.18 5.18	
Restaurant and takeaway food is different to that which I eat/make at home	S294	5.13	Low High	5.12 5.13	
<b>I am happy with the <u>variety</u> of <i>vegetables</i> I eat*</b>	S212	5.10	Low High	4.46 5.50	
My diet is different to that when I lived at home with parents/guardians	S2106	5.10	Low High	5.24 5.01	
<b>I am responsible for doing the food shopping</b>	S262	5.08	Low High	4.76 5.28	<b>M*</b> 3.86 <b>F</b> 5.62
<b>I eat <i>fruit</i> at work</b>	S2112	5.08	Low High	4.68 5.33	
<b>I am happy with the <u>variety</u> of <i>fruit</i> I eat*</b>	S211	5.03	Low High	4.32 5.46	
<b>I am happy about the food I eat*</b>	S213	4.99	Low High	4.47 5.30	
<i>Vegetables</i> are good value for money	S286	4.97	Low High	4.82 5.07	
<b>I am responsible for the preparation, and cooking of the food within the household.</b>	S225	4.97	Low High	4.66 5.16	<b>M</b> 3.96 <b>F</b> 5.42
The <u>type</u> of <i>vegetables</i> I eat has changed over my adult life	S2101	4.97	Low High	4.82 5.05	
<b>I eat the <u>amount</u> of <i>vegetables</i> I do for general health well-being *</b>	S230	4.95	Low High	4.20 5.42	
I generally bring food from home to eat while at work	S2111	4.95	Low High	4.80 5.03	
The <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is different on a Saturday & Sunday to the rest of the week	S266	4.93	Low High	4.90 4.95	
I have good self esteem (feel good about myself generally)	S289	4.92	Low High	4.82 4.98	
<b>I decide what is eaten and bought to eat within the household</b>	S226	4.89	Low High	4.54 5.11	<b>M</b> 3.92 <b>F</b> 5.32
<b>I eat the <u>amount</u> of <i>fruit</i> I do for general health well-being*</b>	S229	4.87	Low High	4.07 5.37	
<b>I am happy with the <u>amount</u> of <i>vegetables</i> that I eat*</b>	S210	4.87	Low High	4.11 5.33	
<b>I have always eaten lots of <i>vegetables</i>*</b>	S288	4.87	Low High	4.25 5.24	
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different to when I lived with parents/guardians	S2105	4.86	Low High	4.91 4.82	
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different to when	S2104	4.86	Low	4.82	

I lived with parents/guardians			High	4.88		
<b>I like to try <i>fruit</i> and <i>vegetables</i> that I am not used to*</b>	S28	4.84	Low	4.22		
			High	5.22		
The <u>amount</u> of <i>vegetables</i> I eat has changed over my adult life	S299	4.84	Low	4.84		
			High	4.84		
The <u>type</u> of <i>fruit</i> I eat has changed over my adult life	S2100	4.84	Low	4.59	<b>M</b>	4.44
			High	4.99	<b>F</b>	5.01
The <u>amount</u> of <i>fruit</i> I eat has changed over my adult life	S298	4.81	Low	4.63		
			High	4.93		
<i>Fruit</i> is good value for money	S285	4.81	Low	4.64		
			High	4.91		
The season affects the <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S261	4.80	Low	4.64		
			High	4.90		
Everyone in the house eats similar <u>types</u> of <i>vegetables</i>	S2126	4.78	Low	4.73		
			High	4.82		
<b>I eat <i>fruit</i> as a meal or as part of a meal*</b>	S21	4.78	Low	3.76		
			High	5.41		
The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by being at work	S2109	4.78	Low	4.53		
			High	4.93		
The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by being at work	S2108	4.75	Low	4.54		
			High	4.89		
Everyone in the house eats the same foods generally	S2128	4.72	Low	4.56		
			High	4.81		
<b>I am happy with the <u>amount</u> of <i>fruit</i> that I eat*</b>	S29	4.72	Low	3.75		
			High	5.31		
Everyone in the house eats similar <u>types</u> of <i>fruit</i>	S2127	4.67	Low	4.40		
			High	4.83		
The season affects the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S260	4.59	Low	4.40		
			High	4.71		
<b>I have always eaten lots of <i>fruit</i>*</b>	S287	4.56	Low	3.65		
			High	5.11		
The food for the household is bought with a plan of what meals are to be made and what will be eaten before the next shopping trip	S263	4.56	Low	4.33		
			High	4.70		
<i>Vegetables</i> are cheap to buy	S284	4.54	Low	4.49	<b>M</b>	4.86
			High	4.57	<b>F</b>	4.40
Everyone in the house eats similar <u>amounts</u> of <i>vegetables</i>	S2125	4.54	Low	4.47		
			High	4.59		
<b>I exercise regularly*</b>	S233	4.54	Low	4.05		
			High	4.84		
The <u>amount</u> of <i>vegetables</i> I eat is affected by what I am doing on that day	S268	4.54	Low	4.38	<b>M</b>	4.21
			High	4.64	<b>F</b>	4.69
The <u>amount</u> of <i>fruit</i> I eat is affected by what I am doing on that day	S267	4.52	Low	4.48		
			High	4.55		
<b>I listen and act on health advice/promotion/information in other general areas such as smoking or exercise</b>	S272	4.51	Low	4.04		
			High	4.79		

