Making Vegetables Desirable: Improving the Eating Habits of Wales' Younger Generation

Alice Sophie Melissa Mort Gilmour

BA (Hons) and MSc

A thesis submitted to Cardiff Metropolitan University School of Art & Design in partial fulfilment of the requirements for the degree of Doctor of Philosophy (PhD)

May 2020

Director of Studies: Professor Steve Gill

Supervisors: Professor Gareth Loudon and Dr Amanda Squire

Advisors: Martin Sutherland and Joe Baldwin

Puffin Produce

Abstract

Existing literature exposes poor eating habits and low vegetable consumption as rife amongst adolescents. Increased autonomy in relation to decision-making around food often follows the onset of secondary school education. Studies have shown that adolescents are vulnerable to peer pressure because they want to fit in with their peers. The aim of this research was to develop a detailed insight into young adolescents' (aged 11- to 13-years-old) behaviour concerning vegetables through exploratory research. The findings will inform the vegetable marketing of the company partner, *Puffin Produce* (who currently package Welsh fresh produce for supermarkets across Wales). A triangulated research methodology incorporated quantitative and qualitative data collection predominantly from schools in South Wales. Phase One involved collecting data from school canteen purchases (n=3 secondary schools), qualitative school catering manager interviews (n=6), catering staff focus groups (n=14) and parent focus groups (n=5). Phase Two included school canteen observations (n=3 secondary schools) and adolescent focus groups (n=42). A design period preceded the participatory design research with adolescents (n=41) and final parent focus groups (n=16) (Phase Three). Abductive thematic analysis resulted in numerous themes, the three most pertinent being convenience, taste preferences and parenting. This study fills three identified 'gaps' in the literature: the novel use of catering staff participants, the geographical research area of South Wales and the incorporation of adolescents in the participatory design research. The original contributions to knowledge includes an understanding into the factors influencing Welsh adolescents' (aged 11- to 13-years-old) attitudes towards vegetables in addition to their food consumption routines and behaviours. Moreover, these insights are of commercial interest and could potentially inform the marketing communications of food companies seeking to target this market and improve healthful eating. The NPD process resulted in a vegetable-based snacking concept that is innovative yet feasible, suitable for *Puffin Produce* to develop further.

Acknowledgements

The completion of this thesis would have been impossible without the assistance and support of numerous people and organisations. I would like to thank my Director of Studies, Steve Gill and my supervisors, Gareth Loudon and Amanda Squire for their knowledge, clear direction and encouragement over the past few years. In addition, Martin Sutherland and Joe Baldwin are recognised for their help, advice and support.

I would like to acknowledge the funding and company partner that enabled this PhD research to be undertaken. KESS2 provided a monthly stipend over the three years of research besides allowances for travel, conferences, equipment, consumables and training development. The company partner (*Puffin Produce*) are thanked for their involvement in the KESS2 project. Additionally, Cardiff Metropolitan University for waiving the UK tuition fees for the duration of the project.

Thank you to each of the 121 participants, the three secondary schools and the staff gatekeepers, without whom this study would not have been feasible. In particular, the willingness to share experiences and take part in the focus groups with great enthusiasm and much laughter made facilitating the sessions a pleasure.

I would also like to thank my family for their support.

Table of Contents

List of Tables and Figures

Glossary of Abbreviations and Terms

Acronym	
AHDB	Agriculture and Horticulture Development Board
ASA	Advertising Standards Authority
BED	Binge Eating Disorder
BMI	Body Mass Index
CAP	Committee of Advertising Practice
COMA	Committee on Medical Aspects
CSAD	Cardiff School of Art and Design
CVD	Cardiovascular Disease
DBS	Disclosure and Barring Service
DEFRA	Department for Environment, Food and Rural Affairs
DoH	Department of Health
DRVs	Daily Reference Values
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
EST	Ecological Systems Theory (Bronfenbrenner)
FDF	Food and Drink Federation
fMRI	Functional Magnetic Resonance Imaging
FoP	Front-Of-Pack labelling
FSA	Food Standards Agency
FSM	Free School Meal
GDAs	Guideline Daily Amounts
HFSS	High in Fat, Salt and Sugar
HS	Healthy Start
KESS2	Knowledge Economy Skills Scholarship, Phase 2
KS3	Key Stage Three
PE	Physical Education
PEL	Perceptual Experience Laboratory
PhD	Doctor of Philosophy
PHE	Public Health England
PGI	Protected Geographical Indication
LEA	Local Educational Authority
LOC	Loss of Control
NCDs	Non-communicable Diseases
NDNS	National Diet and Nutrition Survey
NFU	National Farmers' Union
NHS	National Health Service
NPD	New Product Development
Ofsted	Office for Standards in Education
OPA	Obstructive Sleep Apnoea

ONS	Office for National Statistics
RNI	Reference Nutrient Intake
SACN	Scientific Advisory Committee on Nutrition
SES	Socio-economic Status
SLT	Social Learning Theory (Bandura)
SFVS	School Fruit and Vegetable Scheme
TCD	Theory of Cognitive Development (Piaget)
TPB	Theory of Planned Behaviour (Arjzen)
UK	United Kingdom
UN	United Nations
WHO	World Health Organisation

Term	
Adolescents	The period of time when an individual develops from a child into an adult. The term 'adolescents' encompass 10- to 19-year olds, including children that are younger than the teenage years (World Health Organisation, no date c).
Advertising Standards Authority	Regulates UK advertisements to ensure that they are truthful and socially responsible.
Body Mass Index	A person's weight in kilograms (kg) divided by their height in meters squared. A healthy BMI in is considered to be 20 to 25, being outside this healthy rage may mean that health risks are increased. For children, BMI centile is gender specific (National Health Service, no date e).
Breakfast	The first meal of the day, eaten in the morning.
Calorie	The energy required to increase the temperature of one gram of water by 1 °C. Unit of energy used for foods and drink products (Live Science, 2015).
Cool	Defies definition (see Section 2.6.1.).
Culture	'…the total pattern of a group's customs, beliefs, art and technology. Thus a culture is a group's common way of life, passed on from one generation to the next' (Arnett and Hughes, 2012: p. 7).
Constructivism	Meanings are constructed, rather than discovered. Social phenomena and meanings are continuously developed by social actors. Subjects construct their own meanings, different to others.
Data Protection Act	The 2018 Act provides new data protection standards based on data processing and creates new rights (Department for Digital Cultural Media & Sport, 2018).
Diet	The food and drink regularly consumed by an individual.

Ethics	The study of the 'right behaviour' and addresses how to conduct research in a moral and responsible way.
Energy Intake	Total energy content of the foods consumed, mostly carbohydrates (4 kcal/g), protein (4 kcal/g) and fat (9 kcal/g).
Fast Food	Processed, easily prepared foods often served to take away.
Flexitarian	An individual eating a primarily vegetarian diet, with the occasional inclusion of meat or fish.
Food Insecurity	Disruption of food intake or regular eating patterns due to poverty and lack of resources.
Gatekeepers	'A gatekeeper is a person who stands between the data collector and a potential respondent' (Lavrakas, 2008).
Healthful	Conducive to good health.
Healthy	Describes someone strong and healthy with an absence of disease.
Household income	Combined income of adults living in the household.
Hypertension	Abnormally high blood pressure.
Interpretivism	Form of qualitative methodology that relies on the trained researcher and the human subjects as instruments to measure phenomena, typically involving both observation and interviews. Posits that there is no direct one-to-one relationship between the world and ourselves (subjects) but it is a schema of the mind. Interpretivism is closely linked to constructivism.
Junk food	Pre-prepared or packaged food of low nutritional value.
Kantar Worldpanel	A market research company, which uses continuous consumer panels to gain insights and consumer knowledge.
Key Stage Three	Pupils in Years 7, 8 and 9, aged 11- to 14-years-old.
Nutrients	A substance that provides nourishment for the maintenance of life and growth.
Food Neophobia	Extreme irrational fear and phobic reaction to any new or unfamiliar foods.
Non-communicable Diseases	Non-communicable diseases cannot be transferred directly between individuals. Includes: Parkinson's disease, Alzheimer's disease, cataracts, chronic kidney disease, osteoarthritis, osteoporosis, strokes, most heart diseases and most cancers.
Malnutrition	Lack of proper nutrition caused by insufficient food, not eating enough nutrient-dense foods, and/or one's body being unable to process foods eaten.

Obesity	Obese adolescents are defined as being 'very overweight or obese' when their weight status is at the 98th percentile or above (National Health Service, no date e).
Overweight	Overweight adolescents are those above the 91st percentile (National Health Service, no date e).
Obstructive Sleep Apnoea	Throat muscles intermittently relaxing causes breathing to repeatedly stop and start whilst sleeping.
Intra-familial	Occurring within a family.
Loco Parentis	'In the place of a parent.' Refers to the legal responsibility of a person or organisation to take on some of the functions and responsibilities of a parent. It allows institutions such as schools to act in the best interests of the pupils, as they see fit, whilst not allowing violation of the pupils' rights (Duhaime's Law Dictionary, no date).
Participatory Design	(/'co-operative design' / 'co-design'). An approach to design attempting to actively involve all stakeholders (e.g. employees, partners, customers, citizens and users) in the design process to help ensure that the result meets their needs and is usable.
Pester Power	'…the ability that children have to make their parents buy something, by asking for it many times until they get it' (Cambridge Dictionary, no date). And, '…children's influence over adult purchasing through requests and demands for certain products' (McDermott *et al.*, 2006: p. 513).
Project EAT	Study developed by the University of Minnesota called Eating and Activity in Teens. Aims to identify the environmental, behavioural and personal determinants of nutritional intake, weight status and physical activity. Ethically and socioeconomically diverse young people participated. The studies include: EAT-I, EAT-II, EAT-2010 and EAT-III.
Recession	A period whereby trade and industrial activity reduces, resulting in a temporary economic decline.
Reflexivity	In research terms: thoughtful, self-aware analysis of the interobjective dynamics between researcher and the researched. Reflexivity requires critical self-reflection of the ways in which researchers' social background, consumption, positioning and behaviour impact on the research process (Finlay and Gough, 2003).
Social Norms	Social norms are 'implicit codes of conduct that provide a guide to appropriate action' (Higgs, 2015: p. 38).
Socio-economic Status	The social standing or class of an individual or group. Measured through education, occupation and income.

Sustainability	‘Meets the needs of the present without compromising the ability of future generations to meet their own needs’ (Food and Agriculture Organization of the United Nations, 1987: p. 15).
The Lancet	A prestigious weekly medical journal.
Triangulation	The use of a variety of methods to collect data on the same topic, which involves different types of samples as well as methods of data collection. Helps to assure the validity of the research.
Type II Diabetes	Often characterised by high blood sugar, resistance to insulin and a relative lack of insulin.
Vegan	‘A philosophy and way of living which seeks to exclude – as far as is possible and practical – all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose…’ (The Vegan Society, no date).
Vegetarian	An individual who does not consume meat or fish, especially for moral, religious or health reasons.
Veganuary	A UK registered charitable organisation that launched in 2014 to encourage people worldwide to try a vegan diet for the month of January and beyond.
Year 7	First year of secondary school in Wales, pupils aged 11- to 12-years-old.
Year 8	Second year of secondary school in Wales, pupils aged 12- to 13-years-old.
YouGov	A British international market research and data analytics firm.

CHAPTER ONE – INTRODUCTION

1.1. Introduction

The purpose of the research is to explore the routines, behaviours, food consumption and attitudes towards vegetables, as well as the factors influencing these, for adolescents' aged 11- to 13-years-old. The derived knowledge informed the New Product Development (NPD) of innovative vegetable-based snacking concepts in accordance to a brief jointly made with the company partner, *Puffin Produce*. Product concepts were evaluated by the target market of adolescents and parents* during the developmental stage. A couple of vegetable-based snacking concepts, which had the capacity to improve adolescents' eating habits whilst being suitably desirable, were presented to the company partner in a final meeting.

This chapter begins with a brief overview of the pertinent literature and the theoretical frameworks used to guide the research. Next, background details of the company partner, *Puffin Produce*, provides some insight regarding their role in the research project. A statement of the problem highlighting the issues and reasoning as to why the research was necessary follows this. The overall aim of the research is then presented, along with the four key research questions underpinning the project. Following this, the three phases of data collection are briefly outlined.

1.2. Contextual Background and Theoretical Frameworks

The Literature Review Chapter provides a more comprehensive review of the relevant academic peer-reviewed literature and contextual research (see Chapter Two). Here, a coherent introduction of the literature and historical context relating to adolescents' eating habits will help to explain the purpose of the study. The environmental context of the research was ever changing because it is a highly topical subject and governmental policies were announced during the research

* Throughout this thesis, 'parents' will be used for brevity, though it is acknowledged that some adolescents live with caregivers or guardians.

project. Staying well informed of the real world context was imperative, as these factors may have significantly affected the NPD process.

Adolescence is a peak time for growth and development both physically and socially (Viner *et al.*, 2015). Consuming a healthful diet compromising sufficient fruits and vegetables helps to meet the nutritional needs of growing adolescents and can prevent many chronic diseases and long-term health implications (World Health Organisation, no date d; Benton, 2012; Boeing *et al.*, 2012). However, the 2015 *Welsh Health Survey* revealed that only 64% of Welsh children eat fruit daily and 52% eat vegetables daily. What is more, 6% of male and 5% of female children ate vegetables less than once a week (Welsh Government, 2016). Although potatoes are a healthful dietary component, providing potassium, thiamine and vitamin B6, consumption has been in decline since the 1980s as more convenient carbohydrate sources such as bread, pasta, rice and couscous have becoming increasingly popular (Riley, 2010; Gibson & Francis, 2015; Dukeshire *et al.*, 2016).

Whilst individuals may lack components of a healthful diet, other poor eating habits may develop during adolescence such as skipping meals and increased fast food consumption (Story, Neumark-Sztainer & French, 2002; Braithwaite *et al.*, 2014). Living in an obesogenic environment with abundant fast food restaurants can have a detrimental impact on adolescents' dietary behaviour unless parents restrict intake (Scaglioni *et al.*, 2018). Additionally, television and social media advertising increasingly targets younger individuals (Boyland & Halford, 2013; Dunlop, Freeman & Jones, 2016). Socio-economic status (SES) is an established factor affecting food choice, with low SES individuals often having poorer diets than those of high SES (Bere *et al.*, 2008; Van Lenthe, Jansen & Kamphuis, 2015). Published research has confirmed the significant role of the school environment and peers in adolescent's dietary habits and vegetable consumption (Bruening *et al.*, 2012; Dimbleby & Vincent, 2013; Welsh Local Government Association., 2013).

1.3. Introduction to *Puffin Produce*

Puffin Produce were the collaborating commercial partner in this Knowledge Economy Skills Scholarship, Phase Two (KESS2) funded project and have a commercial interest in the research findings. KESS2 connects companies with

academics to undertake research projects that meet an active business need. The research questions stemmed from the needs of *Puffin Produce* and were designed to offer them consumer insight for further NPD. The company partner is 100% grower owned by farmers in Pembrokeshire and the Wye Valley in Wales. It was established in 1995 by farmers who sought to work together to market their crops. It now packs and supplies Welsh fresh produce to supermarkets throughout Wales: Tesco, Sainsbury's, Aldi, Marks & Spencer, Waitrose, Morrisons and Asda. 65,000 tonnes of potatoes are packed year-round in addition to a variety of other Welsh produce such as leeks, spring onions, cauliflower and cabbage seasonally. *Puffin Produce* are known for their 'Pembrokeshire Earlies' with a Protected Geographical Indication (PGI) status. The company employs 165 individuals and turns over £28 million annually, including £1 million sales per month from their branded premium range called 'Blas y Tir' [English translation: 'Taste of the Land']. *Puffin Produce* continue to prosper because Welsh consumers altruistically seek to support Welsh businesses (UK Government, 2013).

The researcher spent time at the company during the project and their input was taken into consideration throughout. Research questions were aligned to their requirements. For example, during the Phase Three focus groups only chilled vegetable-based NPD concepts were investigated because *Puffin Produce* was building a chilled processing factory on site. The novel findings could inform marketing communication plans targeting adolescents and healthful eating. Insights and vegetable-based NPD concepts will provide *Puffin Produce* with a market advantage, increased consumer knowledge and a good baseline for further NPD. There is potential to extend the trading area from the Welsh to the English market with the new product(s), further expanding the business.

1.4. Statement of the Problem

The motivation behind the research was low vegetable consumption and the increasing number of overweight and obese adolescents in Wales, 'Being overweight has now become normal in Wales' (Welsh Government, 2016, 2019a: p. 7). Adolescents rarely consider healthful foods desirable, neglecting them in favour of unhealthful foods which are heavily promoted and often more socially acceptable to adolescents (Stead *et al.*, 2011; Beales and Kulick, 2013). With the

purpose of addressing this problem, this study proposes to investigate what adolescents are purchasing throughout the school day and explore the various factors that influence their routines, behaviours and food consumption, particularly around vegetables through three phases of research. Researching the period of adolescence is fundamental because the eating attitudes and habits developed endure into adulthood, consequently influencing long-term health (Lake *et al.*, 2004). *Puffin Produce* were motivated to collaborate with this research because they are keen to increase their market offering and grow the business. Their current market is primarily older middle-class adults, yet their market research has made them aware that Wales' younger generation eats less fresh Welsh produce. It is imperative that this market is targeted so that they can remain a market leader as adolescents' become adults and brand loyalty is developed.

1.5. Purpose of the Study

The purpose of the research project is to improve the eating habits of Wales' younger generation through making vegetables desirable.

1.5.1. Research Aim

To develop a detailed insight into young adolescents' (aged 11- to 13-years-old) behaviour concerning vegetables through exploratory research. The project is an industry sponsored PhD, so the subsequent knowledge and understanding will be used to inform the vegetable marketing of *Puffin Produce*.

1.5.2. Research Questions

1.) What are 11- to 13-year-old Welsh adolescents' attitudes to vegetables?
2.) What are their routines, behaviours and food consumption (particularly around vegetables)?
3.) What are the main factors that influence 1 and 2 above?
4.) Can a design innovation develop a healthy product that fits with the attitudes and habits of Welsh adolescents?

1.6. Organisation of the Current Study

The research questions were addressed through the literature review and a mixed methods approach incorporating both quantitative and qualitative data collection over three phases. The study utilised five research methods: (i) Data mining; (ii) Catering manager interviews; (iii) School canteen observations; (iv) Focus groups; and, (v) Participatory design research (see the Methodology Chapter, Chapter Three).

Phase One: Adults

Following the recruitment of three comprehensive secondary schools, catering manager interviews (n=6) and a month of quantitative school canteen sales data were collected. After this, three focus groups with catering staff (n=14) and one focus group with parents (n=5) took place.

Phase Two: Adolescents

Break times and lunchtimes were observed on two non-consecutive school days at each participating school. Besides this, the researcher facilitated five focus groups with adolescents aged 11- to 13-years-old (n=42).

Phase Three: Designing

Findings from Phases One and Two were used to create a detailed design brief in collaboration with *Puffin Produce*. Adolescents aged 12- to 13-years-old participated in participatory design research during Year 8 Food Technology lessons (n=41). Lastly, sequential focus groups were used to speak to the same two groups of parent participants twice (n=16).

CHAPTER TWO – LITERATURE REVIEW

2.1. Introduction

This chapter provides a background into the factors influencing adolescents' eating habits, explaining why these factors required further exploratory research within Wales. Contextual findings and literature references were accumulated throughout the PhD candidature from January 2017 to May 2020. The academic literature was sought primarily from the Cardiff Metropolitan University 'Met Search' and the online database 'SCOPUS.' Studies from developed countries worldwide were included, paying particular attention towards those completed in Wales or inside the UK. As well as searching within academia, data from market research companies such as *Kantar Worldpanel* and information regarding policy or regulations were sought from the *Food Standards Agency* (FSA) and other similar bodies.

First, Bronfenbrenner's *Ecological Systems Theory* (EST) helps to appreciate how an individual's eating behaviour occurs due to influences spread across multiple levels (see Section 2.2.1.). These various influencing factors are reviewed in addition to individualistic factors affecting adolescents' diet. The existing dietary guidelines and recommendations such as the *Eatwell Guide* and the *5-A-Day* campaign are summarised before distinguishing what a healthful diet is in contrast to a poor diet. Abundant literature concerning physiological and psychological problems associated with poor diet are available, several of which are cited (see Sections 2.4.3. and 2.4.4.). The latter part of the PhD title is to improve the eating habits of Wales' younger generation, necessitating the research of adolescents' current eating habits. Up-to-date knowledge concerning the current food landscape and eating habits of adolescents is crucial in determining whether the current study findings align with existing literature. After this, the definition of 'cool' and the semiotics underlying the purchase of 'cool' products are explored. This relates to how consumer culture has increased the commercialisation of childhood over the last couple of decades, partially through food marketers exploiting pester power.

The UK has introduced numerous policy interventions in recent years, such as the second chapter of the *Childhood Obesity: Time for Action* that was published in June 2018; the *Soft Drinks Industry Levy* that began in April 2018; and, *Front-Of-Pack* traffic light labelling that was introduced in June 2013. Thereafter, the influence of

the school environment on diet details the *School Food Standards* and various studies conducted within the school setting (see Section 2.10). How an adolescent's environment can influence their eating habits is explained through Bandura's *Social Leaning Theory* (SLT) and the roles of parenting, peers and socioeconomic status. In contrast, Ajzen's *Theory of Planned Behaviour* (TPB) theorises that individualistic factors influence behaviour more so than learning from the environment. Lastly, the importance of potatoes in the diet and the benefits of consuming Welsh produce are considered.

2.2. Adolescence

Adolescence is a critical developmental period whereby individuals change physically and psychologically as they mature from childhood into adulthood (Viner *et al.*, 2015). Eating habits often change considerably when young adolescents commence their secondary school education (Brannen & Storey, 1998). During adolescence, parental control often lessens as adolescents assume increased independence, autonomy and choice in their food consumption (Bassett, Chapman & Beagan, 2008). Subsequently, the period of adolescence is notorious for vulnerability to peer and societal pressure influencing one's decision-making around food. Food may be used to construct a desirable, conforming identity and self-image (Stevenson *et al.*, 2007; Stead *et al.*, 2011).