I would like to eat out at restaurants more than I do	S292	4.48	Low	4.60		
			High	4.40		
The way that I feel about myself affects the food I eat	S290	4.40	Low	4.33		
			High	4.45		
The <u>amount</u> and <u>type</u> of <i>fruit &amp; vegetables</i> I eat is affected by how available they are at work	S2110	4.36	Low	4.26		
			High	4.42		
I eat with a person / or people (other than those who live within the house) regularly	S221	4.29	Low	3.71		
			High	4.64		
I eat <i>fruit</i> rather than sweets, crisps or chocolate	S25	4.28	Low	3.35		
			High	4.85		
The price of <i>fruit</i> affects the <u>type</u> of <i>fruit</i> I eat	S281	4.27	Low	4.20		
			High	4.32		
<b>I have deliberately changed the <u>amount</u> and <u>type</u> of fruit and vegetables I eat</b>	S2103	4.23	Low	3.86		
			High	4.47		
<b>I would prefer to eat <i>fruit</i> or <i>vegetables</i> as a snack rather than crisps or sweets/chocolate</b>	S27	4.23	Low	3.74		
			High	4.53		
<b>I am interested in where the <i>fruit &amp; vegetables</i> I eat come from &amp; how they are grown</b>	S241	4.23	Low	3.79	<b>M</b>	3.73
			High	4.50	<b>F</b>	4.45
Everyone in the house eats similar <u>amounts</u> of <i>fruit</i>	S2130	4.23	Low	3.77	<b>M</b>	3.78
			High	4.51	<b>F</b>	4.42
<b>I have deliberately changed the food I eat</b>	S2102	4.22	Low	3.75		
			High	4.51		
The way I feel about myself affects the <u>amount</u> and type of fruit and vegetables I eat	S291	4.20	Low	4.11	<b>M</b>	3.85
			High	4.25	<b>F</b>	4.35
<i>Fruit</i> is cheap to buy	S283	4.18	Low	4.14	<b>M*</b>	4.59
			High	4.21	<b>F</b>	4.01
The price of <i>vegetables</i> affects the <u>type</u> of <i>vegetables</i> I eat	S282	4.13	Low	4.07		
			High	4.18		
The foods I eat are affected by those that I live with	S2129	4.08	Low	4.16		
			High	4.02		
<b>I eat the <u>amount</u> of <i>fruit</i> I do as part of reducing or controlling my weight</b>	S231	4.07	Low	3.49	<b>M</b>	3.52
			High	4.43	<b>F</b>	4.31
<b>I eat the <u>amount</u> of <i>vegetables</i> I do as part of reducing or controlling my weight</b>	S232	4.06	Low	3.60		
			High	4.34		
<b>Health advice/promotion/information affects the food I eat</b>	S269	4.01	Low	3.67		
			High	4.22		
I eat meals at the same time each day	S264	4.01	Low	3.97		
			High	4.04		
<b>I eat <i>vegetables</i> at work</b>	S2113	4.00	Low	3.48		
			High	4.31		
<b>I am always thinking about food</b>	S219	3.98	Low	3.67		
			High	4.18		
<b>Health advice/promotion/information affects the amount of fruit I eat</b>	S270	3.93	Low	3.58		
			High	4.14		
The price of <i>fruit</i> affects the <u>amount</u> of <i>fruit</i> I eat	S279	3.92	Low	3.89		
			High	3.95		

The possible waste of <i>vegetables</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S252	3.92	Low High	3.97 3.89		
The possible waste of <i>fruit</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S251	3.91	Low High	3.98 3.86		
My children's eating habits affect the <u>amount</u> and <u>type</u> of fruit I eat	S2114	3.90	Low High	3.87 3.93		
My children's eating habits affect the <u>amount</u> and <u>type</u> of vegetables I eat	S2115	3.90	Low High	3.85 3.93		
<b>Health advice/promotion/information affects the amount of vegetables I eat</b>	S271	3.89	Low High	3.53 4.11		
The possible waste of <i>fruit</i> affects the <u>amount</u> bought (from preparation and from having to throw out food)	S250	3.88	Low High	3.93 3.84		
The possible waste of <i>vegetables</i> affects the <u>amount</u> bought (from preparation, and food thrown out not eaten)	S249	3.87	Low High	3.84 3.89		
<b>I plan the <u>amount</u> of <i>vegetables</i> I eat during the day</b>	S257	3.86	Low High	3.02 4.38	<b>M</b>	3.49
<b>I plan the <u>amount</u> of <i>fruit</i> I eat during the day</b>	S256	3.84	Low High	2.93 4.40	<b>M</b> <b>F</b>	3.37 4.05
The amount of free time I have affects the <u>amount</u> of vegetables I eat	S248	3.84	Low High	3.84 3.84		
<b>I exercise regularly for health reasons</b>	S234	3.82	Low High	3.29 4.16		
The amount of free time I have affects the <u>amount</u> of fruit I eat	S247	3.79	Low High	3.79 3.79		
The price of <i>vegetables</i> affects the <u>amount</u> of vegetables I eat	S280	3.78	Low High	3.67 3.85		
<b>I exercise regularly to lose or control my weight</b>	S235	3.77	Low High	3.24 4.10		
My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2116	3.75	Low High	3.73 3.77		
The <u>type</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2120	3.75	Low High	4.00 3.59		
The <u>amount</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2119	3.74	Low High	3.99 3.58	<b>M</b> <b>F</b>	4.11 3.57
Other people (other than those I live with) have an affect on the food I eat	S222	3.71	Low High	3.58 3.78		
<b>The only time I will eat <i>fruit</i> is when I fancy them*</b>	S273	3.70	Low High	4.47 3.23		
The <u>amount</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2117	3.68	Low High	3.82 3.59		
My spouse or partner affects the <u>type</u> of <i>vegetables</i> I eat	S2124	3.66	Low High	3.78 3.58	<b>M</b> <b>F</b>	4.48 3.30
My spouse or partner affects the <u>amount</u> of <i>vegetables</i> I eat	S2123	3.63	Low High	3.75 3.55	<b>M</b> <b>F</b>	4.41 3.28