2.2.1. Bronfenbrenner's Ecological Systems Theory

Bronfenbrenner's EST can be used to explain how social environmental factors influence adolescents' eating habits. The theory was created in 1979 and purports that an individual's development and behaviour results from multiple levels of influence: microsystems, mesosystems, exosystems and macrosystems. The 'microsystem' consists of immediate family and home environment; the 'mesosystem' includes the local neighbourhood and school; the 'exosystem' features mass media and the community; and, the 'macrosystem' encompasses the widely shared beliefs, cultural values and laws (Brofenbrenner, 1979; Bronfenbrenner, 1994). Reciprocal relationships and continuous interactions within and amongst environmental layers influence an individual's behaviour. The theory

draws attention to how influences outside of the immediate family (such as SES and school education) can become more powerful influencers during adolescence (Wiium & Wold, 2009). Both interpersonal and extrapersonal influences effect adolescents' eating attitudes and behaviours. Davison and Birch adapted Bronfenbrenner's framework to summarise the various risk factors that lead to a child's weight status, as shown in Figure 2.1. (Davison & Birch, 2001):

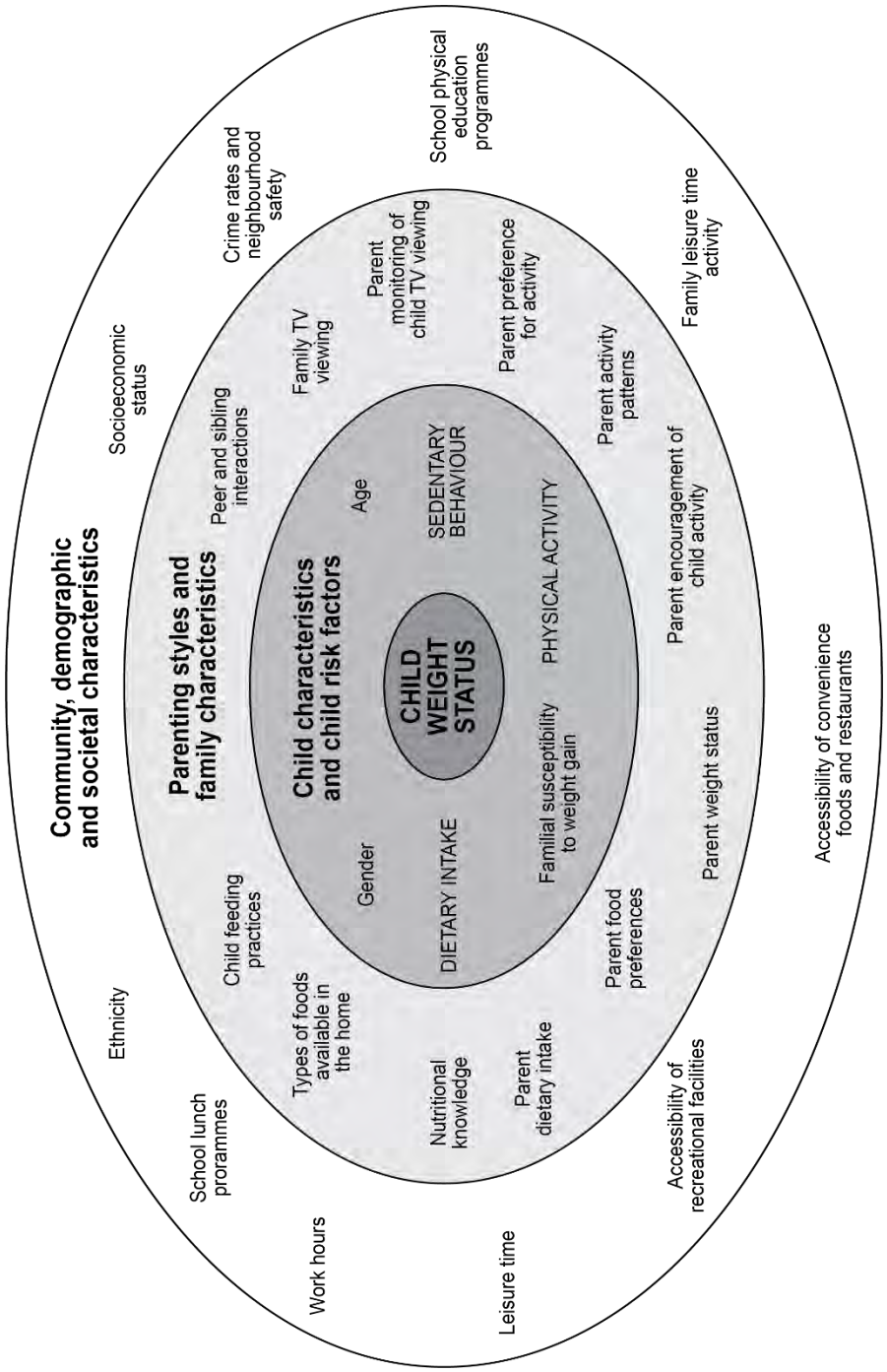


Figure 2.1.: An Ecological Model for the aetiology of childhood overweight (Davison & Birch, 2001: Figure 1)

2.2.2. Piaget's Theory of Cognitive Development

Piaget's *Theory of Cognitive Development* (TCD) posits that childhood maturation is an active process whereby environmental stimulation leads to the development of formal operational (logical and abstract) thinking. The theory specifies four stages of cognitive development: Sensorimotor, Preoperational Thought, Concrete Operational Thought and Formal Operational Thought. TCD contributed towards a more child-centred education (Piaget, 1952; Central Advisory Council for Education, 1967). An individual's self-concept becomes increasingly abstract during adolescence because they are progressively able to distinguish between an ideal self and a feared self. Adolescents become aware 'that one may show a false self to others at times,' potentially leading to the desire of creating a socially acceptable self-concept through their product consumption and behaviour (Arnett & Hughes, 2012: p. 229).

TCD is widely supported through the literature showing that comprehension of advertisement intent improves over time, in correlation to an individual's developmental stage in the TCD (Calvert, 2008; De Jans *et al.*, 2019). In particular, the third and fourth stages, the Concrete Operational Stage (7- to 11-years-old) and the Formal Operational Stage (11- to 15-years-old) are the stages whereby individuals develop the become able to construct their own abstract thoughts and ability to understand advertising systematically. Adolescents are vulnerable to advertising and their understanding of persuasive intent may not fully mature until the age of 12-years-old (Rozendaal, Buijzen & Valkenburg, 2011). Worryingly, a study involving *McDonald's* television advertising discovered that whilst 90% of 11- to 12-year-olds could identify the selling intent of advertising, only 40% understood the persuasive intent (Carter *et al.*, 2011). Still, there is no 'magic' age when individuals are able to comprehend the selling intent rather than persuasive intent within advertisements (Nairn & Fine, 2008). This can be problematic, as one study established that when biased product evaluations were made before the age of 13-years-old, these evaluations persisted into adulthood (Connell, Brucks & Nielsen, 2014). Thus, developing advertising literacy and critical reflection should be encouraged and taught as part of school education (Hudders *et al.*, 2017).

2.3. The Dietary Requirements of Adolescents

Adolescents are vulnerable to inadequate nutrition and their diet must be sufficient to fulfil their expected growth (Rogol, Clark & Roemmich, 2000; Jenkins & Horner, 2005).

2.3.1. Dietary Reference Values and Reference Intakes

Guideline Daily Amounts (GDAs) were previously used in the UK but nowadays *Dietary Reference Values* (DRVs) classified by the *Committee on Medical Aspects* (COMA) and the *Scientific Advisory Committee on Nutrition* (SACN) are available. DRVs provide an estimate of energy and nutritional requirements, including fat, saturated fat, sugars and salt. These guidelines were developed to allow the FSA to advise institutions, assuming that an individual's daily energy and nutrient intake is divided between breakfast (20%), lunch (30%), dinner (30%) and snacks (20%) (Food Standards Agency, 2007b). DRVs are *Reference Nutrient Intakes* (RNIs) adequate for 97.5% of the population of adults and adolescents over 11-years-old (British Nutritional Foundation, no date b; National Health Service, 2014). It is recommended that sugar does not exceed over 5% of an individual's daily calorific intake (Public Health England, 2015b). Overall, RNIs should purely be used as a guide because factors such as age, gender and growth trajectories influence individual requirements, particularly during adolescence (Torun, 2005).

2.3.2. The Eatwell Guide

The *Balance of Good Health* was launched in 1994 and was updated by the FSA as the *Eatwell Plate* in 2007 (Figure 2.2.) (British Nutritional Foundation, no date c; Food Standards Agency, 2001):

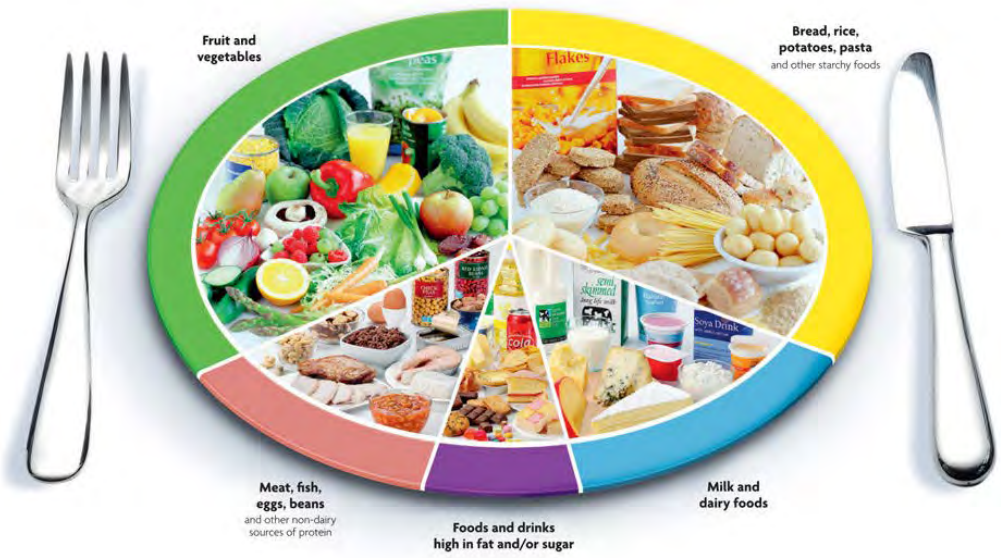


Figure 2.2.: The 2007 FSA Eatwell Plate (Food Standards Agency, 2007a)

The plate was developed as a healthful eating tool to help the UK population. It reflects contemporary dietary recommendations, showing the recommended DRVs of certain food groups (Food Standards Agency, 2007b; Public Health England, 2016). Most recently, the *Eatwell Guide* launched in 2016 (Figure 2.3.):

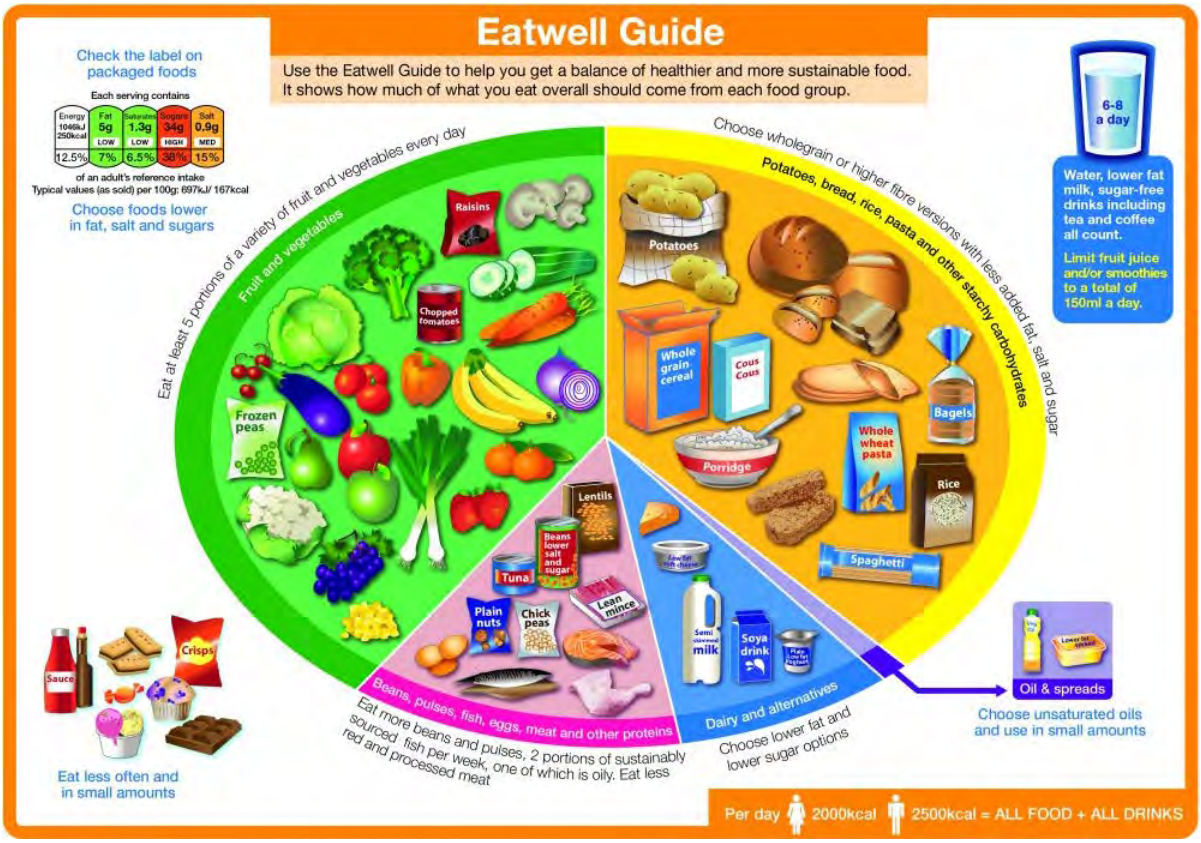


Figure 2.3.: The 2016 Eatwell Guide (National Health Service, 2019b)

The latest guide follows research discovering that drawn images rather than photographs are more accessible and preferred by individuals with poor dietary behaviour (Public Health England, 2016). Moreover, the segment portions changed: starchy foods and the fruit and vegetable segments increased, the non-dairy protein segment was renamed and the 'milk and dairy' became 'dairy and alternatives,' almost halving from 15% to 8% (Harcombe, 2017: p. 1730).

2.3.3. 5-A-Day

The *Department of Health* (DoH) launched the *5-A-Day* campaign in 2003 to encourage the consumption of a wide variety of fruit and vegetables. In 2005, the FSA conducted a *Consumer Attitudes Survey* that revealed 67% of the public were aware of the *5-A-Day* recommendations in comparison to only 43% in 2000. In spite of this awareness, the *National Diet and Nutrition Survey* (NDNS) found that fruit and vegetable consumption remained below the recommendations, implying that the *5-A-Day* campaign had not been wholly successful (Food Standards Agency, 2006). Individuals should ideally consume in excess of their *5-A-Day*, or 600g of non-starchy fruit and vegetables daily (World Cancer Research Fund International, no date a).

2.4. The Effect of Diet on Health

This section considers the effect of dietary intake on an individual's physiological and psychological health.

2.4.1. What is a Healthful Diet and what is a 'Poor' Diet?

The *Food in the Anthropocene* report commissioned by *The Lancet*, describes a healthful diet as follows:

> 'Healthy diets have an appropriate caloric intake and consist of a diversity of plant-based foods, low amounts of animal source foods, unsaturated rather than saturated fats, and small amounts of refined grains, highly processed foods, and added sugars' (Willett *et al.*, 2019).

Relatedly, the *Office for Standards in Education* (Ofsted) defines a 'healthier diet' as 'a diet which provides enough energy for satisfactory growth and development' and, 'a balanced diet with plenty of variety' (Ofsted, 2006: p. 6). Inversely, the *World Health Organisation* (WHO) states that a poor diet is usually low in nutrient-dense foods such as fruit and vegetables and may include a high consumption of junk foods, sugar-sweetened beverages, saturated fat, sugar and salt. Poor diets often lack fibre from wholegrains as well as essential nutrients such as calcium and iron (World Health Organisation, no date d). A systematic review of the literature suggested a greater consensus on defining what an unhealthful diet is rather than defining a healthful diet (de Ridder *et al.*, 2017).

2.4.2. The Childhood Obesity Pandemic

Obesity and overweight incidences have substantively increased worldwide and the UK currently faces a childhood obesity epidemic (World Health Organisation, no date a; Royal Society for Public Health, 2015). The WHO states that 'Rates of childhood obesity are reaching alarming proportions in many countries, posing an urgent and serious challenge' (World Health Organisation, 2016: p. 8). Even so, although overweight and obesity amongst UK children increased annually by 8% between 1994 and 2003, it appears to have stabilised and only increased by 0.4% annually between 2004 and 2013 (Van Jaarsveld & Gulliford, 2015). Perhaps the figure has stabilised after reaching the point of saturation. Troublingly, the Welsh *Child Measurement Programme* in 2014/2015 discovered that 26.2% of Welsh children are overweight or obese in contrast to 21.9% in Britain. Correspondingly, when Welsh pupils leave primary school at 11-years-old, approximately 40% are overweight or obese, particularly females and 18% of 11- to 16-year-olds are classified as overweight or obese (Dimbleby & Vincent, 2013; Bailey, 2016; Public Health Wales NHS Trust, 2018).

There are various aetiologies of obesity. Genetics predispose an individual's Body Mass Index (BMI), yet the majority of heritability studies were prior to the obesity pandemic. Wardle *et al.* found a substantial 77% BMI and waist circumference heritability, indicating that genetics influence being overweight and obese (Wardle *et al.*, 2008). This is supported by current National Health Service (NHS) data demonstrating that 28% of children with an obese mother are obese, in contrast to 8% of children with a normal weight mother (National Health Service, 2019a). Relatedly, a longitudinal study from birth to 9½ -years-old found a correlation between having an overweight parent and overweight children, plausibly due to the genetic link between BMI and temperament (Stewart Agras *et al.*, 2004). Notably, children who are overweight or obese are 74.9–88.2% more likely to stay so during their trajectory into adulthood (Ward *et al.*, 2017). Therefore, establishing healthful dietary habits during childhood and adolescence is ideal.

2.4.3. Physiological Health Problems Associated With Poor Diet

From an evolutionary perspective, human cells, the blood and arteries were not designed to function with the excessive fat and cholesterol consumed as part of an industrialised Western diet (Campbell & Campbell, 2006). Poor diet can lead to various negative short-term and long-term health consequences. Short-term consequences include reduced immunity, iron deficiency, dental cavities, lower cognitive capabilities and a reduction in academic achievement (Berkey *et al.*, 2003; Institute of Medicine and the Committee on Nutrition Standards for Foods in Schools, 2007; Benton, 2012; Myles, 2014; Burrows *et al.*, 2017). Plausible long-term consequences include: overweight and obese weight status, non-communicable diseases (NCDs), malnutrition, elevated cholesterol, asthma, Obstructive Sleep Apnoea (OPA), Type II Diabetes, Hypertension and Cardiovascular Diseases (CVDs) (Food and Agriculture Organization of the United Nations, 2006; Childhood Obesity Foundation., 2015; World Health Organisation, 2015a; Global Burden of Disesase Mortality and Causes of Death Collaborators, 2016; Manion and Velsor-Friedrich, 2017). Consuming a diet high in fat and sugar is frequently the aetiology leading to overweight and obesity, increasing the risk of cancer (World Cancer Research Fund International, no date b; McDougall *et al.*, 2014).

The rising rate of overweight and obesity has major ramifications for the *National Health Service* (NHS) because obesity was a factor in 711,000 hospital admissions during 2017–2018 (National Health Service, 2019a). The latest figures show that the NHS spent an estimated £6.1 billion on overweight- and obesity-related ill health in 2014–2015 and obesity costs the wider UK society £27 billion annually (Public Health England, 2017b).

The WHO states that 1.7 million (2.8%) deaths worldwide can be attributed to a low fruit and vegetable consumption (World Health Organisation, no date b). Fruit and vegetables have a low energy density whilst being nutrient-dense, providing fibre and phytochemicals. A high daily intake of fruits and vegetables correlates with a lower prevalence of overweight and obesity as well as a healthful lifestyle. This reduces the associative risk of chronic diseases such as Hypertension, stroke, cancer, age-related functional decline, CVD, Alzheimer's disease, diabetes (Steinmetz & Potter, 1996; Dauchet, Amouyel & Dallongeville, 2005; Boeing *et al.*, 2012; Liu, 2013; Wang *et al.*, 2014)**.** Contrariwise, Key (2011) analysed large-scale

studies studying the protective effects of fruit and vegetable consumption on cancer risk and expressed that is a lack of established evidence. An epidemiological literature review concerning fruit and vegetables found a methodological issue in that causality for consumption in relation to bodyweight could not be inferred because many studies use a cross-sectional approach (Tohill *et al.*, 2004). Thus, an individual's weight status could have been established before their current exposure levels to fruit and vegetables rather than as a result.

2.4.4. Psychological Health Problems Associated With Poor Diet

Obesity is most commonly attributed to an excess consumption of energy alongside a sedentary lifestyle (National Health Service, 2017b). Hence, a survey conducted by the British public revealed that most believed that an individual's overweight status was due to a lack of will power in their environment rather than blaming genetics (Beeken & Wardle, 2013). Possibly this is why being overweight or obese can lead to numerous psychological and mental health problems, including feelings of shame and a lowered self-esteem (Iannaccone *et al.*, 2016). Adolescents with higher BMIs are more likely to experience weight-based harassment in the form of bullying, stigmatisation and discrimination by their peers, leading to an increased risk of depression (Bucchianeri, Eisenberg & Neumark-Sztainer, 2013; Puhl *et al.*, 2017). Likewise, Jacka *et al.*'s (2011) study with 3040 Australian adolescents found that consuming a healthful diet could be psychologically beneficial and correlated with improvements in mental health. This study also found that deteriorating dietary quality was associated with poorer psychological performance. Nevertheless, there is no correlation between depressive and emotional problems in childhood being predictive of overweight or obesity occurring in later life (Stewart Agras *et al.*, 2004; Duarte *et al.*, 2010).

2.5. The Current Eating Habits of Adolescents

The literature consistently demonstrates that adolescents have suboptimal dietary habits that fail to meet the governmental dietary recommendations.

2.5.1. Poor Fruit and Vegetable Consumption

Fruit and vegetable consumption remains low according to the most recent statistics, with only 18% of individuals aged 5- to 15-years-old consuming their *5-A-Day* (National Health Service, 2017a). Similarly, the 2014–2016 UK NDNS revealed that the mean daily portion of fruit and vegetables was 2.7 amongst adolescents aged 11- to 18-years-old (Public Health England and Food Standards Agency, 2014). Adults slightly fare better, with 24% of Welsh adults eating their *5-A-Day* in 2019, yet this figure is lower than in 2003 when the *5-A-Day* campaign launched (Welsh Government, 2016, 2019b). Studies show that fruit and vegetable consumption peaks during young childhood but declines with age. Specifically, Albani *et al.* (2017) found that males aged 17-years-old ate 0.93 fewer portions of fruit compared to males aged 2-years-old (Teeman *et al.*, 2010).