The <u>type</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2118	3.59	Low	3.73	<b>M</b>	3.97
			High	3.51	<b>F</b>	3.42
<b>I eat <i>vegetables</i> as a snack*</b>	S24	3.54	Low	2.95	<b>M</b>	3.16
			High	3.91	<b>F</b>	3.70
I eat the same <i>vegetables</i> in the same amounts everyweek	S259	3.53	Low	3.30		
			High	3.68		
My spouse or partner affects the <u>amount</u> of <i>fruit</i> I eat	S2121	3.45	Low	3.48	<b>M</b>	3.90
-	-	-	High	3.43	<b>F</b>	3.25
My spouse or partner affects the <u>type</u> of <i>fruit</i> I eat	S2122	3.43	Low	3.45		
			High	3.42		
<b>I eat the same <i>fruit</i> in the same amounts every week</b>	S258	3.41	Low	3.11	<b>M</b>	3.77
			High	3.60	<b>F</b>	3.26
<b>I eat <i>vegetables</i> rather than sweets, crisps or chocolate*</b>	S26	3.38	Low	2.63		
			High	3.84		
<b>Where <i>fruit</i> and <i>vegetables</i> are grown &amp; how they are grown affects the type I eat</b>	S243	3.37	Low	2.85		
			High	3.70		
<b>The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by a specific health concern*</b>	S227	3.28	Low	2.57		
			High	3.72		
<b>The only time I will eat <i>vegetables</i> is when I fancy them*</b>	S274	3.28	Low	3.66		
			High	3.05		
<b>The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by a specific health concern*</b>	S228	3.22	Low	2.55		
			High	3.63		
<b>Where <i>fruit</i> and <i>vegetables</i> are grown &amp; how they are grown affects the amount I eat*</b>	S242	3.15	Low	2.59		
			High	3.50		
I generally eat the same food(s) every day	S265	3.06	Low	2.99		
			High	3.10		
I play a part in growing or collecting some of the <i>fruit</i> and <i>vegetables</i> I eat	S240	2.97	Low	2.95		
			High	2.99		
I would like to eat takeaway food more than I do	S293	2.95	Low	3.14		
			High	2.84		
<b>The only time I will eat <i>fruit</i> is when I can be bothered*</b>	S275	2.86	Low	3.19		
			High	2.66		
The food I eat or cook is usually processed when bought (e.g. from a packet, ready meal)	S244	2.78	Low	2.98		
			High	2.66		
<b>The only time I will eat <i>vegetables</i> is when I can be bothered*</b>	S276	2.68	Low	3.10		
			High	2.42		
I compete in sport regularly	S236	2.51	Low	2.49	<b>M*</b>	3.15
			High	2.52	<b>F</b>	2.23
The food I eat is affected by competing in sport	S237	2.18	Low	2.07		
			High	2.24		
The <u>amount</u> of <i>vegetables</i> I eat is affected by playing or competing in sport	S239	2.15	Low	2.09		
			High	2.19		
The <u>amount</u> of <i>fruit</i> I eat is affected by playing or competing in sport	S238	2.10	Low	1.93		
			High	2.20		

\* utilised Levene Statistical Test

## Appendix 14 Factor Analysis: Attitude & Behaviour Data

### Communalities

No.	Initial	Extraction	Extraction	Extraction	Extraction	Extraction	Extraction	Extraction	Extraction	
S21	1.000	0.721	S231	0.902	S261	0.786	S291	0.830	S2121	0.870
S22	1.000	0.590	S232	0.886	S262	0.839	S292	0.713	S2122	0.889
S23	1.000	0.679	S233	0.803	S263	0.616	S293	0.609	S2123	0.849
S24	1.000	0.718	S234	0.785	S264	0.702	S294	0.665	S2124	0.860
S25	1.000	0.719	S235	0.788	S265	0.656	S295	0.781	S2125	0.830
S26	1.000	0.793	S236	0.794	S266	0.633	S296	0.872	S2126	0.843
S27	1.000	0.676	S237	0.856	S267	0.829	S297	0.880	S2127	0.821
S28	1.000	0.618	S238	0.901	S268	0.764	S298	0.780	S2128	0.779
S29	1.000	0.792	S239	0.815	S269	0.891	S299	0.780	S2129	0.627
S210	1.000	0.823	S240	0.671	S270	0.914	S2100	0.836	S2130	0.733
S211	1.000	0.797	S241	0.771	S271	0.914	S2101	0.820		
S212	1.000	0.785	S242	0.828	S272	0.688	S2102	0.766		
S213	1.000	0.785	S243	0.817	S273	0.823	S2103	0.783		
S214	1.000	0.779	S244	0.640	S274	0.745	S2104	0.857		
S215	1.000	0.761	S245	0.707	S275	0.775	S2105	0.867		
S216	1.000	0.750	S246	0.762	S276	0.736	S2106	0.809		
S217	1.000	0.715	S247	0.825	S277	0.790	S2107	0.740		
S218	1.000	0.744	S248	0.833	S278	0.762	S2108	0.803		
S219	1.000	0.706	S249	0.858	S279	0.879	S2109	0.816		
S220	1.000	0.763	S250	0.905	S280	0.838	S2110	0.667		
S221	1.000	0.734	S251	0.922	S281	0.877	S2111	0.694		
S222	1.000	0.717	S252	0.918	S282	0.858	S2112	0.787		
S223	1.000	0.831	S253	0.843	S283	0.818	S2113	0.692		
S224	1.000	0.828	S254	0.853	S284	0.794	S2114	0.935		
S225	1.000	0.846	S255	0.714	S285	0.825	S2115	0.944		
S226	1.000	0.839	S256	0.789	S286	0.828	S2116	0.815		
S227	1.000	0.846	S257	0.831	S287	0.745	S2117	0.839		
S228	1.000	0.881	S258	0.823	S288	0.713	S2118	0.872		
S229	1.000	0.780	S259	0.815	S289	0.713	S2119	0.892		
S230	1.000	0.777	S260	0.804	S290	0.840	S2120	0.886		

Extraction Method: Principal Component Analysis.

## **Appendix 15** Themed Factor Analyses of the Attitude & Behaviour Statements

The statements which were found to relate to particular factors from the original solution were thematically grouped into valid concepts for a separate analysis; one relating to 'others' and interruptions (Group 1), the second indentifying motives and food characteristics (Group 2), and the third relating to importance and relationship with fruit and vegetables (Group 3).

The sample to variable ratio for each was 4.3/1, 8.9/1, and 5.3/1 respectively. Factorability for each of the groups of variables was assessed as acceptable using correlation coefficients and anti image correlations as presented in SPSS. In support of this the Kaiser Meyer Olkin (KMO) measure for each was .746, .751, and .801 (all above 'Middling'). Significant sphericity using Bartlett's Test was observed for each group (.000). Communalities across the statement variables utilised for the factor analyses were reasonable (Group 1 range .521 - .952, one at .423; Group 2 .609 - .950; Group 3 .524 - .939).

The three factor solutions used principal component analysis with Varimax rotation, where the number of factors for each solution was indicated by Eigenvalues reaching unity. Group 1 (56 variables) produced a 15 factor solution explaining 76.1 percent of variation with the largest component near 14 percent (rotation sums of squared loading). Group 2 (27 variables) produced a solution with 8 factors, explaining 83.1 percent of variance with the largest component 13 percent (rotation sums of squared loading), and Group 3 (45 variables) produced a solution of 11 factors with 69.4 percent of variation explained, the largest component near 12 percent (rotation sums of squared loading). Appendix Table 10 presents the statements loaded strongly on to each of the factors from the analyses, where a near 0.4 level or above was considered suitable in relation to the sample size.

Table Appendix 15 Factor Solution and Loadings

(\*near 0.400, S2" corresponds to statement reference, ." is Factor Loading)

## Group 1 Factor Analysis Solution

Eating Out			Effect of Significant Others			Significance of Social Others		
I would like to eat out at restaurants more than I do	S292	.741	The <u>type</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2118	.913	I eat with a person / or people (other than those who live within the house) regularly	S221	.769
I would like to eat takeaway food more than I do	S293	.722	My spouse or partner affects the <u>type</u> of <i>fruit</i> I eat	S2122	.895	Other people (other than those I live with) have an effect on the food I eat	S222	.814
Restaurant and takeaway food is different to that which I eat/make at home	S294	.562	The <u>amount</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2119	.899			
			My spouse or partner affects the <u>amount</u> of <i>fruit</i> I eat	S2121	.885			
			The <u>type</u> of <i>vegetables</i> I eat is affected by my spouse's or partner's eating habits	S2120	.892			
			My spouse or partner affects the <u>type</u> of <i>vegetables</i> I eat	S2124	.847			
			The <u>amount</u> of <i>fruit</i> I eat is affected by my spouse's or partner's eating habits.	S2117	.870			
			My spouse or partner affects the <u>amount</u> of <i>vegetables</i> I eat	S2123	.834			
			The foods I eat are affected by those that I live with	S2129	.619			
			My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2116	.419			
Self Determination			Schedule Effect			Free Time		
The <u>amount</u> of <i>vegetables</i> I eat is affected by me alone	S224	.837	The <u>amount</u> of <i>vegetables</i> I eat is affected by what I am doing on that day	S268	.680	The amount of free time I have affects the <u>amount</u> of <i>fruit</i> I eat	S247	.881
The <u>amount</u> of <i>fruit</i> I eat is affected by me alone	S223	.817	The <u>amount</u> of <i>fruit</i> I eat is affected by what I am doing on that day	S267	.698	The amount of free time I have affects the <u>amount</u> of <i>vegetables</i> I eat	S248	.871
			The <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is different on a Saturday and Sunday	S266	.659			