2.5.2. Inconsistent Meal Frequency

Mintel market research illustrates that people in the UK typically snack: 79% at home, 47% at work and 18% on the go (Mintel, 2017). There is a tendency for erratic and inconsistent meal frequency amongst adolescents, with breakfast skipping being particularly prevalent among females (Story, Neumark-Sztainer & French, 2002; Hoyland *et al.*, 2012). The *EAT-2010* study involved 2,043 American adolescents from 20 schools completing in-class surveys. It found that the mean frequency of breakfast consumption was four times a week, and that if an adolescent's friendship group ate breakfast then their own intake was 0.26 days a week higher (Bruening *et al.*, 2012). Breakfast omission can negatively impact cognition and learning at school, particularly for nutritionally at-risk rather than well-nourished children (Bellisle, 2004). Equally, a study with Welsh adolescents found a correlation between skipping breakfast, increased snacking and obesity (Elgar *et al.*, 2004). Conversely, a meta-analysis of the literature from 1990 to 2018 found higher BMIs amongst individuals that did regularly eat breakfast, possibly being attributed to the associated increase in daily calorific intake (Sievert *et al.*, 2019).

2.5.3. Processed Foods, Convenience and the Out-of-home Market

Out-of-home snacks and meals are a growing market and parents may be persuaded to purchase High in Fat, Salt and Sugar (HFSS) foods because they are on special offer twice as often compared to fresh produce (Kantar Worldpanel, 2016; Public Health England, 2017b). A large-scale cross-sectional study with 199,135 adolescents from 36 countries found that 39% reported frequent fast food consumption (Braithwaite *et al.*, 2014). Notably, an American study discovered that the energy density of products consumed out-of-home but not at school was the highest, with children and adolescents consuming 527 'empty calories' during a typical school day (Briefel, Wilson & Gleason, 2008). A longitudinal study over five years demonstrated that environmental influences such as the provision of unhealthful foods at home and a lack of maternal influence were predictive of increased fast food consumption (Bauer *et al.*, 2009). A study in Wales involving 16 focus groups with participants aged 7- to 11-years-old found that *McDonald's* was favoured because individuals obtain 'maximum choice with least formality' (Warren *et al.*, 2008: p.. 148). However, families reverting to fast food at main meals was not associated with an increased BMI amongst adolescents. Maybe a growing adolescents' calorific requirements outweigh the negative effects of including highly calorific fast foods in their diet (Boutelle *et al.*, 2007).

2.5.4. The Trend Towards Plant-based Diets

There is a widespread trend towards reduced meat consumption and market research reveals that a third of evening meals are now vegetarian (Kantar Worldpanel, 2016). Some individuals have become flexitarian, defined as 'a plant-based diet with the occasional addition of meat' (The Flexitarian, no date). This is supported by a report from *The Lancet* commission stating that if the global population ate within planetary limits (reducing animal product consumption), then 10.8 to 11.6 million deaths a year could be avoided (Willett *et al.*, 2019). Within the UK, 2% of adults follow a vegetarian diet and 1% of the adult population (542,000 people) classify themselves as 'plant-based,' compared to 150,000 in 2006 (Public Health England and Food Standards Agency, 2014; Quinn, 2016; Veganuary, 2019). Individuals may become vegetarian due to religion, personal health, environmental, ecological concerns or moral disgust concerning animal processing (Dunham & Kollar, 2006; Stevenson *et al.*, 2007). Intriguingly, vegetarianism is more

common amongst those of a higher socioeconomic class, though their lower mortality rate may be ‘attributed to certain non-dietary lifestyle factors such as low prevalence of smoking and a generally high socio-economic status’ (Appleby *et al.*, 2002: p. 19).

The Vegan Society was founded in 1979 and defines veganism as ‘A philosophy and way of living which seeks to exclude – as far as is possible and practical – all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose…’ (The Vegan Society, no date). Attitudes to veganism are changing and there are three main reasons as to why someone may chose this lifestyle: health, animals or for the environment (O’Keefe, 2016; Powell & Gellatley, 2016). During 2019, 5% of the UK population took part in *Veganuary*, forgoing animal products for the month of January. 46% of *Veganuary* participants took part for health reasons (Cooke, 2019; Vernelli, 2019). Further, the greenhouse gases emitted in the production of a vegan diet are approximately half of a meat-eater’s (Scarborough *et al.*, 2014). Mainstream retailers and food-to-go outlets are launching innovative plant-based products. For example, *Tesco* [British multinational supermarket chain selling groceries and merchandise] has extended their new plant-based range, and the *Greggs* [the largest bakery chain in the UK] vegan sausage roll significantly increased its share prices following hitting the headlines in 2019 (Greggs, 2019; Hardy, 2019; Tesco Plc, 2019). In 2016, *Pret A Manger* [coffee shop chain] opened their first vegetarian-only shop and continues to develop new and innovative vegetarian and vegan recipes (Pret A Manger, no date).

An abundance of literature is obtainable, showing that meat is potentially harmful to health. For instance, red meat has been linked to colorectal cancer and processed meat is carcinogenic for humans, causing 34,000 deaths per year globally (World Health Organisation, 2015b). Amongst the British population, the incidence of some cancers is rarer amongst pescatarians and vegetarians (Key *et al.*, 2014). Furthermore, 37,875 men and women aged 20- to 97-years-old took part in the *EPIC-Oxford* study. The study found that pescatarians, vegetarians and vegans had lower BMIs than meat-eaters and that high protein and low fibre intake was associated with higher BMIs (Spencer *et al.*, 2003). Equally, a large-scale study with over 370,000 participants aged 25- to 70-years-old from ten European countries showed that total meat consumption was associated with weight gain (Vergnaud *et al.*, 2010).

There are a few issues with the plant-based trend. Firstly, veganism can be expensive and the animal advocacy movement favours middle- and upper-class women. Secondly, vegans may need supplementation with calcium, iron and vitamin B12 to avoid deficiencies (National Health Service, no date d). Thirdly, the rise of vegetarian junk food such as burritos has led some to consume a 'diet rich in calorie dense foods, as well as fruits and vegetables.' Thus, the obesogenic effects of consuming vegetarian junk foods may minimise the protective effect of vegetables, but these foods are given a health halo because they are plant-based (Field *et al.*, 2003: p. 825; Besson, Bouxom & Jaubert, 2020). Lastly, little is known about the long-term health impact of plant-based dietary adherence (Appleby & Key, 2016).

2.5.5. Eating Disorders

Eating disorder patients are becoming increasingly diverse and less easily stereotyped (Rosen & Neumark-Sztainer, 1998). Between 2000 and 2009, the number of individuals diagnosed with an eating disorder in the UK increased by 15% (Micali *et al.*, 2013). Anorexia Nervosa is characterised by failure to maintain a healthy bodyweight and remains the psychiatric illness with the highest mortality rates as 10% die *(Arcelus et al.*, 2011; National Health Service, no date b). Bulimia Nervosa is diagnosed in individuals who use inappropriate weight compensatory behaviours such as laxatives, vomiting, diuretics and exercise at least once a week for a minimum of three months prior to diagnosis (National Health Service, no date c). However, the most prevalent eating disorder is Binge Eating Disorder (BED). The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) defines BED as someone who exhibits Loss of Control (LOC). BED is more common amongst males and children as young as 5-years-old are diagnosed (Decaluwé & Braet, 2003; Berkman, Brownley & Peat, 2015; Saltzman & Liechty, 2016). One issue with the DSM-IV criteria is the subjectivity of 'loss-of-control.' This was demonstrated by a study with overweight individuals aged 8- to 13-years-old; when asked if they had ever eaten too much, 33% of the participants answered 'no' (Levine *et al.*, 2006). Overeating and sedentary behaviours can become chronic, resulting in the maintenance of obesity (Duarte *et al.*, 2010).

2.5.6. Allergies and Food Intolerance

Allergies and intolerances are becoming increasingly prevalent. Allergies trigger immune responses that can be life threatening, resulting in about 10 deaths per year in the UK. Allergies affect two million people within the UK, 1–2% of adults and 5–8% of children. There are 14 key allergens: gluten, crustaceans, egg, fish, peanuts, soybeans, milk, nuts, celery, mustard, sesame seeds, sulphur dioxide, lupin and molluscs. Food intolerances usually do not engage the immune system, but they can make someone feel very ill and affect their long-term health. Common intolerances include lactose and gluten (Berrie-Johnson, 2005; Sicherer, 2011; Food Standards Agency, 2015). Management of food intolerance depends on the individual, a review article found that some lactose-intolerant sufferers may not need to omit lactose-containing products from their diets (Lomer, Parkes & Sanderson, 2008).

2.6. Defining 'Cool' and what it Symbolises

The PhD title created before the project began was 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation.' Hence, theories around coolness are included in the literature review. Sections 2.6. and 2.7. introduce what 'cool' means and why it is important as well as how companies find 'cool.' The PhD title was changed from 'cool' to 'desirable' before the resubmission of the thesis following the PhD viva voce. The results of the PhD project meant that the original title was no longer fitting to the research.

2.6.1. No Universal Definition

It has become commonplace to exclaim 'cool!' to express approval and appreciation of a positive or desirable attribute of someone or something (Sundar, Tamul & Wu, 2014). Despite the widespread usage of the term 'cool' by both the general public and marketing practitioners, there is no unanimous set of highly-constrained characteristics that form a universal definition (Dar-Nimrod *et al.*, 2012; Rahman, 2013). The *Collins Dictionary* ambiguously states that, 'If you say something is cool, you think it is very good' (Collins Dictionary, no date).

Design researchers have attempted to define ‘cool’ by ascribing a set of words or themes to the term. Mohiuddin *et al.* (2016: p. 132) studied the existing literature and created a conceptual framework for social marketing although perceptions of ‘cool’ are fleeting and relative within generations. The framework includes seven dimensions of ‘cool:’ ‘deviating from norm, self-expressive, indicative of maturity, subversive, prosocial, evasive and attractive.’ Furthermore, Rahman (2013: p. 620) found common themes in the description of the term ‘cool:’ ‘fashionable, amazing, sophisticated, unique, entertaining, eye-catching and composed.’ Similarly, other research explicates the attractiveness and uniqueness to the concept of ‘cool’ ‘in order to capture the psychological essence of coolness,’ covering characteristics such as: ‘trendiness, uniqueness, rebelliousness, genuine-ness and utility’ (Sundar, Tamul & Wu, 2014: p. 169). Tapp and Bird (2008: pp. 20-21) suggest that ‘cool’ individuals are those ‘in the know’ whilst consciously rejecting mainstream values and conformity, avoiding ‘the passé, older generations, or anyone or thing that tries too hard to be cool.’

2.6.2. Semiotics

de Saussure, one of the founders of semiotics, defined it as the study of ‘the life of signs within society’ (Encylopaedia Brittannica, no date). Signs include: ‘words, images, sounds, gesture and objects’ (Chandler, 2007: p. 2). The commodification of ‘cool’ allows individuals to communicate this symbolically through their product consumption. The meanings attached to products are ‘cool’ rather than the tangible product itself (Poutain & Robins, 2000; Rahman, 2013). Thus, self-aware adolescents may choose to consume products for what they signify, desiring to construct and convey a ‘cool’ image by readily consuming products that they perceive as ‘cool’ in certain social contexts. This was illustrated by an ethnographic study that suggested adolescents constructed their ‘cool’ image symbolically through their language and clothing inspired by pop culture as they attempted to feel empowered and more adult-like (Kirkland & Jackson, 2009). Adolescents’ construct an increasingly abstract lifestyle through their behaviour and consumption of products as they understand ‘that one may show a false self to others at times’ (Saxton, 2005; Arnett & Hughes, 2012: p. 229).

Whilst the literature lacks research pertaining to ‘cool’ unhealthful food consumption, other research concerning underage adolescent smoking has established that adolescents are more likely to smoke if the behaviour is perceived as ‘cool’ amongst their peer group (Cullen, 2010). A Danish study with participants aged 9- to 16-years-old tested four novel healthful ‘cool’ snack products (consisting of fruit, vegetables, bread, dips and toppings). It found that buying snacks outside the home was significantly influenced by social aspects such as peers and social activities (Nørgaard, Sørensen & Grunert, 2014). This study showed that peers influenced adolescents’ purchasing of snacking products. Accordingly, if a ‘cool’ peer group is eating unhealthful foods, then an adolescent’s keenness to maintain their ‘cool’ reputation could support the development and maintenance of unhealthful eating behaviours.

2.7. Finding ‘Cool’ and Buying It

Marketers seek the elusive ‘cool’ ‘next big thing’ that can be marketed and sold to consumers. The desirability of coolness is ‘presumably enhanced by the mysteriousness of what cool actually is’ in addition to its fickle and elusive nature (Tapp & Bird, 2008; Dar-Nimrod *et al.*, 2012: p. 175).

2.7.1. Coolness Changes

Historically, ‘cool’ was associated with black culture, jazz music and drug misuse and the term was assigned to personality traits such as ‘rebellion, irony, roughness, etc.’ (Dar-Nimrod *et al.*, 2012: p. 183). Nonetheless, over the last few decades the word has permeated modern society and now denotes a more positive application. However, ‘cool’ varies according to the contextual environment, across subcultural levels and over time because it is socially constructed. Inevitably, products and behaviours become ‘cool’ and ‘uncool’ over time as they gradually become consumed or adopted by the general population (Nancarrow, Nancarrow & Page, 2002). Though perceptions of coolness with regard to certain products change, the actual concept of coolness remains stable over time (Saxton, 2005; Sundar, Tamul & Wu, 2014).

Definitions of ‘cool’ depend on an individual’s age. This was supported by a study investigating 100 Australian parents’ perceptions of branded snack foods for children: (i) *Yoplait* [largest franchise brand of yogurts] ‘Go-Gurts,’ (ii) *Dairy Whip* [synthetic substitute for whipped cream] ‘Whipped Cream,’ (iii) *Kellogg’s* [a cereal and snacks company] *Coco Pops*, and (iv) *Kellogg’s* snack bars. Child-targeted advertising portrayed snacks as fun, exciting and helping to increase popularity, whereas the adult-targeted advertising portrayed snacks as ‘nutritious, healthy, tasty and convenient.’ The study compared the child-targeted and adult-targeted advertising, finding that parents judged the snack foods as healthful after viewing the adult-targeted advertising and this resulted in their consequential purchase intention being significantly greater (Jones & Fabrianesi, 2008: p. 592). This study demonstrates the importance of appropriately marketing products to their target consumers as well as the parent purchasing the product.

2.7.2. Coolhunting vs. Cool Farming

The ‘transitory, fleeting, contingent’ nature of ‘cool’ makes research difficult, however deep and rich insights can be demonstrated through the use of qualitative data collected via direct and indirect questioning (Nancarrow, Nancarrow & Page, 2002: p. 231). The term ‘coolhunting’ purports a corporate activity whereby brand owners and agencies discover what is ‘cool’ through researching ‘cool’ individuals amongst ‘genuinely subversive subcultures.’ This allows ‘Cool hunters’ to exploit and profit from the time lag between subcultural trends moving to the mass market (Southgate, 2003; Hebdige & Potter, 2007: p. 527). Commercial companies invest heavily in the quest to find ‘cool’ or ‘the next big thing’ and ‘Cool hunters’ began selling insight to marketers in the 1990s. However, it is difficult to pinpoint ‘cool’ because it remains elusive in nature (Tapp & Bird, 2008; Rahman, 2013). O’Donnell and Wardlow (2000) developed the *Theory on the Origin of Coolness*. The theory dispels the observational role of ‘Cool hunters,’ arguing that they simply report what is already ‘cool.’ They express that in order for businesses to stay ahead; companies should not partake in ‘coolhunting.’ Instead, it would be more productive to try to understand the process of identity construction that leads adolescents to consume certain products (Figure 2.4.):

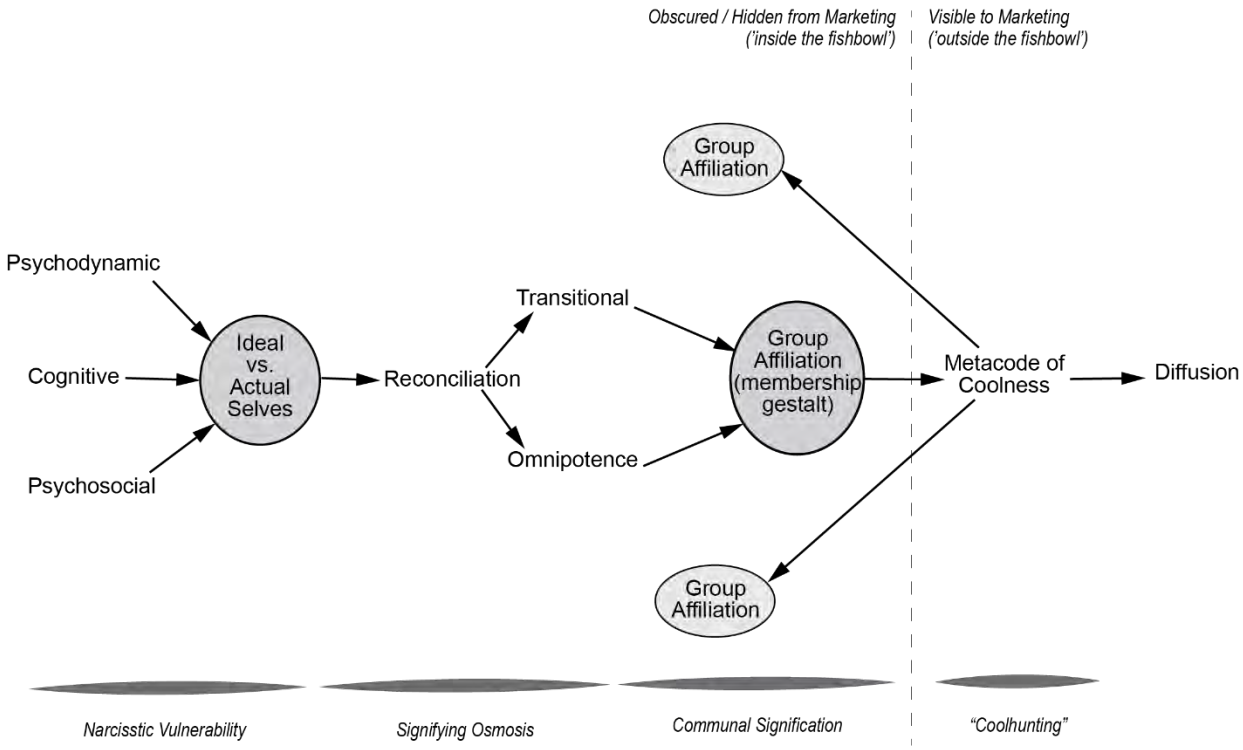


Figure 2.4.: O'Donnell and Wardlow, 2000. A Theory of the Origins of Coolness (O'Donnell and Wardlow, 2000)

The theory highlights that coolness fluctuates between an adolescents' 'actual and ideal selves in early adolescence (narcissistic vulnerability), which motivates teens to reduce this drive through strategies of peer-group affiliation' (O'Donnell & Wardlow, 2000: p. 13). Specifically, adolescents may decide to invest in particular products that denote 'cool' and may develop their own attitudes and behaviours, as they desire to construct a perceivable 'cool' identity. Thus, 'coolhunting' may be considered self-defeating because chasing 'coolness' only results in uncovering the latest trends and 'cool' phenomena rather than helping marketers discover what will be perceived as 'cool' in the future (Southgate, 2003). Instead, companies should exploit their best assets through 'cool farming' whereby companies get 'involved in the actual creation of new trends by nurturing and cultivating new ideas' (Gloor & Cooper, 2007: p. 83).

2.7.3. Buying 'Cool' Off the Shelf

A review of the literature suggested that 'cool' significantly motivates and influences consumer behaviours and attitudes (Mohiuddin *et al.*, 2016). Consuming a 'cool' lifestyle is explained below:

> ‘Moreover, while personal or inner *cool* remains both fairly elusive and exclusive, an aesthetically, outer *cool* lifestyle is far more attainable, the desire of everyone… A *cool* lifestyle can be achieved, to a large extent, through selective consumption – which is why *cool* is so interesting to marketers’ (Nancarrow, Nancarrow & Page, 2002: p. 311).

Marketing campaigns often convey the ability to buy ‘cool’ products straight off the shelf. Therefore, marketers need to thoroughly understand consumer desires and social pressures so that behavioural change through the mass consumption of products can be marketed (Tapp & Bird, 2008). Rogers’ book, *Diffusion of Innovations* describes how innovative products can take a long time for the mass market to adopt. He states that ‘When new ideas are invented, diffused, and adopted or rejected, leading to certain consequences, social change occurs.’ Adoption of social changes can be lengthy, consisting of five stages: (i) knowledge, (ii) persuasion, (iii) decision, (iv) implementation, and, (v) confirmation (Rogers, 2003: p. 6).

Regarding marketing campaigns targeting adolescents, Saxton (2005) writes that social mobility allows adolescents to choose their lifestyle and their age through product consumption. Marketers should consider three vital points: ‘relevance is crucial; personalisation will be key; and, interactivity will be expected’ (Saxton, 2005: p. 22). Individuals are particularly vulnerable to materialistic values if they feel peer pressure towards owning ‘cool’ products with the intention of constructing a ‘cool’ and popular persona to avoid embarrassment (Poutain & Robins, 2000; Dittmar, 2007). Furthermore, food advertising campaigns use ‘cool’ as a core symbolic appeal. This could lead to a negative thought process that junk food is oppositional, that ‘oppositional attitudes are ‘cool’ and accordingly, junk food is ‘cool.’ Many individuals form a strong bond with unhealthful food brands (Schor & Ford, 2007: p. 16). On the contrary, despite the commodification of ‘cool,’ some consider it a personality trait and even a ‘rite of passage.’ Often, other values are perceived as more socially desirable than ‘cool,’ such as ‘confidence, prosocial values, attractiveness, personal competence, drive for success, trendiness, and friendliness’ (Dar-Nimrod *et al.*, 2012: p. 175, 179).

2.8. Consumer Culture

Since the industrial revolution, commercial pressures have increased and 'childhood is now an experience of consuming food, clothes and entertainments' as individuals experience a 'relentless stream of marketing messages' (Piachaud, 2008: p. 454). Nowadays, children are viewed as consumers in their own right and are of keen interest to marketers because they are 'a potentially lucrative market' with 'great economic potential' (Palmer & Carpenter, 2006: p. 167).

2.8.1. Pester Power as a Marketing Tool

Pester power (sometimes known as the 'nag factor') can be defined as '…children's influence over adult purchasing through requests and demands for certain products.' In particular, child-focused products rely on pester power as a marketing tool to influence parents' decision-making (Bridges & Briesch, 2006; McDermott *et al.*, 2006: p. 513). Conversely, McNeal (1991) states that it is the child's responsibility to request certain items such as new clothes, toys, products and medicines because otherwise busy working parents may not consider purchasing particular brands or products. He writes that children of primary school-age represent three markets: a *primary market* that spends their personal allowance and gift money; a *market of influencers* that influence parental spending; and, a *future market* that has the potential to use the products and services when older. Subsequently, companies recognise that 'kids are their future customers, who must be wooed and won today' (McNeal, 1991: p. 12). One of the earliest studies into children's influence over parental decisions observed that children aged 3- to 12-years-old play a dominant role in cereal selection in the supermarket environment (Atkin, 1978).