Changing Diet			Constancy			Differences to Parental Influence		
The <u>type</u> of <i>fruit</i> I eat has changed over my adult life	S2100	.818	I eat the same <i>vegetables</i> in the same amounts every week	S259	.875	My diet is different to that when I lived at home with parents/guardians	S2106	.861
The <u>type</u> of <i>vegetables</i> I eat has changed over my adult life	S2101	.819	I eat the same <i>fruit</i> in the same amounts every week	S258	.870	The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different to when I lived with parents/guardians	S2105	.850
The <u>amount</u> of <i>vegetables</i> I eat has changed over my adult life	S299	.767	I generally eat the same food(s) every day	S265	.523	The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different to when I lived with parents/guardians	S2104	.828
The <u>amount</u> of <i>fruit</i> I eat has changed over my adult life	S298	.755	I eat meals at the same time each day	S264	.514			
I have deliberately changed the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2103	.741						
I have deliberately changed the food I eat	S2102	.733						
Seasonal Effect			Holiday Differences			Children		
The <u>amount</u> of <i>fruit</i> I eat is affected by what I am doing on that day	S267	.404	When on holiday the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is different	S296	.891	My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>fruit</i> I eat	S2114	.904
The season affects the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S260	.839	When on holiday the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is different	S297	.870	My children's <b>eating habits</b> affect the <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat	S2115	.900
The season affects the <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S261	.808	My diet is different when I am Holiday	S295	.763	My children affect the <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat	S2116	.755
Primary Responsibility for Food Process			Work Environment			Similarity of Household Diet		
I am responsible for the preparation, and cooking of the food within the household.	S225	.867	The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by being at work	S2109	.803	Everyone in the house eats similar <u>types</u> of <i>fruit</i>	S2127	.863
I am responsible for doing the food shopping	S262	.884	The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by being at work	S2108	.772	Everyone in the house eats similar <u>types</u> of <i>vegetables</i>	S2126	.871
I decide what is eaten and bought to eat within the household	S226	.875	My eating patterns (type, amounts, regularity of food) are different when I am at work to when I am not at work	S2107	.633	Everyone in the house eats similar <u>amounts</u> of <i>vegetables</i>	S2125	.851
(1 Variable elsewhere S263)			The <u>amount</u> and <u>type</u> of <i>fruit</i> & <i>vegetables</i> I eat is affected by how available they are at work	S2110	.741	Everyone in the house eats the same foods generally	S2128	.791
						Everyone in the house eats similar <u>amounts</u> of <i>fruit</i>	S2130	.721

**Group 2 Factor Analysis Soln.**

Wastage			Price			Health Conscious		
The possible waste of <i>fruit</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S251	.924	The price of <i>vegetables</i> affects the <u>type</u> of <i>vegetables</i> I eat	S282	.898	Health advice/promotion/information affects the <u>amount</u> of <i>fruit</i> I eat	S270	.941
The possible waste of <i>vegetables</i> affects the <u>type</u> bought (from preparation and from having to throw out food)	S252	.932	The price of <i>fruit</i> affects the <u>type</u> of <i>fruit</i> I eat	S281	.909	Health advice/promotion/information affects the <u>amount</u> of <i>vegetables</i> I eat	S271	.934
The possible waste of <i>fruit</i> affects the <u>amount</u> bought (from preparation and from having to throw out food)	S250	.933	The price of <i>fruit</i> affects the <u>amount</u> of <i>fruit</i> I eat	S279	.917	Health advice/promotion/information affects the food I eat	S269	.929
The possible waste of <i>vegetables</i> affects the <u>amount</u> bought (from preparation, and food thrown out not eaten)	S249	.907	The price of <i>vegetables</i> affects the <u>amount</u> of <i>vegetables</i> I eat	S280	.904	I listen and act on health advice/promotion/information in other general areas such as smoking or exercise	S272	.682
Sport			Origin			Exercise		
The <u>amount</u> of <i>fruit</i> I eat is affected by playing or competing in sport	S238	.922	Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>type</u> I eat	S243	.836	I exercise regularly	S233	.882
The food I eat is affected by competing in sport	S237	.889	Where <i>fruit</i> and <i>vegetables</i> are grown & how they are grown affects the <u>amount</u> I eat	S242	.830	I exercise regularly for health reasons	S234	.827
The <u>amount</u> of <i>vegetables</i> I eat is affected by playing or competing in sport	S239	.825	I am interested in where the <i>fruit</i> & <i>vegetables</i> I eat come from & how they are grown	S241	.829	I exercise regularly to lose or control my weight	S235	.727
I compete in sport regularly	S236	.795	I play a part in growing or collecting some of the <i>fruit</i> and <i>vegetables</i> I eat	S240	.627			
Weight Control			Specific Health Concern					
I eat the <u>amount</u> of <i>vegetables</i> I do as part of reducing or controlling my weight	S232	.926	The <u>amount</u> and <u>type</u> of <i>vegetables</i> I eat is affected by a specific health concern	S228	.900			
I eat the <u>amount</u> of <i>fruit</i> I do as part of reducing or controlling my weight	S231	.927	The <u>amount</u> and <u>type</u> of <i>fruit</i> I eat is affected by a specific health concern	S227	.913			

Group 3 Factor Analysis Soln.

General Importance & Enjoyment			Fruit Prominence			Value		
Vegetables are important to my diet	S215	.531	I enjoy eating <i>fruit</i>	S216	.710	Vegetables are cheap to buy	S284	.858
Vegetables are important part of my food shopping budget	S278	.520	I eat the amount of fruit I do for general health	S229	.540	Fruit is cheap to buy	S283	.880
I enjoy eating <i>vegetables</i>	S217	.485	I eat <i>fruit</i> as a meal or as part of a meal	S21	.483	Vegetables are good value for money	S286	.839
I am happy about the food I eat	S213	.717	Fruit is important to my diet	S214	.551	Fruit is good value for money	S285	.859
I have always eaten lots of <i>vegetables</i>	S288	.585	I eat <i>fruit</i> at work	S112	.601			
I am happy with the <u>variety</u> of <i>vegetables</i> I eat	S212	.740	I have always eaten lots of <i>fruit</i>	S287	.527			
I am happy with the <u>amount</u> of <i>fruit</i> that I eat	S29	.698	I eat <i>fruit</i> rather than sweets, crisps or chocolate	S25	.399*			
I am happy with the <u>amount</u> of <i>vegetables</i> that I eat	S210	.851	I am happy with the <u>variety</u> of <i>fruit</i> I eat	S211	.450			
I am happy with the <u>variety</u> of <i>fruit</i> I eat	S211	.633	I am happy with the <u>amount</u> of <i>fruit</i> that I eat	S29	.443			
I have always eaten lots of <i>fruit</i> (variable S255 elsewhere)	S287	.404	I have always eaten lots of <i>fruit</i> (4 additional fruit variables, S23 elsewhere)	S287	.527			
Mood			Snacking			Self Esteem		
The only time I will eat <i>fruit</i> is when I fancy them	S273	.770	I eat <i>vegetables</i> rather than sweets, crisps or chocolate	S26	.820	The way that I feel about myself affects the food I eat	S290	.834
The only time I will eat <i>fruit</i> is when I can be bothered	S275	.705	I would prefer to eat <i>fruit</i> or <i>vegetables</i> as a snack rather than crisps or sweets/chocolate	S27	.659	The way I feel about myself affects the <u>amount</u> and <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat	S291	.843
The only time I will eat <i>vegetables</i> is when I fancy them	S274	.800	I eat <i>vegetables</i> as a snack	S24	.701			
The only time I will eat <i>vegetables</i> is when I can be bothered	S276	.651	I eat fruit rather than sweets crisps or chocolate	S25	.589			
Preplanning of Daily Intake			Prominence of Food Thought			Taste		
I plan the <u>amount</u> of <i>vegetables</i> I eat during the day	S257	.882	I am always thinking about food	S219	.765	The <u>amount</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S254	.834
I plan the <u>amount</u> of <i>fruit</i> I eat during the day	S256	.874	Food is important to my daily life	S218	.734	The <u>type</u> of <i>fruit</i> and <i>vegetables</i> I eat is affected by how they taste	S253	.890
			I look forward to meal times	S220	.689			
Ease of Preparation			General Happiness			( the vegetable prominence variables have combined as part of General Importance)		
Vegetables are easy to prepare and use	S246	.782	I have good self esteem (feel good about myself generally)	S289	.636			
Fruit is easy to prepare and use	S245	.797	I have a varied diet	S55	.512			