2.8.2. Food Marketing

Food advertisements aim to increase brand awareness, preferences, purchasing and loyalty amongst children and adolescents (Story & French, 2004). Obesogenic environments have become the social norm in Western cultures, with increased availability, accessibility and affordability of unhealthful foods that 'promote high energy intake and physical inactivity, including sedentary behaviour.' (World Health Organisation, 2016: p. 10). Numerous research studies have attributed the marketing of HFSS, low-nutrition foods across mass media channels as a factor

contributing to the childhood obesity pandemic (Beales & Kulick, 2013). This is supported by a study with 8- to 11-years-olds whereby two thirds of the participants 'reported that food ads 'often' or 'sometimes' made them feel hungry' (Marshall, O'Donohoe & Kline, 2007: p. 175). More recently, one study with 96 Italian children aged 6- to 11-years-old compared brand awareness and snack intake. Individuals with a high brand awareness who had not seen a television advert for the branded food during the experiment exhibited a lower snack intake when the branding was not visible on the snack packaging (Gregori *et al.*, 2017).

A report based on a *YouGov* survey of adolescents aged 11- to 19-years-old found an association between watching commercial television with junk food advertising and increased consumption of unhealthful snacks (Cancer Research UK, 2018). Branding and advertising can be powerful, as a *Functional Magnetic Resonance Imaging* (fMRI) scan experiment with 32 adolescents showed. In comparison to non-food logos, the food logos caused increased brain activity in areas associated with motivation and emotion, possibly because foods is biologically necessary (Bruce *et al.*, 2014).

Perhaps similar persuasive marketing communication techniques could be applied to healthful foods. In March 2017, *Lidl* [German global discount supermarket chain] piloted their fun size vegetable range targeting children. The range includes 'Cauliflower Clouds,' 'Unicorn Carrots,' 'Broccoli Trees' and 'Sweet Potato Piggies.' The range has been successful so far (Barker, 2017). Across the UK, £16m is spent on fruit and vegetables advertising. This equates to a mere £1 for every £17.50 spent annually on soft drinks and confectionery (The Food Foundation, 2018). The chief marketing officer for the *Veg Power* campaign said that the priorities motivating primary school-aged children were fun, taste and health. He explained that the *Veg Power* advertising campaign was effective because it put children on the same side as their parents (Parker, 2019) (see Appendix A.1.). Making vegetables fun through marketing and advertising for children can be compatible with advertising activity targeting parents (Jones & Fabrianesi, 2008).

2.9. Policy Related to Diet

The WHO asserts that 'Governments hold the ultimate responsibility in ensuring their citizens have a healthy start in life' (World Health Organisation, 2016: p. 9).

Oppositional to this, the NHS was dubbed a 'National Sickness Service' in a *Her Majesty's Stationery Office* report because it favours short-term fixes rather than the establishment of long-term lifestyle solutions (Wanless, 2004: p. 6). Positively, a recent report published by the Welsh Government stated that it is taking a preventative approach in reducing the number of individuals becoming obese by shifting focus and resources to early intervention (Welsh Government, 2019a). A few relevant policies and regulations implemented by the UK government are summarised below.

Tax:

The *Soft Drinks Industry Levy* was introduced on 5th April 2018 as a £520 million levy on sugar-sweetened drinks. The tax affects drinks containing more than 5g of sugar per 100ml (18p) and those with more than 8g per 100ml pay a higher tax (24p). Fruit juices and milk-based drinks are exempt from the taxation (HM Revenue and Customs, 2018). Whilst currently there is no unhealthful food tax, previous research indicates that introducing a 'fat tax' and subsidising healthful foods could increase individuals' healthful choices (Papoutsi *et al.*, 2015). The government set a voluntary target of reducing sugars in nine products by 20% by 2020 (Public Health England, 2017a). A Public Health England (PHE) report evidenced a 2.9% average sugar reduction across products, being more successful in yogurts (10.3% reduction) and cereals (8.5% reduction) (Niblett *et al.*, 2019).

Traffic light Front-Of-Pack Labelling:

Front-Of-Pack (FoP) traffic light labelling clearly shows the calories per 100g/ml and calories per portion. Nutritional information concerning salt, (total) sugars, fat and saturated fats is presented in a colour-coded format. The labelling was introduced in 2013 but remains voluntary (UK FSA, 2013). The majority of Welsh consumers reported that they considered FoP traffic light nutritional information whilst food shopping (Evans *et al.*, 2017). Notably, whilst consumers are increasingly scrutinising nutritional information, individuals may choose healthful items in one category but less healthful alternatives elsewhere, using FoP labelling as a compensatory mechanism (Trivedi, Sridhar & Kumar, 2016).

5-A-Day:

See Section 2.3.3.

Healthy Start:

Healthy Start (HS) is a scheme aiming to improve the health of pregnant women and families on benefits or with low incomes in the UK. Beneficiaries receive vouchers for purchasing milk, formula milk, fresh or frozen fruit and vegetables. Every four weeks 2.6 million HS vouchers are issued to families. Eligible pregnant women and children aged 1- to 4-years-old receive one HS voucher each per week worth £3.10. Infants under the age of 1-year-old receive two vouchers a week worth a total of £6.20 (National Health Service, no date a). One study found that individuals receiving the HS vouchers ate significantly more fruit and vegetables and were more likely to meet the recommended nutrient intakes for vitamin C, iron, calcium and folate (Ford *et al.*, 2009).

Change4Life:

The *Change4Life* initiative launched in January 2009. Costing £75 million, the aim is to 'help every family in England eat well, move more and live longer by changing behaviour.' Families are encouraged to reduce salt and fat intakes in addition to swapping to healthier, lower sugar alternatives (Department of Health, 2009: p. 6). The *Change4Life* initiative launched in Wales in 2010 (National Health Service Wales, 2010).

The Calorie Reduction Pledge:

The *Calorie Reduction Pledge* is part of the *Call to Action on Obesity in England* plan. 'Possible actions include: reformulation, portion size, development of lower calorie options, encouraging consumers to choose healthier options, satiety enhancers, balance of portfolio/menu/etc., activity intended to inform and education consumers towards making healthier choices' (Department of Health, 2015: p. 6).

Childhood Obesity: Time for Action:

The UK has a 'world-leading childhood obesity plan' that was published in 2016 and the second chapter was published in 2018. The 2016 instalment of the plan challenged industry to take 20% of sugar out of commonly eaten children's foods by 2020. *Kellogg's* cereal has reduced sugar by 20-30% across its children's range. Other sections of the plan include the aim of reducing calories in everyday foods by 20% by 2024 (Department of Health and Social Care, 2018). Reformulation may be difficult for companies as ingredients change the structure of products, however the

Food and Drink Federation (FDF) provides tools to help its members (Food and Drink Federation, no date).

Supermarket Checkouts:

There are no government-led regulations for checkouts in the UK. Many supermarkets take a voluntary approach, pledging to take 'a stronger stance on health' and remove sweets from the checkout area (Kantar Worldpanel, 2016: p. 2). Most supermarkets in the UK have developed their own checkout policies, and a cross-sectional observation study discovered that stores with clear and consistent policies had a lower proportion of unhealthful foods at the checkout (Ejlerskov *et al.*, 2018).

Food Advertising Restrictions:

Of increasing concern and scrutiny is that advertising targeting vulnerable children has become a contemporary social policy issue (Dhar & Baylis, 2011). Critics of advertising say that 'it is unfair because children lack the cognitive skill and life experiences needed to resist persuasive claims' (Moore, 2004: p. 161). The *Advertising Standards Authority* (ASA) has rules regarding the content and scheduling of HFFS. Strict codes of conduct have been put in place by the ASA to protect children, who are 'less able to fully understand and critically assess the ads they see and hear' (Advertising Standards Authority, 2016). The ASA is an independent advertising regulator in the UK, applying the Advertising Codes, written by the Committees of Advertising Practice (CAP) (Advertising Standards Authority, 2016). In 2007, there was a total ban of HFSS advertising from children's television channels and children's slots on commercial channels. These restrictions have reduced children's exposure to HFSS advertising by 37% overall and there is 13% less food and drink advertising on television. Above all, nutritional and health claims must not be exaggerated and may only be mentioned if the benefits are significant (Buckingham, 2009; Ofcom, 2010). Recently, Jamie Oliver has called for stricter advertising regulation, stating that 'constantly being targeted with cheap, easily accessible, unhealthful junk food' undermines educational work and makes healthful decision-making challenging for children (Oliver, 2018).

A recent survey in Wales revealed that 63.9% thought that banning HFSS advertisements before 9:00pm would encourage healthier eating amongst the

general public (Evans *et al.*, 2017). Hitherto, restrictions regarding child-directed television advertising have not been totally effective in reducing advertising exposure and childhood obesity (Beales & Kulick, 2013; Huang & Yang, 2013). Nevertheless, child-centric legislation does little to prevent childhood exposure to adults' marketing communications. Strachan and Pavie-Latour (2017: p. 13) suggest that coddling, insulating and protecting children and adolescents from food and nutrition marketing is undesirable because they will be 'ill-informed to make sense of the melee of marketing communications later in life' if they lack the exposure leading to the development of required rationalising and discerning skills.

2.10. The Influence of the School Environment on Diet

The school environment is capable of influencing adolescents in a variety of ways, through availability, pricing and peer pressure. Schools in Wales are required to promote eating healthfully amongst pupils (Welsh Local Government Association., 2009).

2.10.1. School Food Standards

The School Food Plan aims to improve school food, teach pupils to enjoy real food and improve the nation's health. The plan outlines ten governmental actions focused on cooking and eating proper food (Dimbleby & Vincent, 2013). By extension, *School Food Standards* have been mandatory since 2015 and regulate school meal provision, including breakfast, lunch and snacks. Principally, '[ensuring] that food provided to pupils in school is nutritious and of high quality; to promote good nutritional health in all pupils; protect those who are nutritionally vulnerable and to promote good eating behaviour' (Food For Life, no date; Department for Education, 2019: p. 4). In Wales, *The Healthy Eating in Schools (Nutritional Standards and Requirements in Wales)* were introduced in 2013 to replace the 2001 regulations. These requirements include providing at least two portions of vegetables or salad; having fruit and vegetables on the menu; and, specifies that co-educational secondary school dinners should provide approximately 646 calories (Welsh Local Government Association, 2013).

2.10.2. Initiatives

Below are a few school-based initiatives of interest to the current study.

Jamie Oliver:

In February 2005, Jamie Oliver's television series *School Dinners* brought the world's attention to the poor standard of food served in school canteens (Revill & Hill, 2005). The four-part series tackled the issue of school meals, campaigning to increase school dinner budgets from 37p to 50p in primary schools and to 60p in secondary schools (Feed me Better, no date). The school meal became an 'emotive, political and social issue' once the general public realised that diet impacted an individual's potential, including 'educational attainment levels, health and life expectancy' (Fairchild & Collins, 2011: p. 209). Nowadays, *Turkey Twizzlers* [battered 'meat' product made of 34% turkey, water, pork fat, rusk, additives, sweeteners and flavourings] are off the menu and the nutritional quality of school food has improved. Despite this, some schools are 'lagging behind' and the menus are 'too bland, boring and beige' (Dimbleby & Vincent, 2013: p. 7).

School Fruit and Vegetable Scheme:

There is a voluntary *School Fruit and Vegetable Scheme* (SFVS) in England but not Wales as part of the national *5-A-Day* campaign. Children aged 4- to 6-years-old are entitled to a piece of fruit or vegetable, including: apples, pears, bananas, carrots, cherry tomatoes, soft citrus fruits, raisins/sultanas, mini cucumbers, strawberries, sweet bite peppers and sugar snap peas (Change4Life, 2017). The SFVS increases individuals' fruit and vegetable consumption, but does not 'appear to have any wider impact on diet,' with no sustained increased fruit and vegetable consumption after individuals grow up and are no longer eligible (Ofsted, 2006; Teeman *et al.*, 2010: p. 91).

Breakfast:

Providing breakfast clubs in deprived areas can have a positive educational, health and social impact on pupils because hunger affects academic achievement (see Section 2.5.2). There is a growing body of literature recognising that frequent breakfast consumption amongst adolescents was positively correlated to schoolwork quality (Berkey *et al.*, 2003; Hoyland *et al.*, 2012).

Holiday Hunger:

Kellogg's conducted research into community holiday clubs. Pupils are out of school 170 days a year and low-income households often struggle during the holidays. 14% of parents served smaller meals to reduce costs and almost four in ten purchased cheaper and less healthful food. The research found that 47% of parents with a low household income would take their children to a holiday club serving breakfast in their local community and 27% of teachers believed that such clubs would be beneficial (Kellogg's, 2015).

2.10.3. School Dinners vs. Packed Lunches

Upon starting secondary school, the ability to choose food in the school canteen is one of the most appealing aspects (Brannen & Storey, 1998). To remain viable, schools should provide 'food that is both appetising and nutritious; making the dining hall a welcoming place; keeping queues down; getting the price right; allowing pupils to eat with their friends; getting them interested in cooking and growing' (Dimbleby & Vincent, 2013: p. 8). A minority of schools advise parents about how to prepare a healthful packed lunch, but lunch box monitoring and providing parents with feedback improves quality and the nutritional content (Ofsted, 2006).

2.10.4. National Curriculum

The national curriculum provides an opportunity for nutritional education (Bailey, 2016). Engaging pupils and embedding habits of eating regularly and healthfully has the potential to prevent obesity over their lifetime (World Health Organisation, 2016). A systematic review established a positive association between food literacy and adolescents' dietary intake. Adolescents with a greater food literacy who frequently prepared food had healthier diets (Vaitkeviciute, Ball & Harris, 2015).

2.10.5. School-based Studies

Food Dudes are super hero characters that receive special powers after eating vegetables, encouraging children to 'keep the life force strong.' Wengreen *et al.*'s study involved 253 children watching short videos featuring the *Food Dudes* characters over 16 days. Their fruit and vegetable consumption significantly increased during and post-implementation (Wengreen *et al.*, 2013). Another study

concerning the *Food Dudes* intervention with 4- to 11-year-old participants found that only pupils receiving a school dinner significantly increased their fruit and vegetable intake (Upton, Upton & Taylor, 2013). Notably, a study including six schools and 2,292 pupils aged 5- to 10-years-old indicated that receiving tangible awards for vegetable consumption in the *Food Dudes* programme was no more effective than verbal praise in increasing long-term vegetable consumption (Morrill *et al.*, 2016). Although the *Food Dudes* studies were conducted with primary school-aged children, vegetable characterisation may still appeal to young adolescents.

2.10.6. The Importance of a Whole School Intervention

Ofsted report that multi-faceted, whole school interventions involving 'teaching and non-teaching staff, school cooks/caterers, pupils, parents, governors and local authority representatives' may have the potential to change pupil attitudes, practices and knowledge surrounding fruit and vegetables (Ofsted, 2006: p. 15). Nevertheless, existing school-based intervention efforts have not been able to reverse the rising rates of childhood obesity. Taking a more holistic approach with multiple factors may be more effective (see 2.2.1.) (Birch & Ventura, 2009).

2.11. Microsystem Factors Influencing Adolescents' Diet

The EST model describes the microsystem as including the child's immediate surroundings; including peers, parents and school (see Section 2.2.1.) (see Section 2.10. for the influence of school).

2.11.1. Bandura's Social Learning Theory

SLT (sometimes known as *Social Cognitive Theory* (SCT)) was theorised by Bandura in 1963. Bandura stated that behavioural learning occurs through continuing 'interaction between personal, behavioural, and environmental determinants' (Bandura, 1977: p. 194). The theory expands upon the behavioural theories of classical and operant conditioning to include cognition and environmental elements, asserting that individuals learn through observing others, modelling behaviour (vicarious learning) and reciprocal inter-relationships whereby experiences of classical and operant conditioning lead to consumer socialisation.

Classical conditioning involves learning associations between two stimuli and operant conditioning consists of rewarding positive behaviour as a way to learn new behaviours (Learning Theories, no date; Psychologist World, no date; Bandura, 1977). Lawlor and Prothero describe childhood as a 'learning curve' wherein individuals acquire purchasing decision behaviours and cognitions from their parents (Lawlor & Prothero, 2011: p. 562).

Studies with preschool-aged children have investigated the effects of classical and operant conditioning. For example, Birch (1998) found that when 3- to 5-year-olds were offered food in a positive context as opposed to a negative context then liking was more probable, supporting the classical conditioning model of learning. Similarly, classical conditioning was used in an experimental study with 3- to 5-year-olds who were given disliked foods paired with liked foods. Brussel sprouts were paired with cream cheese and this increased consumption and preference for the previously disliked Brussel sprouts (Capaldi-Phillips & Wadhera, 2014). On the contrary, another study involving preschool-aged participants involved repeatedly tasting a small portion of disliked vegetables, either alone or with a liked dip (associative conditioning). Both conditions resulted in increased vegetable liking, however the associative conditioning with a dip was not massively beneficial (Anzman-Frasca *et al.*, 2012).

SLT posits that social norms influence behaviour. Social norms can be defined as, 'implicit codes of conduct that provide a guide to appropriate action' (Higgs, 2015: p. 38). Individuals compare themselves to the social norm whilst taking into account how much they identify to the norm (Higgs & Thomas, 2016). For instance, Neumark-Sztainer's study demonstrated 'that a broad array of interrelated factors may be associated with food choices: socio environmental factors (e.g., parent influence, food availability); personal factors (e.g., taste, food preferences, body images); and behavioural factors (e.g., meal patterns, vegetarian lifestyles)' (Neumark-Sztainer *et al.*, 1999: p. 934). A literature review study found that context-specific social norms have the potential to alter both children's and adult's evaluations of food. Hereby, non-context-specific eating norm messaging such as 'most people eat three portions of vegetables on a daily basis' can have minimal influence (Robinson, Blissett & Higgs, 2013: p. 173). In contrast to Piaget's theory of TCD, Bandura's SLT could be more relevant as it takes into consideration the

complexity of external factors, such as cultural and societal issues that may indirectly or directly influence adolescents' eating behaviour (Bandura, 1986).

2.11.2. Socioeconomic Status

Obesogenic eating patterns may have resulted from the changing global food system. Nowadays, heavily processed, high-calorie foods are affordable and effectively marketed to the masses (Lake & Townshend, 2006; Kearney, 2010). Unhealthful dietary habits and obesity are a serious problem worldwide regardless of whether countries are 'developed' or not. Large proportions of people across all socioeconomic groups do not consume vegetables daily (Roo*s et al.*, 2008; World Health Organisation, 2016). An individual's 'cultural capital' or social assets as defined by Bourdieu help to explain socioeconomic status and how this influences taste preferences (Bourdieu, 1984) . A systematic review of the literature followed by a questionnaire found a positive association between individuals with a higher education having a higher social capital and a resultant healthier consumption of food (Kamphuis *et al.*, 2015).

Maslow's *Hierarchy of Needs* is a five-tiered pyramid, at the base is 'physiological needs' and individuals will only endeavour to meet higher levels of needs once their physiological needs are met (Kelleher, no date) (Figure 2.5.):

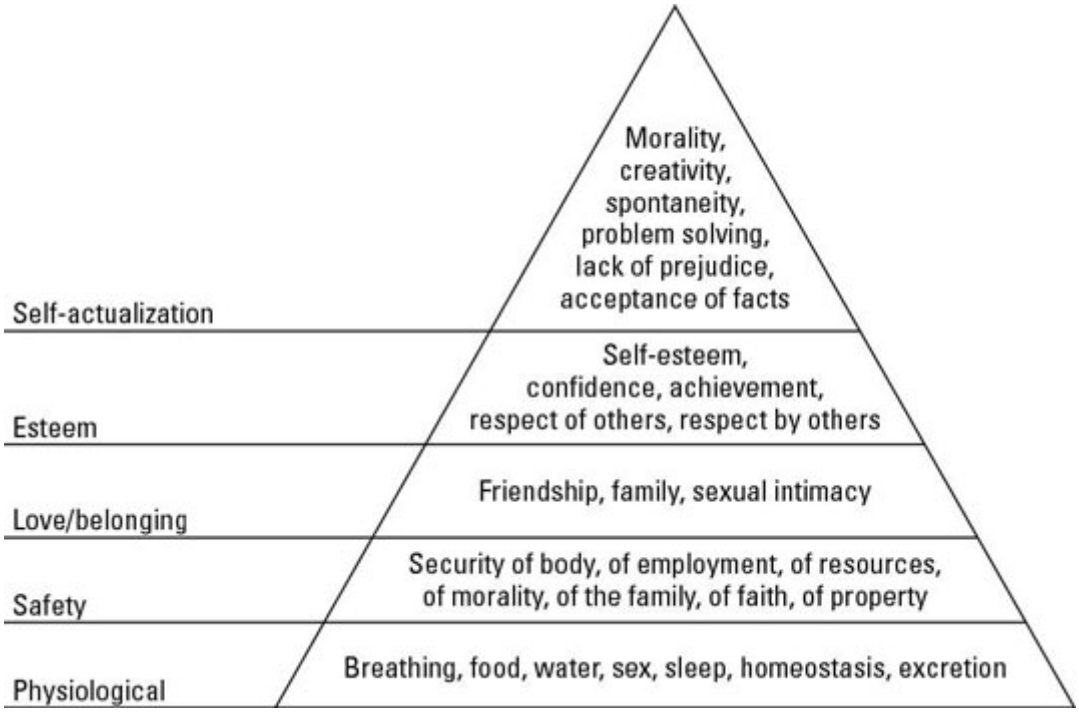


Figure 2.5.: Maslow's Hierarchy of Needs (Kelleher, no date)

This *Hierarchy of Needs* can be applied to study the socioeconomics around food choice. 2903 adults participated in a Dutch questionnaire study, whereby an association was discovered between education and being in a higher level of the pyramid. Moreover, those with a higher pyramid score had a higher fruit and vegetable consumption, implying that individuals who were satisfied with their higher-level needs made healthier food choices (Van Lenthe, Jansen & Kamphuis, 2015). On the other hand, a recent survey of 243 pupils from seven secondary schools in the UK found 'tribal theory' to play a greater role than SES. Cues from peers and marketing influences determined out-of-home food consumption rather than SES and no significant differences were established between high and low SES pupils and their energy and nutrient consumption (Kapetanaki *et al.*, 2019).

Deprivation:

Deprivation can be defined as 'The damaging lack of material benefits considered to be basic necessities in a society' (Oxford Dictionary, no date). Ethnographic research with foodbank users in the UK showed that as deprivation increased, individual's fruit and vegetable consumption decreased (Garthwaite, Collins & Bambra, 2015). As mentioned previously, children in low socioeconomic groups are most vulnerable to obesity, and childhood is critical as it has a lasting effect on an individual's long-term health (The Stationery Office, 1998; World Health Organisation/Regional Office for Europe, 2014). Equally, the *Child Measurement Programme for Wales 2014/2015* exposed that the proportion of overweight or obese 4- to 5-years-olds differed greatly across Wales depending on the local authority, being the highest at 31.7% in Merthyr Tydfil which is more deprived than the Vale of Glamorgan at 17.0% (Bailey, 2016).

Furthermore, those of higher social class have lower rates of overweight and obesity. Research within the UK uncovers a pattern between socioeconomic differences and lifestyle behaviours. That is, individuals of higher social class living in some of the least deprived areas tend to smoke less, do more physical activity, consume more fruit and vegetables, but are inclined to drink more alcohol (Public Health England and Food Standards Agency, 2016). The *Office for National*

Statistics (ONS) exposed class divides across the UK, with males living in the most deprived areas having a shortened life expectancy of 9.4 years and female life expectancy shortens by 7.4 years on average (Office for National Statistics, 2019).

Ethnicity:

Ethnicity influences an individual's food consumption and dietary habits. Childhood obesity is ubiquitous amongst some ethnic minorities in the UK, particularly Bangladeshi and Pakistani pupils (Public Health England, 2015a). Ethnic differences are evident in that Asian American female adolescents are more likely to help with food preparation at home than adolescents of other ethnicities (Larson *et al.*, 2006). Feeding practices may vary too, research shows that South Asians and Black Afro-Caribbean parents exerted a greater pressure for their children to eat what they were served in comparison to White British parents (Gu *et al.*, 2017). Family meal times tend to occur more frequently for Asian adolescents in comparison to other ethnicities (Surjadi, Takeuchi & Umoren, 2017).

Culture:

Biological and socio-cultural factors influence which foods people decide to eat, their preparation methods and eating times (Horne *et al.*, 1995). Contendo *et al.* (2006) interviewed 108 adolescents aged 11- to 18-years-old regarding their food choice. The study demonstrated that food choice was 'deeply embedded in culture,' with food items often chosen to complement other foods, i.e. fries with a hamburger or cooked vegetables with chicken (2006: p. 575). Dimbleby and Vincent (2013: p. 32) write that since the Industrial Revolution, those living in urban areas have 'found themselves cut off from the fresh produce, and culinary traditions, of the countryside.' But, these days it seems that interest in cooking is growing, with cookbooks, cookery programmes and food on social media becoming increasingly popular, suggestive of 'a growing cultural fascination with gastronomy' (Dimbleby & Vincent, 2013).

Environmental Factors:

An individual's immediate 'built environment, transport systems, active recreation opportunities, cuisines and food culture, and culture around body size' moderates the effects of global obesity drivers and the population's resultant BMI (Swinburn *et al.*, 2011: p. 808). Environments are deemed obesogenic if they promote intake of

high-energy foods that are ‘available, affordable, accessible and marketed’ in addition to sedentary behaviour as a social norm (World Health Organisation, 2016: p. 10). Within the UK, London’s food environment ‘bombards people with marketing and promotion of unhealthful foods’ and is blamed for exacerbating the obesity issue. Thus, restrictions on opening new hot food takeaway outlets are in place (Greater London Authority, 2018: p. 9). A UK-based study linked communities living in areas of high concentrations of fast food outlets with increased fast food consumption in the community. However, levels of obesity only increased amongst those with a low level of education (Burgoine *et al.*, 2016).

Recession:

Kantar Worldpanel market research discovered that ‘During times of economic uncertainty, health takes a secondary role and price and pragmatism drive consumer choices.’ Accordingly, sales of healthful products such as fruits and vegetables decline because consumers become more price-conscious and value-oriented during and after a recession (Kantar Worldpanel, 2013, 2014). During the 2008 global economic crisis, unemployment increased and food prices increased faster than wages, becoming 30% more expensive that year. As a consequence, reduced disposable incomes meant that UK households spent less on food and the nutritional quality of foods purchased declined because energy-dense, poor nutritional foods are cheaper than fruits and vegetables, being more satiating for less expenditure (Robertson, Lobstein & Knai, 2007; Griffith, O’Connell & Smith, 2013: p. 2). Following the recession, lower income households in the UK cut their consumption of fruit and vegetables by one third, purchasing only 2.7 portions of their *5-A-Day* in 2010 (Harvey & Jowit, 2012).

Household Income:

The latest figures show that in the UK, the average food and drink expenditure per person per week is £31.39 on household food and £13.92 on eating out-of-home (Department for Environment Food & Rural Affairs, 2019). Despite high mark-ups, HFSS convenience foods are affordable for the masses, with those in low socioeconomic groups buying more economically, ‘obtaining more grams of food of any type per pound spent’ (The Stationery Office, 1998: p. 40). Jones *et al.* studied the prices of both healthful and unhealthful foods, finding that on average, 1000 calories of unhealthful foods cost £2.50 whilst 1000 calories of healthful foods cost

£7.49. This large price disparity means that those with a lower household income will purchase the unhealthful, yet cheaper foods (Jon*es et al.*, 2014; Kellogg's, 2015). All ages and genders in the lowest socioeconomic class (quintile 1) have a lower than average fruit and vegetable intake. Only 3% of adolescent males aged 11- to 18-years-old in quintile 1 met the *5-A-Day* guidelines, compared to 39% of those in quintile 5 (Public Health England and Food Standards Agency, 2014).

Parents require sufficient financial resources and knowledge concerning 'savvy' vegetable preparation to successfully encourage their children to consume fruits and vegetables (Cullen *et al.*, 2000). Since 2013, the price of vegetables have fallen, feasibly due to the 'highly competitive retail market' (The Food Foundation, 2016). In the 1970s, working individuals spent 25% of their income on food whereas in 2010 they spent 13% (Cribb, Johnson & Joyce, 2012). Americans are becoming overweight although less of their income is spent on food, this can be attributed to the low cost of the energy dense foods and the palatability of which reinforces consumption (Drewnowski & Specter, 2004).

Food insecurity, food poverty and food banks:

Even in industrialised countries, food poverty significantly contributes to health inequalities that result in some people being unable to 'acquire or eat an adequate quality or sufficient quality of food' (Dowler and O'Connor, 2012: p. 44). Data gathered for the *United Nations* (UN) revealed that 8.4m people in the UK face periods where they are too poor to eat, resorting to the cheapest sources of calories or skipping meals (Taylor & Loopstra, 2016). Food insecurity and food poverty is a significant problem across the UK, resulting in food bank usage particularly increasing in areas where welfare benefits are being cut. Poverty increases the probability of obesity (Loopstra *et al.*, 2015; Salmasi & Celidoni, 2017). Interviews with UK food bank users found the consensus that healthful food was too costly. This meant that fruit and vegetables were overlooked in favour of 'filling' cheap yet processed alternatives (Garthwaite, Collins & Bambra, 2015). Presently, food poverty prevention focuses on avoiding hunger rather than focusing on healthful eating. But, eating healthfully can potentially reduce health care costs in the long term and have wide societal benefits (Cecchini *et al.*, 2010; Jones *et al.*, 2014).

Educational Level:

A longitudinal questionnaire study correlated adolescents with highly educated parents and having stronger role models as well as greater fruit and vegetable preferences, increased knowledge about recommended consumption levels and stronger intentions to eat their *5-A-Day* (Bere *et al.*, 2008). Similarly, a questionnaire study with mothers of 2 ½ to 7-years-olds demonstrated that mothers' educational level resulted in differences in children's food consumption of various foods, including fruit, vegetables and soft drinks (Vereecken, Keukelier & Maes, 2004). Conversely, pupils from areas where adults had no qualifications had a 'lower intake of dietary fibre, calcium, vitamin C and iron and a higher intake of fat than similar pupils from other areas' (Teeman*et al.*, 2010: p. 75).

2.11.3. Parenting

Parenting practices and intra-familial factors determine an individual's eating environment, eating behaviour and weight status.

Early Childhood:

Children are predisposed to prefer energy-dense foods, meaning that early childhood intervention is important whilst the child's ecology is relatively constricted because parents will have a greater influence (Anzman, Rollins & Birch, 2010). Between the ages of 2- and 5-years-old, parents can challenge developing food preferences. Positively introducing fruit and vegetables from an early age is recommended (Cooke *et al.*, 2004; Birch & Ventura, 2009). Research reveals that many families use effective and ineffective parental feeding practices simultaneously, suggesting that education is required to minimise coercive feeding practices (Baranowski *et al.*, 2013).

Traditional Parenting Practices:

Historically, food scarcity was an environmental threat to a parents' ability to raise healthy, growing children. Consequently, traditional child-feeding practices have evolved: '(1) feeding children frequently; (2) offering large portions; (3) offering preferred foods; (4) offering food as a first response to crying or distress; and, (5) coercing children to eat when food is available, even if they are not hungry' (Birch & Ventura, 2009: p. 77). Traditional feeding practices may improve child health and reduce child morbidities in developing countries whereby food sources are often

scare. On that account, plumpness may be viewed as more healthy and the outcome of successful parenting (Caprio *et al.*, 2008).

Nonetheless, applying these feeding practices in an obesogenic environment, can have a detrimental effect and result in overeating and weight gain. Reasons for this are that it promotes children's: '(1) lack of responsiveness to satiety cues; (2) overeating in response to large portions; (3) learned preference for unhealthy, palatable foods as they are used as rewards and treats; (4) learning to eat in response to distress rather than hunger; and (5) learned dislike for 'healthy foods' if there is pressure to eat them' (Birch & Ventura, 2009: p. 77). Obesogenic eating behaviours may develop following emotional feeding (feeding when the child is in emotional distress) and instrumental feeding (using food as a reward). The child learns to associate eating with cues other than hunger, which increases the risk of the child eating more than physiologically required (Wardle *et al.*, 2002; Faith *et al.*, 2004). Remarkably, a UK-based study with young adult participants found an association between individuals who cleared their plates and heavier body weight. Many retrospectively said that their parents had encouraged them to clear their plates when they were younger (Robinson & Hardman, 2016).

Parenting styles:

The literature specifies four parenting styles: Authoritarian, Authoritative, Indulgent-Permissive and Uninvolved/Neglectful (Blissett, 2011). Authoritarian parenting is associated with a low responsiveness and warmth towards the child alongside highly demanding expectations. In an eating context, the parent may attempt to control what the child eats whilst disregarding the child's preferences. Secondly, Authoritative parenting is associated with a high warmth and responsiveness besides a high demandingness and parental involvement. Parents may give their child a choice about what they eat and encourage consumption of healthful foods. Indulgent-Permissive parenting is indicative of a high warmth and low demandingness as well as a general lack in monitoring the child's behaviours. Providing little structure and limiting food choices only by availability, permits the child to eat whatever they want to in whatever quantities they desire. Uninvolved/Neglectful parenting is associated with a low level of warmth and low demandingness as well as little involvement and control over the child (Patrick *et al.*, 2005; Blissett, 2011).

Authoritative parenting appears most beneficial for instilling healthful eating behaviours. Interestingly, younger adolescents were more likely to describe their parents as 'authoritative' compared to older adolescents. Compared to neglectful parenting, authoritative parenting resulted in more positive dietary behaviours and individuals were more likely to: eat breakfast, eat fewer unhealthful snacks, consume fewer sugar-sweetened beverages and have a greater daily fruit consumption (Kremers *et al.*, 2003; Van Der Horst *et al.*, 2007; Pearson *et al.*, 2010). Likewise, Patrick *et al.* (2005) found that children living in authoritative households were more likely to have fruit and vegetables readily available, subsequently increasing their consumption. However, although authoritarian parents have good intentions, less healthful eating behaviours were often promoted (Patrick *et al.*, 2005). This may cause an energy imbalance as 4- to 11-year-olds experiencing authoritarian parenting reported a high intake of both healthful and unhealthful snack foods as well as greater body dissatisfaction (Ogden, Reynolds & Smith, 2006). In contrast, an indulgent feeding style was associated with higher fruit consumption in comparison to those living in authoritarian or neglectful homes (Kremers *et al.*, 2003).

Thematically, the literature suggests that any lack of control over a child's intake, perhaps through either indulgent-permissive or uninvolved/neglectful parenting, is likely to result in an unsatisfactory fruit and vegetable consumption. However, excessive control and pressure to eat by parents implementing an authoritarian parenting style can negatively impact children's fruit and vegetable consumption (Blissett, 2011). This is because overly controlling parenting 'can refocus the child away from responsiveness to internal cues of hunger and satiety and towards external factors such as the presence of palatable foods' (Birch, 1998: p. 623). Exposure to particular flavours develop a child's preferences for certain foods. Parents should be aware of how to develop taste preferences, as amongst 6- to 12-year-olds, taste preferences as well as the availability and accessibility of fruit and vegetables were the most significant factors determining their fruit and vegetable consumption (Blanchette & Brug, 2005).

Parental Modelling:

Numerous studies show that the eating behaviour of parents is more effective than parental nagging or preaching about the benefits of eating healthfully (Ogden,

Reynolds & Smith, 2006; Pedersen, Grønhøj & Thøgersen, 2015). Mealtimes are a crucial modelling opportunity because children and adolescents are more likely to meet their own recommended fruit and vegetable consumption levels if they report their parents eating salads, consuming fruit and snacking on vegetables (Fisher *et al.*, 2002; Pearson *et al.*, 2010; Draxten *et al.*, 2014). In spite of this, Cullen *et al.* (2000) only found a weak correlation between parental fruit, fruit juice and vegetable modelling behaviour and their child's consumption.

Family meal times:

Parents still play a central role in fruit and vegetable consumption despite adolescents desiring greater autonomy and parental control beginning to diminish. Frequent family meals are associated with an increased vegetable intake, benefiting adolescents (Arcan *et al.*, 2007). Data from the *Project EAT-I and EAT-II* studies revealed that a positive environment at mealtimes was associated with better self-esteem among overweight adolescents and was inversely associated with unhealthy weight-control behaviours. Furthermore, frequent family meals were associated with 'lower levels of cigarette smoking, alcohol and marijuana use, low self-esteem, depressive symptoms, and suicidal ideation and attempts' (Neumark-Sztainer *et al.*, 2010: p. 1118).

2.11.4. Peers

Peer pressure can cause individuals to develop unhealthful behaviours such as underage smoking, alcohol consumption and drug use as adolescents seek to fit in amongst their peer group (Cross, 2002). There is considerable evidence supporting the hypothesis that peer relationships influence the growth of problematic behaviour amongst youth (Gifford-Smith *et al.*, 2005). There is copious literature suggesting that peer influence and social norms encourage unhealthful food intake and dietary behaviours. In particular, survey data from the *Project EAT-I* and *EAT-II* studies concerning dieting and unhealthy weight control behaviours was collected from 2,516 adolescents at baseline (1998–1999) and at follow-up (2003–2004). 8.8% said that their friends were very involved in dieting. Friends' participation in disordered eating behaviours was associated with an increased likelihood of an individual participating in disordered eating behaviours five years later (Eisenberg & Neumark-Sztainer, 2010). Secondly, a focus group study with adolescents in

Denmark aged 13- to 15-years-old found that individuals often experience intergenerational conflicts and personal dilemmas as peer pressure is a strong determining factor for the consumption of less healthful snacks (Bech-Larsen, Jensen & Pedersen, 2010). Another study found that adolescents were reluctant to appear overly health-oriented amongst their peers (Bech-Larsen & Kazbare, 2014). Thus, the vegetable-based NPD must be a product considered desirable and socially acceptable for adolescents to eat amongst their peers.

On the other hand, peers can have a positive influence. A web-based survey with 1850 Australian adolescents established that an increase of vegetable consumption was associated with an adolescent's best friends supporting healthful eating (Pearson, Ball & Crawford, 2011). However, data from *EAT-2010* showed that although friendship groups exhibited similarities in their eating patterns, there was little association between fruit and vegetable consumption amongst friendship groups, but larger associations were found for breakfast and whole grain intake (Bruening *et al.*, 2012). However, adolescents that select healthful food options to conform to social norms and for publicly acceptance will not experience long-term behavioural change unless their underlying perceptions are changed and the decision is made on a basis of personal beliefs (Contento *et al.*, 2006; Higgs, 2015). Likewise, recent research with individuals aged 7- to 11-years-old suggests that peer influence is only apparent in healthful eating intentions rather than their actual choice of snacks to consume (Hang, Davies & Schüring, 2020).

2.12. Individualistic Factors Affecting Adolescents' Diet

Various factors affect an individual's food consumption. Perceived barriers include: taste, food appearance, choice or availability, cost, filling power, body image or weight concerns and time or effort involved (McKinley *et al.*, 2005). The *Project EAT-I, EAT-II* and *EAT-III* studies state that 'favourable taste preferences, fewer perceived time barriers to healthy eating, higher home availability of F/V, and limited home availability of unhealthy foods' during adolescence were predictive of fruit and vegetable consumption in the 5-year and 10-year follow-up stages of the study (Larson *et al.*, 2012: p. 1216).

2.12.1. Theory of Planned Behaviour

The TPB was developed by Ajzen in 1985. The theory states that attitudes, subjective norms and perceived behavioural control result in an individual's intention and their subsequent behaviour (Ajzen, 2002). Dunn *et al.* (2011) applied TPB to fast food consumption, discovering that it could explain up to 50% of the variance between an individual's intentions and consumption. Therefore, an individual's knowledge alone was inadequate in preventing fast food consumption, because other factors influenced the eventual behaviours (Dunn *et al.*, 2011). A literature review examining TPB variables and food choice behaviours found that attitudes had the strongest association with the overall intention and subjective norms had the least influence. Higher correlations between intention and behaviour were established for older participants (McDermott *et al.*, 2015). A recent study supports TPB, finding that injunctive norms (prompts of what ought to be done) had little effect on increasing healthful snack consumption, but descriptive norms (prompts of what people were doing) were more effective in increasing healthful eating amongst children (Hang, Davies & Schüring, 2020).

2.12.2. Convenience

Kantar Worldpanel market research presents convenience as a prominent trend because lack of time is a barrier to eating healthfully. Specifically, individuals in Wales do less cooking from scratch and tend to rely more heavily on convenience meals (Kantar Worldpanel, 2017). A literature review found that children and adolescents feel they must compromise between time and eating healthfully, thus purchasing less healthful foods to save time (Krølner *et al.*, 2011). Alarmingly, adolescents in Neumark-Sztainer *et al.*'s (1999) focus group study cited the effort of peeling fruit as a barrier, perceiving fruits and vegetables as inconvenient and unsuitable for eating on the go. Rather, adolescents seek convenient products that they can take on the bus and put in their backpack; prioritise a longer lie-in over breakfast; and, have an aversion to queuing for their school dinner (Neumark-Sztainer *et al.*, 1999).

2.12.3. Temperament

Temperament contributes to eating habits and weight status (Jacob*i et al.*, 2003; Stewart Agras *et al.*, 2004; Blissett & Fogel, 2013). In particular, nutrition may be of low concern amongst adolescents as they lack a sense of urgency concerning their health (Neumark-Sztainer *et al.*, 1999). Other research supports this, McDade *et al.* (2011) found adolescents may lack intrinsic motivation to partake in health promoting habits and behaviours because these actions may only pay off in the long-term. However, they may be motivated to eat healthfully if they desire to 'create a "cleansed," "refreshed," and "energised" mind, body, and emotional state' (O'Dea, 2003: p. 500).

Neophobia:

Food neophobia typically affects individuals aged 18-months to 2-years-old, with more males diagnosed than females. Children with this phobia usually have a lower intake of fresh produce and are often particularly phobic around vegetables (Jacobi *et al.*, 2003; Cooke *et al.*, 2004; Laureati *et al.*, 2015). Repeated exposure of food is essential to reducing food neophobia and increasing a child's acceptance of certain foods. Corsini *et al.* writes that '…increased liking for one vegetable may positively impact vegetable consumption in general' (Addess*i et al.*, 2005; Corsini *et al.*, 2013 p. 943). Exposure and establishment of a healthful diet before the age 4-years-old has been linked to a greater food repertoire when older (Nicklaus *et al.*, 2005; Dovey *et al.*, 2008).

2.12.4. Taste Preferences

Birch and Ventura (2009) suggest that children are born with a predisposition to prefer sweet and salty foods as well as energy-dense foods, but avoid sour and bitter tastes. Conversely, other research found that liking of sweet and salty foods is a learnt behaviour rather than being intrinsic (Anzman, Rollins & Birch, 2010). A large-scale European study compromising 13,505 individuals with the mean age of 11-years-old found predominantly that individual's 'liking and preferences were related to likelihood of daily intake of both FV [fruit and vegetables]' (Brug *et al.*,

2008: p. 12). Tasting foods leads to familiarity, ensuing a greater liking for those foods over time. Repeated taste testing with carrots, tomatoes and peas suggest that 8 or 9 tastes are effective at improving the liking scores for the vegetables, rather than the commonly quoted 15 to 20 exposures (Lakkakula *et al.*, 2010; Ma *et al.*, 2014). Regarding vegetable properties, a tasting and ranking study with participants aged 4- to 25-years-old found that boiled and stir-fried carrots and green beans were the most familiar. Moreover, a 'uniform surface and typical vegetable taste' were central to liking, whereas 'brown colouring and a granular texture' were negatively associated with vegetable liking (Zeinstra *et al.*, 2010: p. 906). Flavour-flavour and flavour-nutrient learning can gradually develop vegetable acceptance. The pure taste of vegetables may not be acceptable for children, but 'diluting the taste or masking the taste of vegetable flavours' may improve acceptance (Zeinstra *et al.*, 2009: p. 530).

2.13. Why Welsh Adolescents should be Eating Welsh Produce

This section details the importance of potatoes in the diet and reviews why Welsh adolescents should eat foods produced in Wales. For example, cauliflower is preventive in the proliferation of certain cancers developing (Boivin *et al.*, 2009). Equally, consuming cruciferous vegetables at least once a week compared to never or only occasionally has been connected to reduced cancer risk (Bosetti *et al.*, 2012).

2.13.1. Potatoes

Although potatoes in the UK are classified as a starchy food, in America they are considered a vegetable (United States Department of Agriculture, no date; National Health Service, 2019b). Potato consumption has declined in Westernised countries since the 1940s. Increased travel opportunities have led to greater preferences towards ethnic foods. Moreover, pasta, rice, bread and couscous are much quicker to cook and more convenient for busy lifestyles (Kearney, 2010; Riley, 2010; Dukeshire *et al.*, 2016). Research from the *Agriculture and Horticulture Development Board* (AHDB) revealed that fresh and frozen potatoes accounted for 35% of carbohydrate-containing meals eaten at home. Meals including fresh potatoes, such as roast dinners and shepherd's pie have fallen out of favour and

16% of potatoes are consumed as jacket potatoes (Agriculture and Horticulture Development Board, 2015, 2019; Gill, 2017).

Consumers seek convenient options and pre-prepared potatoes are becoming increasingly common (Agriculture and Horticulture Development Board, 2019). However, high-fat and high-salt potato dishes such as roast potatoes, chips and potato-based snacks are consumed more readily than plain boiled or baked potatoes (Gibson & Francis, 2015; Gladman, 2017). By extension, potato product consumption differs by age, namely 'The highest percentage of consumers of 'chips, fried and roast potatoes and potato products' were 4- to 10-years-old age (79%) and lowest in those aged 65-years-old and over (55%)' (Public Health England and Food Standards Agency, 2014: p. 77). Although potatoes are a good source of energy, their inclusion in young people's diets is decreasing. AHDB stated that the proportion of children's lunchboxes 'containing crisps has more than halved since the millennium' (Agriculture and Horticulture Development Board, 2015: p. 2).