## Appendix 16 Cluster Analysis: Attitude & Behaviour Responses

### Anova Results for Average Portions per Day & (Separately) Average Age

		N	Mean	Std. Deviation
AvPtnsDay	1	27	7.65	4.25
	2	82	4.44	2.79
	3	68	7.68	3.26
	4	44	8.11	3.60
	5	11	6.02	2.48
	6	7	1.93	1.24
	Total	239	6.40	3.66
Av. Age	1	26	49.6	14.8
	2	81	43.1	15.7
	3	67	52.8	15.5
	4	43	50.3	12.4
	5	11	40.1	12.4
	6	7	38.4	14.8
	4 missing Total	235	47.6	15.4

#### Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
AvPtnsDay	2.385	5	233	.039
Av. Age	1.428	5	229	.215

#### ANOVA Results

		Sum of Squares	df	Mean Square	F	Sig.
AvPtnsDay	Between Groups	739.767	5	147.953	14.124	.000
	Within Groups	2440.666	233	10.475		
	Total	3180.433	238			
Av. Age	Between Groups	5111.157	5	1022.231	4.648	.000
	Within Groups	50365.243	229	219.936		
	Total	55476.400	234			

#### Robust Tests of Equality of Means

		Statistic(a)	df1	df2	Sig.
AvPtnsDay	Welch	24.729	5	43.082	.000
	Brown-Forsythe	15.866	5	124.865	.000
Av. Age	Welch	4.410	5	38.313	.003
	Brown-Forsythe	5.054	5	83.754	.000

a Asymptotically F distributed.

## Crosstabulations

### Gender\*Attitude Behaviour Clusters Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	6.524(a)	5	.259	.260
Fisher's Exact Test	6.397			.263
N of Valid Cases	239			

a 3 cells (25.0%) have expected count less than 5. The minimum expected count is 2.14.

### High & Low Consumer\* Attitude Behaviour Clusters Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	59.990(a)	5	.000	.000
Fisher's Exact Test	59.977			.000
N of Valid Cases	239			

a 3 cells (25.0%) have expected count less than 5. The minimum expected count is 2.67.

b The standardized statistic is 1.733.

### Takeaway Usage\*Attitude Behaviour Clusters Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	31.614(a)	5	.000	.000
Likelihood Ratio	34.645	5	.000	.000
Fisher's Exact Test	33.810			.000
N of Valid Cases	239			

a 3 cells (25.0%) have expected count less than 5. The minimum expected count is 2.64.

### Shop Prepared Food Usage\* Attitude Behaviour Clusters Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	38.507(a)	5	.000	.000
Likelihood Ratio	40.115	5	.000	.000
Fisher's Exact Test	38.799			.000
N of Valid Cases	239			

a 2 cells (16.7%) have expected count less than 5. The minimum expected count is 3.34.