The popularity of low-carb diets during the 1990s and 2000s across developed countries encouraged the reduction of 'starchy and sugary foods, including bread, rice, pasta and potatoes; all foods with added sugars; and certain high-carbohydrate fruits and vegetables, such as bananas and many root vegetables' (Knight, 2015: p. 441). However, following low-carb diets can be detrimental, and increasing fat intake 'may lead to an adverse cardiovascular risk profile' (Hu & Bazzano, 2014: p. 337). There is a misunderstanding amongst the general public that potatoes are unhealthful due to their glycaemic index; however, boiled potatoes have a favourable nutritional status and provide high levels of satiety in comparison to other plant-based foods. A 200g portion of boiled potatoes provides 11% of an individual's daily fibre requirement as well as 28% of their daily-recommended potassium and 47% of their vitamin C. Furthermore, potatoes provide phosphorous, magnesium and iron (Haase, 2008; Andre *et al.*, 2014). Potatoes are a versatile, low-cost carbohydrate and the main contributor for potassium intake in the British diet. Even if an individual appears to eat plentiful fruit and vegetables, a lack of potatoes in the diet can result in suboptimal levels of potassium, thiamine and vitamin B6 (Gibson & Francis, 2015).

2.13.2. Welsh Farming Economy

Puffin Produce is based in Pembrokeshire, West Wales and agricultural farmers located there benefit from the Gulf Stream, a warm yet powerful Atlantic ocean current from Florida (Government, 2015).

Farming Economy:

The 2018 summer droughts reduced potato yield, contributing to potato crop yield value falling by £220m to £641m (Department for Environment Food and Rural Affairs, 2018). Increasing fruit and vegetable consumption amongst the public in accordance with dietary guidance would provide opportunity for growth across the UK horticultural industry. The *Fruit and Vegetable Alliance* is a group of small and large fruit and vegetable producers, organisations, trade organisations and health or food charities. They 'have come together to collectively make the case for supporting the production and consumption fruit and vegetables in the UK with supporting the publics' health (Fruit and Vegetable Alliance, 2018: p. 3). The *National Farmers' Union* (NFU) is committed to 'increasing the proportion of British fruit and vegetables that are available for consumers to buy' (National Farmers' Union, no date: p. 1).

Nationality:

As a nation, Wales enjoys relatively high levels of identification (Bradbury & Andrews, 2010). Research commissioned by *Food and Drink Wales* discovered that amongst the Welsh population, 44% would pay more for Welsh brands and 74% want more Welsh food and drink in their shops, associating it with good quality and taste (Food and Drink Wales, 2017). For that reason, Welsh adolescents may altruistically want to purchase Welsh vegetable-based snacking products if they personally identify with their Welshness.

Environmental Impact:

The three pillars of sustainability (economy, society and environment) are important for consumer perception (Grebitus, Printezis & Printezis, 2017). Substitution of potatoes with alternatives such as Italian dried pasta and Indian dried basmati rice have resulted in a greater impact on global water resources (Hess *et al.*, 2016). The *Department for Environment, Food and Rural Affairs* (DEFRA) provides statistics on vegetable production in the UK. These days, 53% of the total UK vegetable supply

chain is produced within the UK (Department for Environment Food and Rural Affairs, 2019). This is a slight decrease from 2017 DEFRA statistics which claimed that 54% of vegetables eaten were home produced, in contrast to 83% thirty years ago (Department for Environment, 2017). Potatoes have the highest carbon footprint out of all vegetables, mostly due to the emissions released during cooking and processing. However, per calorie they have a much lower environmental impact than meat (Hamerschlag & Venkat, 2011). Despite this, maximising the yield of potatoes could help reduce carbon footprint but have otherwise negative environmental effects (Röös, Sundberg & Hansson, 2010).

2.14. Conclusion

Reviewing the literature, governmental reports and contextual materials has highlighted that adolescents' eating habits and dietary consumption are poor, rarely meeting the *5-A-Day* fruit and vegetable guideline. Whilst policies are in place and adolescents receive nutritional education at school, this knowledge clearly is not enough to drive healthful food choices because other factors detrimentally influence eating habits. Consumer behaviour, unhealthful eating habits and vegetable consumption are topical research areas. The research landscape is ever changing as governmental policies are introduced, technology advances, marketing becomes more pervasive and research seeks to understand why adolescents eat what and how they do. The literature increasingly promotes the use of children and adolescent participants for research studies exploring attitudes and behaviours rather than relying solely on their parent's opinions.

In particular, the microsystem factors influencing eating behaviours, such as parenting and peers as well as individualistic factors including convenience and taste preferences, require greater exploration. The literature presents adolescence as a key developmental period because eating habits affect individuals in the long-term. Researching the factors influencing young adolescents' eating behaviours and the importance of these factors is imperative in improving the well-being amongst Wales' younger generation, in line with the Welsh *Well-being of Future Generations Act*. The next chapter will describe the methodology and rationalise the inclusion of each method in answering the research questions.

2.15. Development of Research Questions

As aforementioned, reviewing the literature and contextual materials around the subject was an ongoing process because the research landscape was constantly changing. However, as custom in the PhD process, a 20,000-word Literature Review document was initially produced. This was completed within the first seven months to provide a breadth and depth of information. Three individuals from *Puffin Produce* read the Literature Review and provided feedback. The examiner at the MPhil to PhD transfer stated that research questions should be created to inform the data collection.

In Chapter One, the four research questions were presented:

1.) What are 11- to 13-year-old Welsh adolescents' attitudes to vegetables?
2.) What are their routines, behaviours and food consumption (particularly around vegetables)?
3.) What are the main factors that influence 1 and 2 above?
4.) Can a design innovation develop a healthy product that fits with the attitudes and habits of Welsh adolescents?

These questions were developed as a result of discussion with the company partner, PhD supervisors and an analysis of the extant literature presented in the Literature Review. The initial Literature Review was completed using the pre-set PhD title, taking 'younger generation' to include anyone from babies being weaned, toddlers, pre-school children's' food intake, primary school-aged children, adolescents at secondary school and even Millennials in their twenties. Following discussions with *Puffin Produce*, this was narrowed down more specifically to 11- to 13-year-olds to streamline the research. The Literature Review had shown that this age group tends to be when individuals may start to eat more unhealthily as they succumb to the influence of peer pressure (Gifford-Smith *et al.*, 2005).

Previous studies focusing on adolescents' dietary habits had sought to answer questions around routines, behaviours and food consumption as well as the influencing factors. However, the current study was required to focus more so on vegetable consumption rather than the notion of healthful eating in general. Therefore, the research took into account the vegetables produced by *Puffin Produce* and provided a novel contribution to knowledge through the approaches

taken. The fourth research question followed on from the first three questions and sought to provide a real-world market advantage for *Puffin Produce* by developing a design concept that could be further developed. This figure shows how the four research questions contribute to knowledge:

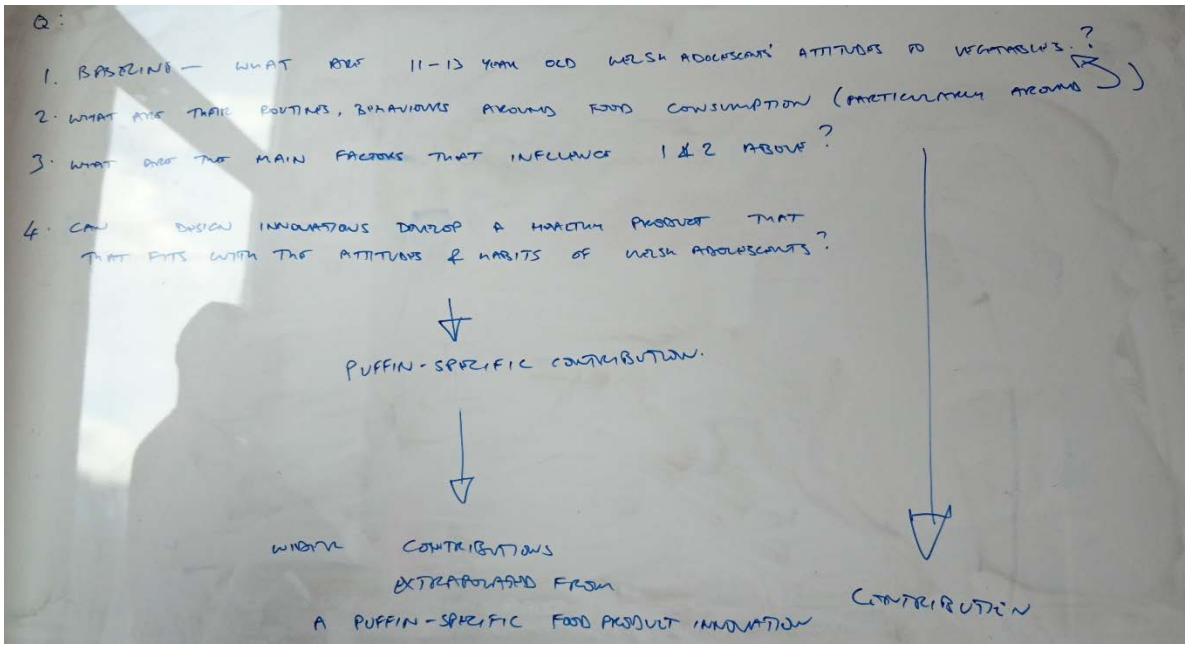


Figure 2.6.: Developing the research questions following the MPhil to PhD Transfer

CHAPTER THREE – METHODOLOGY

3.1. Introduction

This Methodology Chapter describes and discusses the inclusion of five research methods triangulated in the study: (i) Data mining; (ii) Catering manager interviews; (iii) School canteen observations; (iv) Focus groups; and, (v) Participatory design research. First, the organisation of the methodological approach and each research method undertaken in the three phases of the current study is displayed diagrammatically. The benefits of taking a triangulated approach and incorporating both qualitative and quantitative data collection within the study are discussed before moving onto the philosophy of the research approach.

Next, each of the five research methods are described in turn, providing a rationale explaining why each method was appropriate for answering the research questions. After this, the opportunity sampling process and the use of schools as a funnel for participants is reviewed. Ethical considerations include the important role of schools acting in *loco parentis* to grant consent for adolescents' participation in the study. Moving on, Braun and Clarke's thematic analysis process is explained. Lastly, quality assurance is examined regarding factors such as reliability, validity, objectivity, generalisability, experimenter effects as well as the importance of researcher reflexivity.

3.2. Study Design

The research questions were open-ended and exploratory to facilitate the collection of rich qualitative data (same as Section 1.5.2.):

1.) What are 11- to 13-year-old Welsh adolescents' attitudes to vegetables?
2.) What are their routines, behaviours and food consumption (particularly around vegetables)?
3.) What are the main factors that influence 1 and 2 above?
4.) Can a design innovation develop a healthy product that fits with the attitudes and habits of Welsh adolescents?

Phases One and Two of the research largely focused on answering the first three questions and the fourth research question solely related to Phase Three of the research study (Table 3.1.):

		Q1	Q2	Q3	Q4
Phase One	Catering Manager Interviews	■	■	■	
	Data Mining		■		
	Adults Focus Groups	■	■	■	
Phase Two	School Canteen Observations		■		
	Adolescent Focus Groups	■	■	■	
Phase Three	Participatory Design Research		■		■
	Parents Focus Groups	■	■	■	■

Table 3.1.: Table displaying which research questions were explored in each research method

3.2.1. Organisation of the Current Study

The study featured five different research methods over the three phases. The choice of these research methods was based upon similar established studies from the literature review. This diagram concisely illustrates the three phases of the research study (Figure 3.1.):

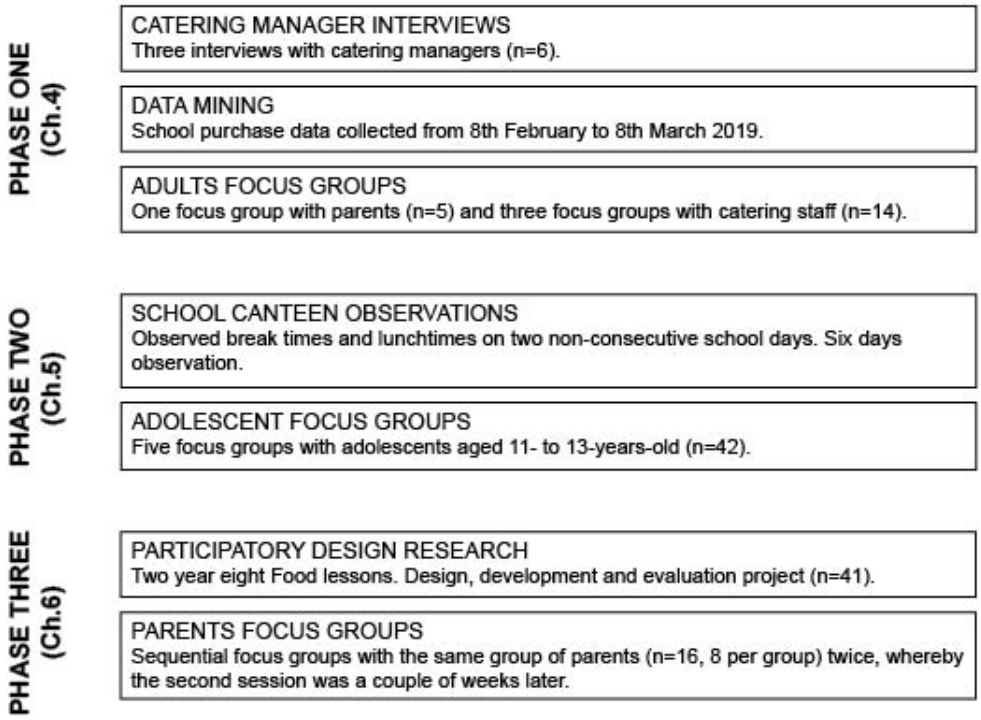


Figure 3.1.: Diagram explaining the research methods concerned within each of the three phases of the research study

Phases One and Two occurred concurrently as they were reliant on the involvement and availability of participants at the three secondary schools. Following Phases One and Two, the NPD of vegetable-based snack products resulted in designs which were evaluated during Phase Three of the study.

3.2.2. Triangulation

As aforementioned, a triangulated approach involved amalgamating both quantitative and qualitative research methods (Dawson, 2009). Solitary research methods are limited regarding the extent and scope of data collection as they are never 'intrinsically superior' to all other methods (Silverman, 2010: p. 10). Hence, combining multiple viewpoints allowed for greater accuracy, improving the empirical soundness, reliability and cross-validity of the study because the qualitative data was able to expand upon the quantitative findings (Jick, 1979; Creswell *et al.*, 2006).

Flick (2008) writes about the benefits of combining qualitative methods in a triangulated research study:

(i) Different perspectives (e.g. knowledge and practices) emerge when methodological approaches are combined;
(ii) Allows different research methods to be compared (e.g. one-to-one interviews versus focus group discussions);
(iii) Can analyse different data levels (e.g. documents or audio-recordings from verbal data); and,
(iv) Compared to use of a single method, there is a potential gain of knowledge.

Conversely, there are some notable issues with triangulation. For instance, whilst quantitative and qualitative research may appear to examine similar issues, the comparisons made may be questionable and equally weighting research perspectives can be difficult (Bryman, 1992; Flick, 2008).

3.2.3. Quantitative Data Discussion

Quantitative school canteen purchase data was collected during Phase One to determine what adolescents purchased and the popularity of certain items. The general aim of quantitative research is to pursue precise, scientific measurement that allows for statistically valid analysis which are generalisable to a larger population (Crowther & Lancaster, 2012). For instance, whilst the catering

managers could qualitatively articulate which items were popular, they were unable to give specific sales numbers that allowed for comparison between items, categories and schools. Then again, 'its contribution to social problems is necessarily lopsided and limited.' This is due to the researcher retaining an outsider's perspective, detached from the subject matter as they assume that facts and data have an objective reality (Silverman, 2007: p. 83). The research may lack representativeness and depth in describing how exactly the phenomenon was established. Therefore, incorporating quantitative data collection into a triangulated research study aids statistical generalisation which is impossible when exclusively qualitative data is collected (Bryman, 1992).

3.2.4. Qualitative Data Discussion

Qualitative research was appropriate as the research questions were predominantly exploratory, aiming to explore the complexities of individuals' behaviour, attitudes and habits (Denscombe, 2017). Therefore, whilst the quantitative purchase data shows which items have higher sales, the qualitative research can provide an insight into why particular items were more popular. Observations and quotes can aid in highlighting areas worthwhile of further investigation, often acting as a source of hypotheses. Namely, the behavioural observations in the school canteens were investigated further during the focus groups (Flick, 2007; Coolican, 2009). Subjectivity is a core hindrance of qualitative research because the researcher is central to data interpretation. This may lead to potential biases because the researcher becomes subjectively immersed in the research (Finlay, 2002; Finlay & Gough, 2003; Flick, 2008). To help counteract this, the researcher should avoid asking leading questions, try to be reflexive and avoid making prejudgements (Milton & Rodgers, 2013).

Furthermore, complex and interwoven qualitative data variables can make measurement difficult (Patton, 2015). Another disadvantage is that qualitative research often uses relatively small samples that have been sampled according to specific criteria (Denscombe, 2017). Therefore, the results may lack external validity and generalisability to a wider population (Bailey, 2007). Then again, 'statistical generalization is neither what qualitative research provides nor what is linked as a claim to it' (Flick, 2007: p. 41).

3.2.5. Philosophy

The research philosophy provides a foundation for the data collection, which takes an interpretative constructionist perspective. The diagram below, derived from Crotty's book, *The Foundations of Social Research*, shows how the four elements inform one another (Figure 3.2.):

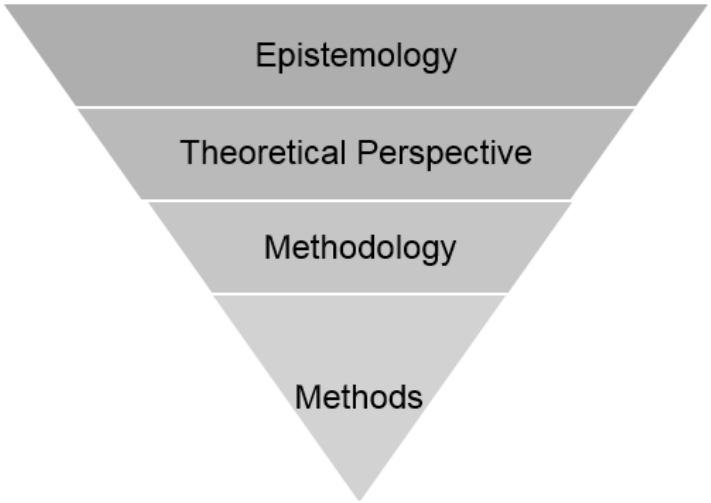


Figure 3.2.: Diagram showing the foundations of social research (Crotty, 2003: p. 4)

Epistemology

Epistemology concerns trying to understand '*what it means to know,*' in other words, 'the 'who' and the 'what' and the outcome of this relationship' (Gray, 2004: p. 16). The epistemology takes a constructionist approach, believing that reality is constructed by individuals and is constantly developed according to the 'social context' (Crotty, 2003: p. 42). Thus, due to the qualitative nature of the study, objectivity and subjectivity may be an issue as the researcher's 'prior constructions' both in a historical and cultural context will influence their data interpretation (Lincoln & Guba, 2013: p. 57). There is an epistemological distance between social and natural science. In particular, reporting observations similarly to how natural science research is reported would be inappropriate because comprehension and interpretation in human sciences research is required (Corbetta, 2003).

Theoretical Perspectives

The current research study takes an Interpretivism theoretical perspective, which assumes that social phenomena is complex and that the social world is formed and given meanings by human actors. Pachtrat summarised it as 'Humans making meaning out of the meaning-making of other humans' (Pachtrat, 2006: p. 374). The researcher becomes part of the data as they attempt to make meanings from participants' actions and interactions as 'meaning-making creatures' (Yanow, 2006b: p. 9). This means that the researcher's presentation of social reality can never be definitive and there will always be a degree of social subjectivity because phenomena cannot be objectively studied separately from the real world context (Corbetta, 2003; Bryman, 2016).

Historically, the subjective manner of Interpretative research has been criticised by theorists and Positivism may be considered a superior theoretical perspective. Positivist researchers remain psychologically detached from their research both cognitively and emotionally, recording data objectively throughout (Gray, 2004; Bryman, 2016). A core argument against an interpretative epistemology is that it is 'neither rigorous nor objective.' This argument often comes from an idealistic view based on 'positivist ontological and epistemological presuppositions' (Yanow, 2006a: p. 69). A further criticism is 'on ontological grounds with an excessive preoccupation with the Self – a kind of disengaged contemplation or philosophical navel-gazing – that ignores the impacts on individuals of institutions and their power' (Yanow, 2006b: p. 22).

Methodology

The philosophical stance helped to determine appropriate research methods for studying the social reality. Researcher subjectivity was a risk due to prejudices and preconceived theories (Corbetta, 2003).

3.3. Research Methods

This section will describe the rationale behind each of the research methods used.

3.3.1. Data Mining

Data mining pursued answering the second research question, 'What are their routines, behaviours and food consumption (particularly around vegetables)?'

Having explicit knowledge about what exactly adolescents aged 11- to 13-years-old purchase during the school day provided an insight into their food consumption when not under parental influence. Moreover, choosing to collect data from a school setting meant that peer pressure and social norms were likely influencers of adolescents' decision-making process (Higgs, 2015). Collecting objective quantitative data was beneficial as it permitted cross-referencing and comparison to the qualitative data. In summary, although clear conclusions cannot be drawn from the data mining alone, hypotheses can be developed and used to inform future research.

Anonymised school canteen purchase data was collected from each of the three participating schools. The majority of schools in the Vale of Glamorgan and in Cardiff use computerised payment systems rather cash in the school canteen. Two of the schools sampled used biometric thumb print data and the other school used key fobs swiped on a scanner. Biometric systems at schools are becoming increasingly common as they allow the removal of cash from the canteen; prevent singling out *Free School Meal* (FSM) pupils; reduce queueing time; and, enable daily spend limits to be set (Biometric Technology Today, 2010). Parents were able to upload money onto their adolescent's account online. Originally, one academic year of school canteen purchase data was sought for years 7 and 8, divided into breakfast, break time and lunchtime. However, only School A was able to offer this detailed report. System constraints at School B meant that they were only able to provide a month of data, so all three schools provided data from 8th February to 8th March 2019. Two of the schools provided sales data in a hard copy paper format for data protection reasons.

There were three issues with this stage of the data collection. Firstly, rather than showing specifically which vegetables were chosen by pupils, this was often recorded as 'main meal' or 'hearty meal' in the databases. Another issue that was disclosed during the catering staff focus groups was that the recording of 'vegetarian' meals was not wholly representative because staff working on the tills often cannot distinguish between what is vegetarian and what is not. Resultantly, vegetarian sales may possibly be higher than those recorded on the computerised system. A third issue was the nonlinear process of data collection due to lack of engagement and software glitches. Failure to complete data mining prior to the

school canteen observations or focus groups meant that hypotheses and potential questions could not be developed before the qualitative stages of research.

3.3.2. Catering Manager Interviews

After recruiting suitable schools, meetings were arranged via telephone calls and email exchanges with the relevant gatekeepers. Identifying a meeting time was often difficult due to their availability of time and resources, i.e. being short-staffed, whole school inspections and special school events. Catering managers were informally interviewed during the initial meeting. The purpose of the catering manager interviews was to investigate the first three research questions (see Table 3.1.). The interviewing process allowed a greater insight into the quantitative data, determining their perceptions as to why certain phenomena occur (Patton, 2002).

The length of the interview was not time-bound and lasted from 25 to 120 minutes, depending on the willingness of catering managers to share their experiences and the time available. Interviews were conducted either in an office adjacent to the school kitchen in the afternoon or in the school canteen before morning break time. Rapport was established by the researcher engaging in small talk (e.g. the weather forecast, snowfall and how busy the term had been) prior to beginning the interview questioning. The interviews were informal, so the interview prompt sheet acted only as a rough guide for the interview rather than preparing a detailed interview guide. This enabled the researcher to demonstrate an openness to unanticipated phenomena and the ability to react accordingly. The catering manager interviews were the first data collection method, meaning that the semi-structured interviewing prompt sheets were based on research from the literature review (see Appendix B.2.).

Rationale

The decision to include catering manager interviews as part of the research study enabled the collection of in-depth qualitative information concerning what adolescents purchase, consume and how they behave whilst in school. Good interviewing technique resulted in rich answers and clarification of statements that provided in-depth qualitative data (Jick, 1979). Interviewing parents was deliberated; however, they would only able to account for their limited experiences with their own adolescent(s). Whereas, interviewing catering managers was

beneficial because they often have years of anecdotal experience and a greater insight into the consumption habits and trends of hundreds, if not thousands of adolescents over their careers.

Nevertheless, the chapter *Validation and Generalization of Interview Knowledge* in the book *Doing Interviews* highlights some negative issues surrounding interviewing. Firstly, the process can be time-consuming and interviewer effects may influence the responses provided. Secondly, interviewing takes an individualistic approach, possibly focusing too much on the individual and neglecting their embeddedness within social interactions. Thirdly, there is a tendency to be credulous, taking what the interviewee says at face value as well as cognitivist, focusing on the interviewee's thoughts and prior experiences rather than the actual action (Kvale, 2007).

3.3.3. School Canteen Observations

Covert observation of Key Stage Three (KS3) pupils (KS3 encompasses pupils aged 11- to 14-years-old) occurred at break time and lunchtime in the school canteen on two non-consecutive school days at each school between October 2018 and March 2019. The researcher wore business casual clothes to conform with the supervising teaching staff (Holtzblatt, Wendell & Wood, 2005). Despite this, at one of the schools, catering staff were repeatedly questioned about the researcher's presence. Although no video recording or audio recording equipment was utilised, photographs were taken of the setting, food offered, menus and prices before service began (see Appendix D.). Analogue research tools (a clipboard, pen and paper) were used to record practical details and event timings during the observational period. Balance between the breadth and depth of notes was vital, as capturing absolutely everything would have been impossible. Shorthand was occasionally used, for example 'Que' for 'Queue.' A prompt sheet developed in hindsight of the literature review and the catering manager interviews. The prompt sheet was repeatedly referred to throughout the observational period (see Appendix B.12.). Personal thoughts and preliminary analyses were jotted down shortly after the observational period (Hammersley & Atkinson, 2007; Dawson, 2009).

Rationale

Adolescents in KS3 have relatively recently started their secondary school education, so this increased independence and newfound control over their own food choices is prominent (Brannen & Storey, 1998). Break time and lunchtime are prime opportunities for adolescents to exert their own decision-making over purchases, food consumption and how they behave when amongst their peers. Previous research indicates that parental absence can result in adolescents feeling greater peer pressure, basing food choice on their peers' opinions, expectations and the approval of others (Higgs, 2015; Eck *et al.*, 2019). SLT provided a theoretical framework, suggesting that adolescents may learn eating habits from their peer group (Bandura, 1977).

Hypothetically, if only one day had been observed then this day may have been an anomaly and reduce the results' reliability and the rigour of the study. This was certainly the case at one school because on the first day of observations all the tills broke, meaning that catering staff had to write down adolescents' purchases using pen and paper rather than the efficient fob scanning system. Resultant longer queues may have influenced what pupils purchased; for example, selecting something that was suitable to start eating whilst queueing. Covertly observing packed lunch contents rather than reliance on dietary reports meant that the researcher was able to determine which foods were brought into school. Parental reports of packed lunch contents can be over-optimistic, as one study with 321 parent-child dyads from 19 schools found that the overreporting of fruit and vegetable consumption and underreporting of snack products and sweetened drink consumption was ubiquitous (Hawthorne *et al.*, 2018).

Nevertheless, observational research can be time-consuming and the analysis of extensive notes can be difficult (Patton, 2015). Furthermore, whilst the researcher was able to observe behaviour exhibited by adolescents, they cannot comprehend why certain behaviours occurred. To counteract this, the observational data was compared against the interview and focus group data, highlighting any differences between what people say they do and how they truly behave (Angrosino, 2007).

3.3.4. Focus Groups

Focus groups were predominantly used in the current research study because this data collection technique is an established method for researching eating habits and

behaviours (Jenkins & Harrison, 1990). The researcher facilitated nine focus groups during Phases One and Two of the research. These focus groups took place during the school day, either in the canteen or in a classroom between April and July 2019. The focus groups remained as short as possible to minimise disruption to the participants' day, particularly for the catering staff participants because the catering managers strictly requested that the groups lasted no longer than twenty minutes at Schools A and C. During Phase Three of the research, two sequential parent focus groups took place and two groups of up to eight participants partook in discussion amongst the same group a couple of weeks later in November 2019. Ideally, when the core component of the research is the same, the same participants should take part in both stages of the sequential research (Morse, 2010). However, due to illnesses and absences this was unfeasible.

Audio recording was utilised because extensive notetaking would have been distracting and interruptive to the conversational flow. Whilst voice recorders can be obvious, 'usually participants get used to recording machines after some time' (Blumberg, Cooper & Schindler, 2011: p. 295). Each focus group used a semi-structured questioning schedule derived from the literature review and the school canteen observations. Use of a schedule helped to ensure consistency with regard to covering specific topics within the sessions. Conducting focus groups with adolescent participants required an ability to put them at ease and build rapport by 'a shift towards engaging with children's own cultures of communication,' using more colloquial language (Christensen, 2004: p. 174). Semi-structured and open questions allowed for digression, discussion, and 'for some flexibility in accordance with topics raised and level of participation within the group.' Questions were primarily aimed at assessing adolescents' perceptions of factors influencing their food choices (Neumark-Sztainer *et al.*, 1999: p. 930).

Closed-ended questions in the adolescent focus groups were designed to encourage participation amongst less confident participants. For instance, the introductory question of saying their name and their favourite vegetable encouraged participants to speak briefly with minimal pressure. Doing so also aided with the verbatim transcriptions because all the participants' first names were recorded. Phase Three of the research involved four parent focus groups. The questions asked focused on the fourth research question: 'Can a design innovation develop a healthy product that fits with the attitudes and habits of Welsh adolescents?' The

research was not present during the four final focus groups in order to avoid investigator effects and to encourage participants to be honest about the snacking concepts shown (Patton, 2015). Sketches, computer aided design and physical prototypes were used during these four focus groups to generate feedback (Milton and Rodgers, 2013) (Table 3.2.):

		Appendix
Phase One	Catering staff Focus Groups	B.5.
	Parents Focus Groups	B.8.
Phase Two	Adolescent Focus Groups	B.17.
Phase Three	Parents Focus Groups	1st: E.6. 2nd: E.8.

Table 3.2.: The focus group discussion sheets in the Appendixes

Rationale

Conducting focus group research allowed the researcher to collect qualitative data exploring participants' feelings, experiences, beliefs and attitudes. In comparison to observational research, more in-depth data can be collected in a shorter amount of time and the degree of consensus on certain topics can be determined. Additionally, focus groups do not disadvantage participants with poor literacy skills (Krueger & Casey, 2014; Patton, 2015). In contrast to interview research, focus groups are advantageous as they allow access to a multiplicity of views in a group context. The researcher can observe and assess the group dynamic whilst participants bounce ideas off each other (Rubin & Chisnell, 2008; Silverman, 2010). Focus groups help to understand the gap between what people say and what they do better, complementing the other triangulated research methods.

One risk with focus groups is that dominant individuals may dictate the group discussion, intimidating shy individuals who may be reluctant to express their opinions amongst their peer group (Coolican, 2009). A second issue is small sample sizes limiting the generalisability of the study as they may not be wholly representative of the wider population (Jenkins & Harrison, 1990). Thirdly, the researcher has less control over the data produced than in quantitative studies or one-to-one interviews (Morgan, 2010).

3.3.5. Participatory Design Research

Following the completion of Phases One and Two, a design brief was developed in collaboration with *Puffin Produce*:

> *To design and develop an ambient vegetable-based product (potatoes, cauliflower, savoy cabbage). The product must be suitable for snacking and food-to-go. Young adolescents are the target consumer and the target market includes parents, families and adolescents.*

Participatory design research was organised at School B and the researcher provided a lesson plan including a *Microsoft PowerPoint* presentation, two A4 worksheets and instructions for the teacher. Table 3.3. shows an outline of the activities:

Individuals	Details	Purpose
1. Group Work	'What snacks do you eat?' Pupils worked with others on their table (2 to 4 individuals per group) to mind map or list the snacks they ate on a piece of plain A4 paper.	Designed to stimulate the adolescents. A fairly easy task that should help inspire ideas later on.
2. Whole Class	Teacher wrote 'cauliflower / potato / cabbage' on the white board and asked pupils to put their hands up if they liked each of the vegetables. Then, the teacher made a list from the pupils' responses to this question: 'What food products do you associate with these vegetables?'	Engages the whole class and moves the focus onto vegetables produced by *Puffin Produce*.
3. Individuals / Pairs / Group Work	Pupils worked individually, in pairs or in groups to design how these vegetables could be incorporated into some of the snacks that they currently enjoy eating. Draw designs and label accordingly.	It might be challenging for the adolescents to design and develop something that is new, so were given the opportunity to work in pairs or groups to allow pupils to bounce ideas off each other.
4. Individual Work	Adolescents were given a colour printed A4 sheet	Gain feedback from individual pupils about

	illustrating the six vegetable-based NPD concepts. Pupils were asked to give the concepts a star rating and provide evaluative feedback.	which concepts have potential.

Table 3.3.: An outline of the participatory design research

During the participatory design research, the researcher took a low-profile observational role, remaining unreactive and unobtrusive whilst making hand-written notes. This was to avoid experimenter effects and the participants altering their behaviour to appear more socially desirable (Wragg, 1994). Ethical reasons prevented video recording or audio recording the lessons. The completed worksheets produced during the participatory design research were collected afterwards, assisting in the continuing NPD process.

Finding other relevant studies including adolescents in participatory design research related to food research proved difficult. Nevertheless, there was one study exploring the competences and meanings of convenience food. This participatory research study was done with adolescent participants aged 12- to 15-years-old who had to 'brainstorm' convenience foods, with freedom 'in choosing the reporting method (e.g. mind map, drawings, text)' (Wahlen, van der Horst & Pothoff, 2016: p. 2832). 'Brain-storming' or 'mind mapping' exercises are effectively used by teachers to encourage thinking amongst adolescent pupils (Cowley, 2007). Subsequently, a mind mapping exercise was included within the participatory research design.

Whole class discussions and pair work were incorporated because research has shown that adolescents are more motivated to engage in participatory design work when they are able to work collaboratively (Iversen, Dindler & Hansen, 2013). What is more, individual work was incorporated into the participatory design research as otherwise adolescents who are less confident may not have their ideas heard (Kensing & Greenbaum, 2013). The next few pages will show the materials used for the participatory design research (Figures 3.3, 3.4. and 3.5.). Please note, at this stage of the research the project title and focus was still centred around the concept of coolness.

Participatory Research

Information and Lesson Plan

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales'Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour. The working group research will take around 30–40 minutes during two Year 8 lessons. Alice will provide a lesson plan and the resources. The teacher will lead the lessons and Alice will not talk to or interact with any of the pupils. She may make hand-written notes during the research and will photograph the board and pupils' work at the end of the session. If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

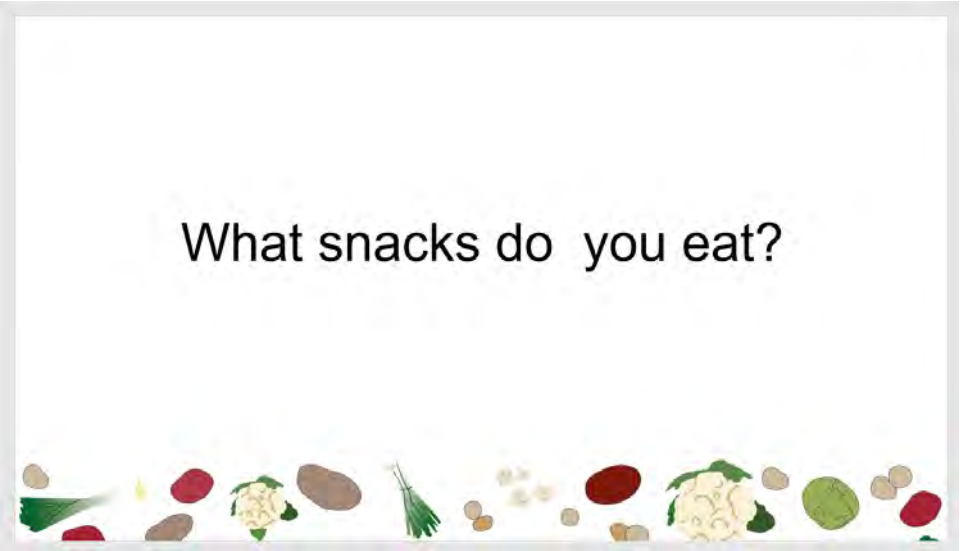
The purpose of the project:

Alice is researching how to make vegetables "cool" and improving the eating habits of Wales' younger generation. The purpose of the working groups with adolescents is to gain an insight into what pupils regard to be a good design of a vegetable-based snack.

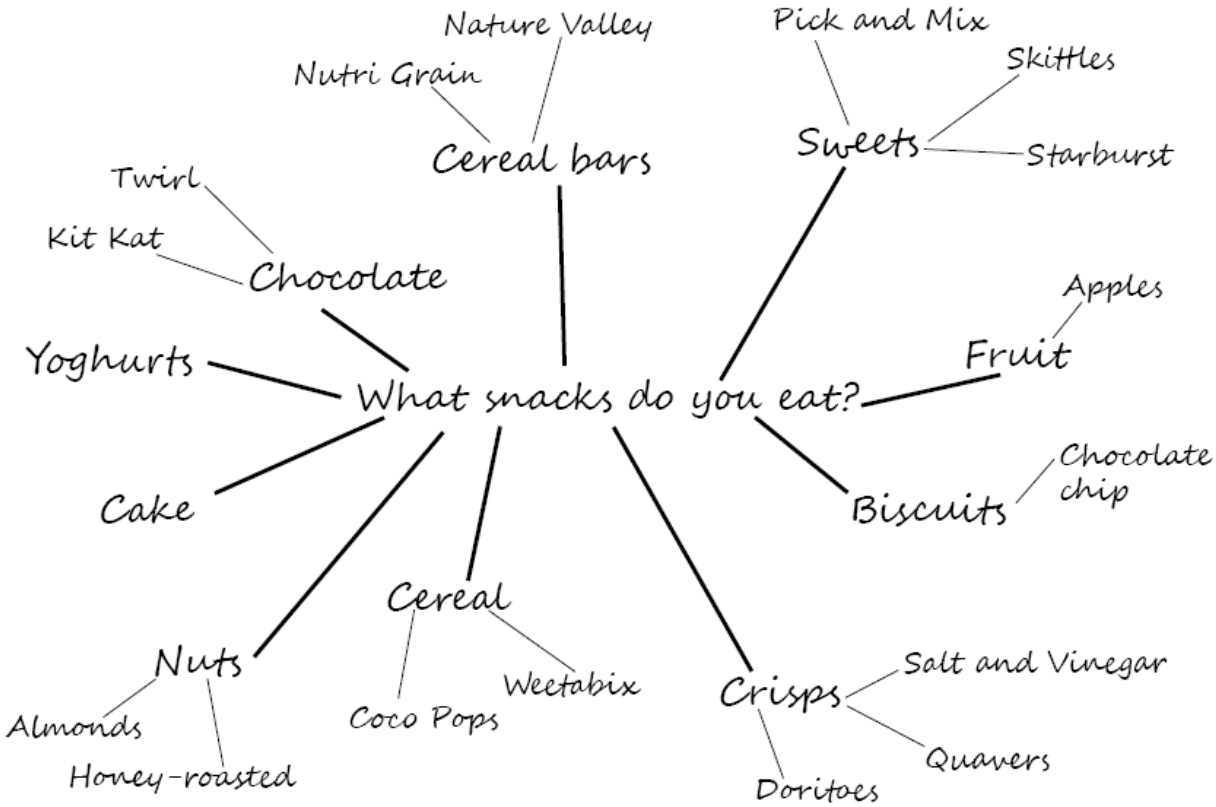
LESSON PLAN

Introduction: Today we are going to be designing new snacks and evaluating ideas for new vegetable snacks.

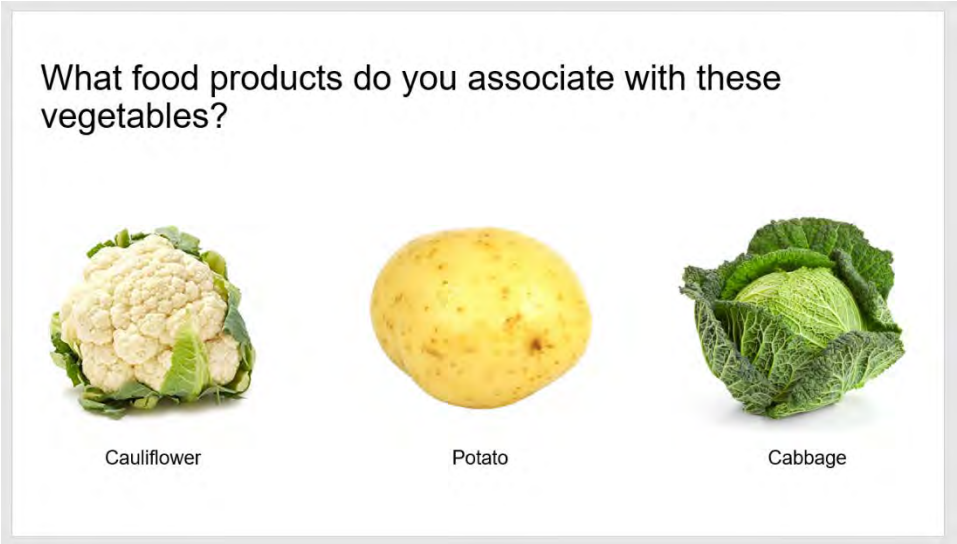
Activity One – Whole Class: Teacher creates a mind map on the board. 'What is a snack?' (Between meals etc.); 'What snacks do you eat?;' 'What about vegetables? Are any of these vegetables?'



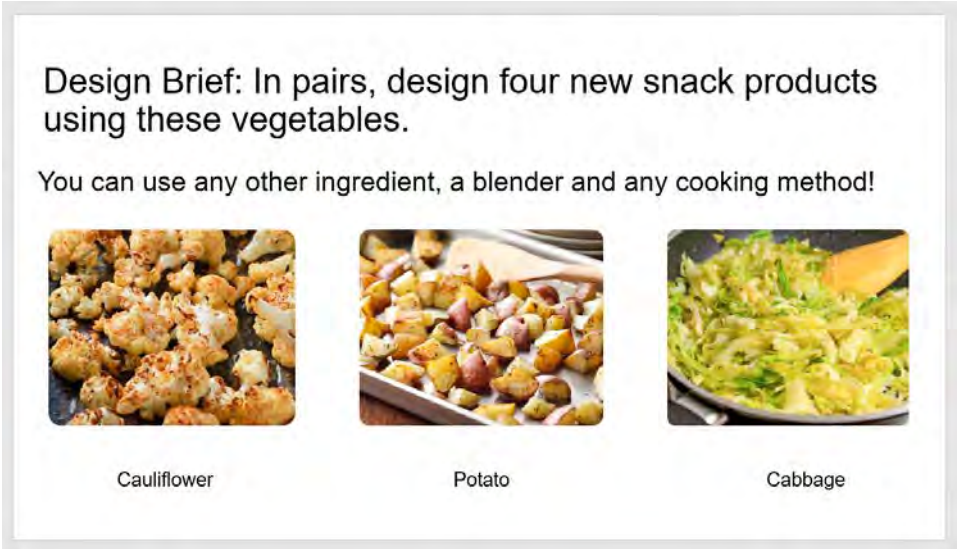
Example of a mind map:



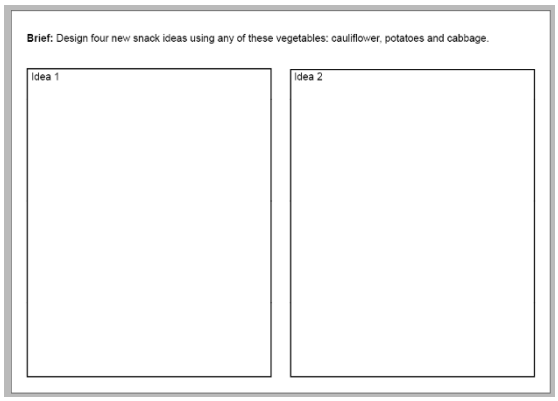
Activity Two – Whole Class: Pupils asked what kinds of food products they associate with cauliflower, potatoes, cabbage. Teacher writes a list.



Activity Three – Pair Work: Each pair is given a double-sided worksheet and the brief: 'In pairs, design four new snack products using these vegetables.' Asked to draw the product and label it. Designs can include any other ingredient, a blender and any cooking method. Given ten minutes to do the task.

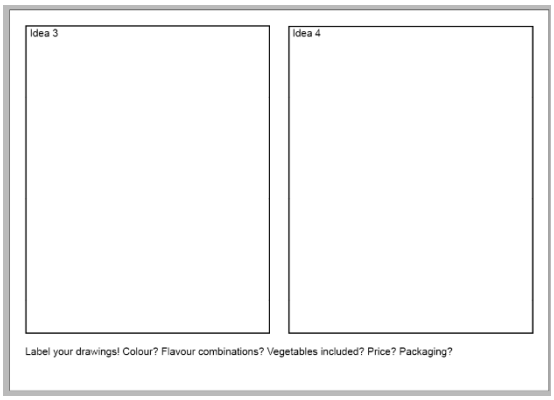


Double-sided A4 worksheet:


Brief: Design four new snack ideas using any of these vegetables: cauliflower, potatoes and cabbage.

Idea 1

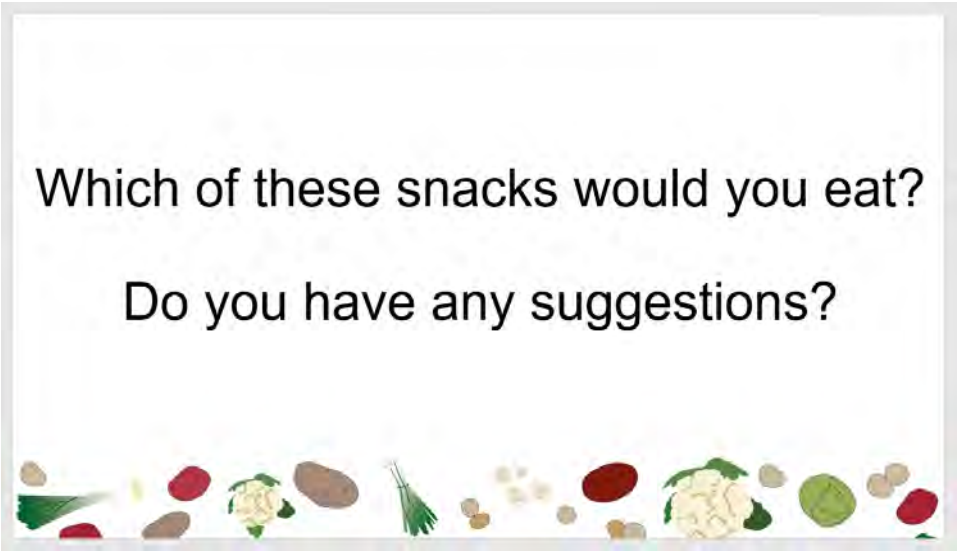
Idea 2


Idea 3

Idea 4

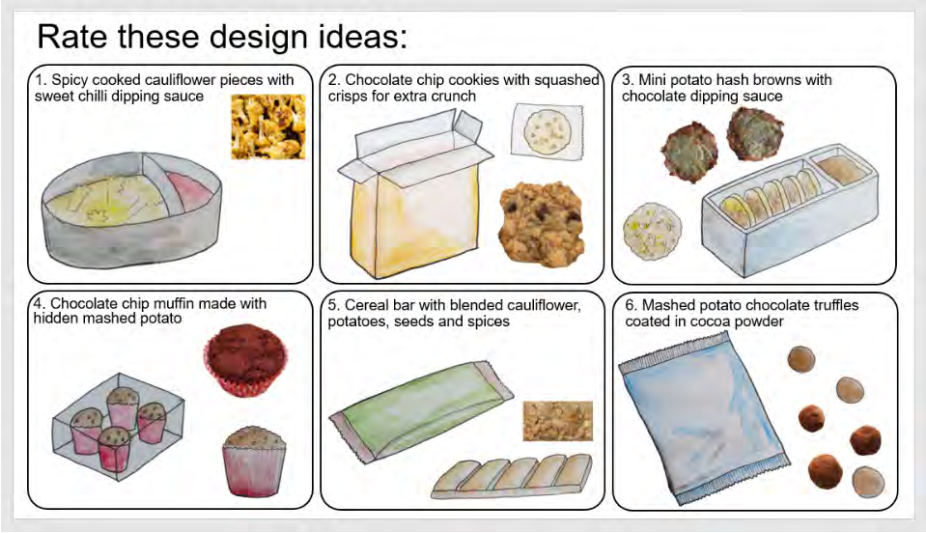
Label your drawings! Colour? Flavour combinations? Vegetables included? Price? Packaging?

Activity Four – Whole Class: Pupils given the opportunity to voluntarily share their snack ideas with the class. Class discussion.

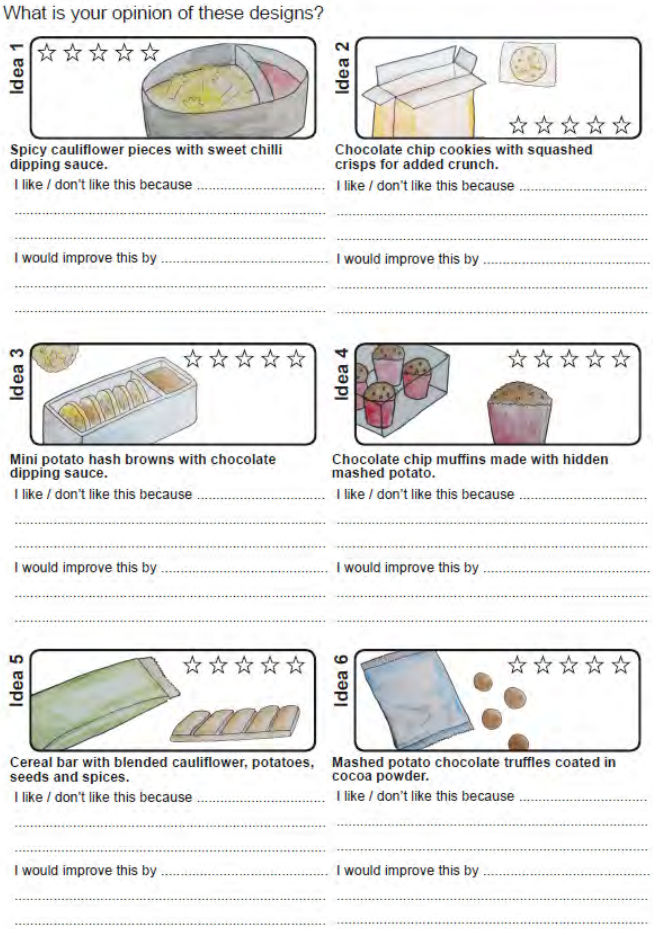


Activity Five – Individually: ‘Let’s look at these ideas that a designer has come up with.’ Teacher explains each idea briefly.

Pupils given a sheet with the same product ideas on them and asked to rate and comment on the designs.



A4 worksheet:



What is your opinion of these designs?

Idea 1 ☆☆☆☆☆

Spicy cauliflower pieces with sweet chilli dipping sauce.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 2 ☆☆☆☆☆

Chocolate chip cookies with squashed crisps for added crunch.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 3 ☆☆☆☆☆

Mini potato hash browns with chocolate dipping sauce.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 4 ☆☆☆☆☆

Chocolate chip muffins made with hidden mashed potato.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 5 ☆☆☆☆☆

Cereal bar with blended cauliflower, potatoes, seeds and spices.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 6 ☆☆☆☆☆

Mashed potato chocolate truffles coated in cocoa powder.

I like / don't like this because .....

.....

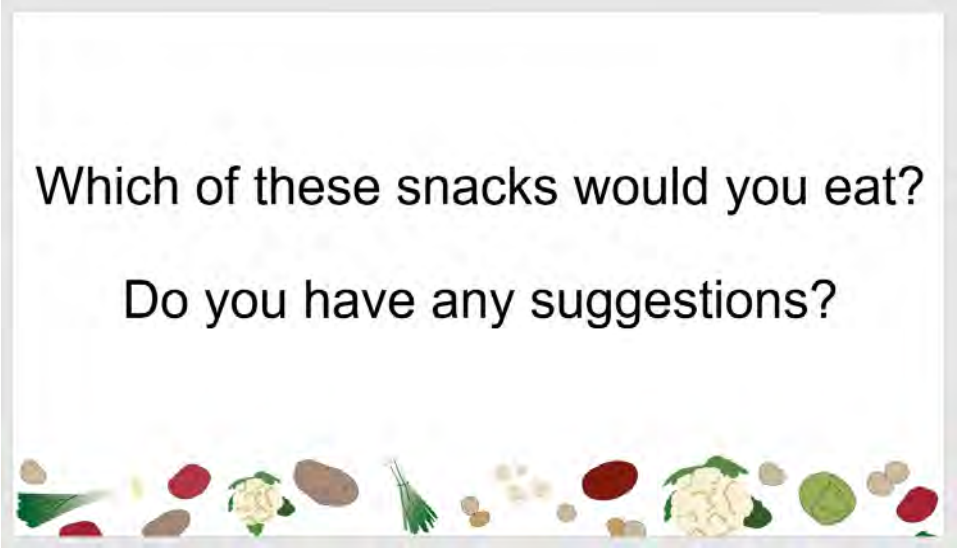
.....

I would improve this by .....

.....

.....

Activity Six / Plenary – Whole Class: Pupils will be asked if they want to share their ideas with the group. Group discussion.



End of session:

Alice will photograph the board and the worksheets produced by pupils.

Thank you for taking part in this research.

Figure 3.3.: Participatory Design Research Lesson Plan

Brief: Design four new snack ideas using any of these vegetables: cauliflower, potatoes and cabbage.

Idea 1

Idea 2

Idea 3

Idea 4

Label your drawings! Colour? Flavour combinations? Vegetables included? Price? Packaging?

Figure 3.4.: Participatory Design Research Pair Worksheet

What is your opinion of these designs?

Idea 1

Spicy cauliflower pieces with sweet chilli dipping sauce.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 2

Chocolate chip cookies with squashed crisps for added crunch.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 3

Mini potato hash browns with chocolate dipping sauce.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 4

Chocolate chip muffins made with hidden mashed potato.

I like / don't like this because .....

.....

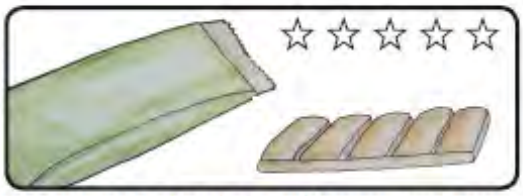
.....

I would improve this by .....

.....

.....

Idea 5



Cereal bar with blended cauliflower, potatoes, seeds and spices.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Idea 6

Mashed potato chocolate truffles coated in cocoa powder.

I like / don't like this because .....

.....

.....

I would improve this by .....

.....

.....

Figure 3.5.: Participatory Design Research Individual Worksheet

Rationale

NPD input from the target consumer was deemed important (Christensen, 2004; James, 2007). Milton and Rodgers write concerning the importance ‘to involve potential users in the design, build and evaluation of your prototypes’ (Milton & Rodgers, 2013: p. 118). The participatory research with adolescents enabled this as they considered the target market. The researcher sought to create a participatory design experience that stimulated creativity amongst the adolescents and enabled evaluative reflection (A’Echevarria & Patience, 2008). A variety of tasks ‘resulted in various data: besides field notes, pupils produced drawings, mind maps and other textual artefacts.’ These were sorted, coded and categorised using thematic analysis (Wahlen, van der Horst & Pothoff, 2016: p. 2832). The findings from the adolescent participatory design research were used for further NPD prior to the Phase Three parents’ focus groups.

3.4. Sampling

Flick wrote that sampling 'refers not only to selecting cases and materials but also to taking samples inside cases and materials (e.g. certain statements or parts)' (Flick, 2008: p. 35). However, this section focuses on participant recruitment and the selection of specific materials and quotations for analysis is discussed later (see Section 3.6.2.). This diagram shows the number of schools and participants sampled during each research phase (Figure 3.6.):

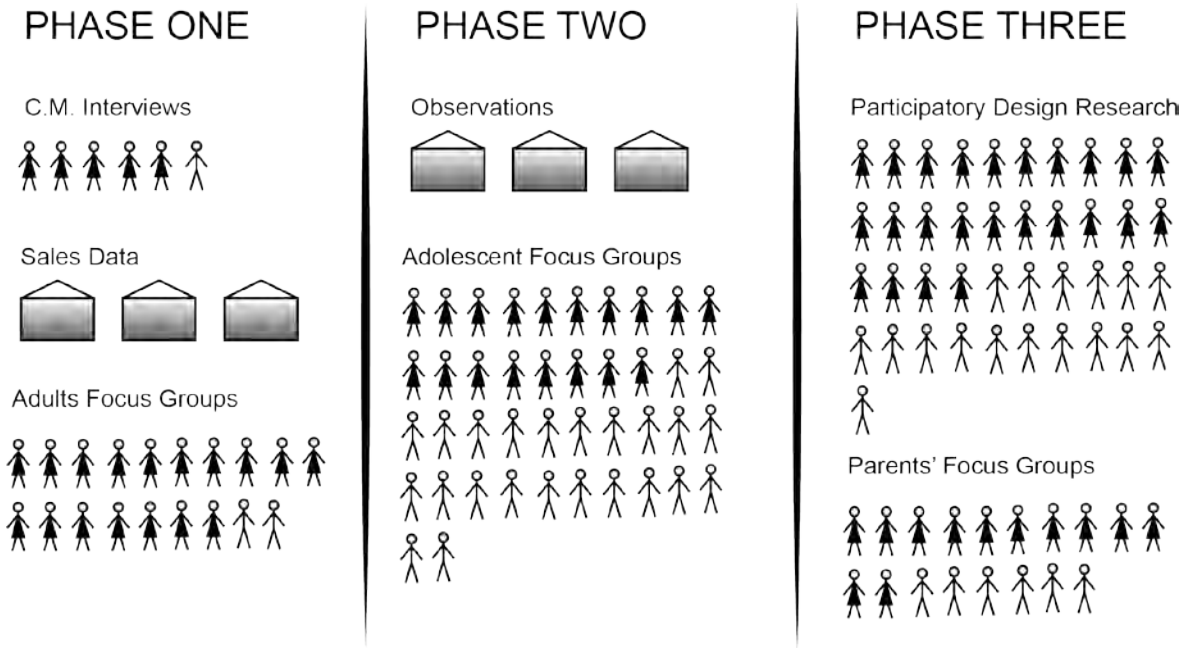


Figure 3.6.: Number of schools, females and males that participated in each research method

3.4.1. Adolescents

Research with children and adolescent participants, rather than obtaining data from the parental viewpoint, is becoming increasingly common. The current study recognised adolescents as individuals with their own subjectivity, experiences and personal opinions within their socio-cultural context. Compared to adults, they are less self-conscious and less self-aware, tending to be more open and honest when not under parental influence (Kim, 2012; Szulc *et al.*, 2012). Despite the increased ethical issues and additional researcher responsibilities, 'present[ing] new insights based on children's own perspectives as social actors' rather than using their voices purely to confirm established prejudices about the age group was important (Christensen & Prout, 2002; James, 2007: p. 262). Adult 'gatekeepers' are

individuals with the ability to limit the researcher's access to the child participants (Punch, 2002). The *Encyclopedia of Survey Research Methods* defines a gatekeeper as 'a person who stands between the data collector and a potential respondent' (Lavrakas, 2008). Gatekeepers were the head teachers, assistant head teachers and the catering managers.

3.4.2. Schools

Conducting research within a school setting offered logistical benefits. Firstly, the computerised systems already in place meant that collecting quantitative data was efficient. Above all, schools are an ideal location to safely access, engage and sample cooperative adolescents, acting as a funnel for the focus groups. Another benefit is having access to catering staff who often have years of experience as well as other key stakeholders who may be willing to help organise data collection. A further benefit was the potential for *Puffin Produce* to target the school catering market. Alternatively, if the regulations and logistical barriers proved prohibitive then a novel product that adolescents would willingly take into school was a market opportunity.

The inclusion criteria for schools involved in the study were:

- Having a computerised cashless system for food and drink payment.
- Mixed-sex schools.
- State comprehensive secondary schools (not private or fee-paying).
- 'Closed gate' policies whereby pupils could not purchase food off-site.
- Relatively low rates of FSM (compared to the National Average).
- Located in or around Cardiff and the Vale of Glamorgan for ease of access.

The exclusion criteria were Welsh-speaking schools and schools that did not meet the inclusion criteria. Eventually, three comparable secondary schools were recruited.

FSM Eligibility Explanation

Puffin Produce currently target the middle-class demographic and the company were keen to continue targeting this market. FSM eligibility over the previous six years is commonly used to measure socio-economic disadvantage (Ilie, Sutherland & Vignoles, 2017). The most recent data obtainable from January 2018, indicates that the Welsh national FSM prevalence is 17.4%, a decrease from 17.8% in 2017

(The Children's Society, 2018). Therefore, schools with lower than average FSM eligibility percentages may be indicative of pupils from middle-class backgrounds, appropriate for the study and the marketing strategy at *Puffin Produce*. Conversely, FSM are not a completely accurate measure of low socioeconomic status, as Taylor discovered that almost 8% of pupils ineligible for FSM in Wales had been living in poverty before they were 7-years-old. (Gorard, 2012; Taylor, 2018).

Number of Schools

Although schools were not used comparatively, the generalisability of the data was improved by sampling three secondary schools rather than two. Repeated findings between participating schools improved the validity and the reliability of the research. Schools were referred to by letter pseudonyms to protect their autonomy throughout the research project, in this thesis and in all published journal articles (Table 3.4.):

	School		
	A	B	C
Proportion of pupils entitled to FSM	3.5%	11.6%	5.6%
Number of pupils on roll	1500	2400	1900
Proportion of pupils from a minority ethnic background	4.5%	21.5%	15.9%
Closed gate policy	Yes	Yes	Yes

Table 3.4.: The profile of each school

3.4.3. Participant Recruitment

The research study was reliant on voluntary participation. Opportunity and convenience sampling allowed the researcher to recruit whomever was available. This type of sampling method is beneficial in exploratory research as it would be unethical to force participants to take part if randomly sampled. However, volunteer bias is not fully representative as motivated individuals do not represent the whole population (Blumberg, Cooper & Schindler, 2011). Drawing upon an existing circle of contacts can simplify and solicit access, and one PhD advisor had a contact with the *Food in Schools Coordinator* working for the *Welsh Government Association* (Silverman, 2010). This contact was able to provide an insight into the data mining

possibilities in addition to the contact details of two catering managers (Maxwell, 2013). Recruiting schools and participants from schools proved difficult, presumably because there was no immediate benefit for gatekeepers and participants, furthermore it 'requires scarce time and resource' (Sturgis, Smith & Hughes, 2006: p. 5).

One originally recruited school withdrew their participation in the study after providing purchase data and the catering manager interview. School B was the alternative school recruited and this flow chart shows the recruitment process and the order of research methods within each of the three schools (Figure 3.7.):

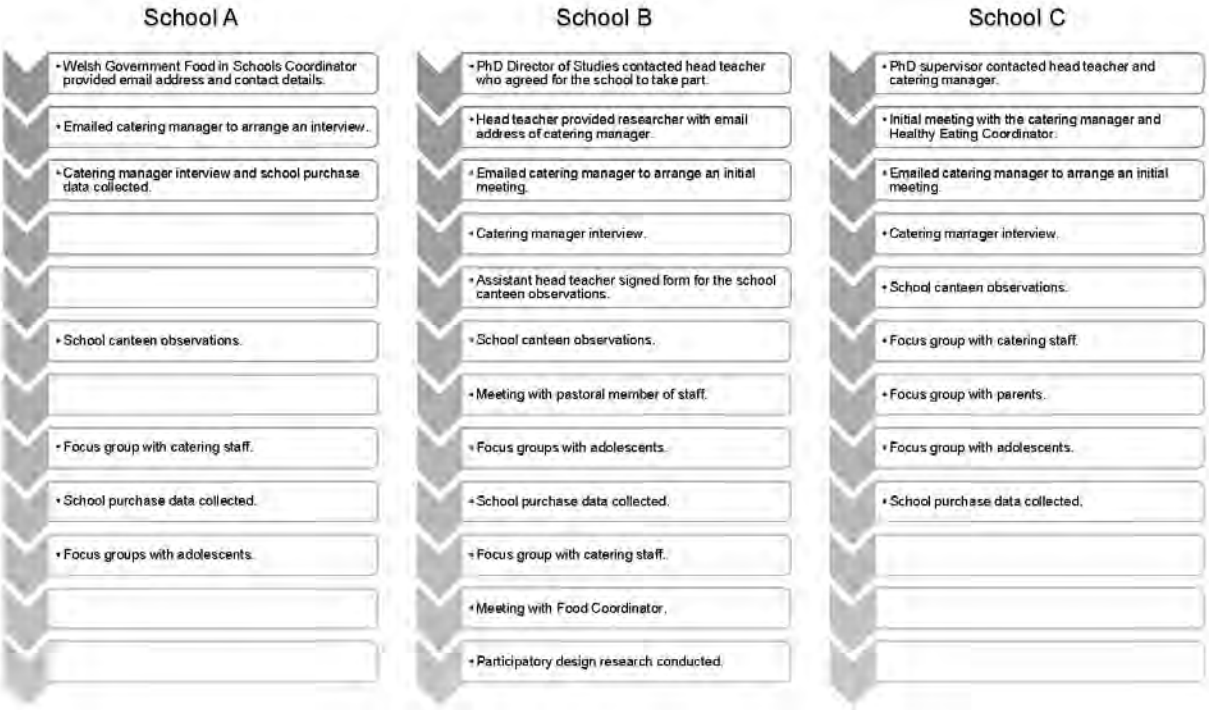


Figure 3.7.: Flow chart showing recruitment and stages of research

Although School A provided the quantitative sales data and catering manager interview immediately, it took 11 months until the canteen observations commenced and a total of 17 months before the focus groups took place. In contrast, these periods of data collection took approximately five months at School B. The participatory design research was executed at School B and the last two boxes in the flow chart show the recruitment and research.

Catering Manager Interviews

At School B, being the largest school, three catering managers participated in the interview (Table 3. 5.):

Phase One Participants	Number of Staff Present per School		
	A	B	C
Catering Manager Interviews	1	3	2
Catering Staff Focus Groups	3	8	3
Parents Focus Group	N/A	N/A	5
Total per School	4	7	10

Table 3.5.: The number of adult participants that took part in Phase One

School Canteen Observations

Gatekeepers at each school received a verbal description of the research method in addition to a two-page information sheet. They acted in *loco parentis* when signing a consent form agreeing for the covert observations to take place (see Section 3.5.2. and Appendix B.11.).

Focus Groups

Opportunity and convenience sampling was used to recruit participants. The focus groups with the adults (parents and catering staff) consisted of three to eight participants. Smaller focus groups are beneficial because they allow greater opportunity for each participant to talk, therefore enabling more in-depth conversation (Krueger & Casey, 2009). Recruitment of catering staff focus group participants was discussed during the initial catering manager interviews. It proved difficult for the catering managers to allocate a suitable date and time within the working day, which would be least disruptive to the staff members taking part and those left working in the kitchen. At School B, two of the catering mangers also took part in the focus group. In total, 85.7% of the sample was female (n=18) as two fathers and one catering manager were male. Furthermore, despite originally requesting one parents' focus group per school, two schools said that they would be unable to facilitate this. School C organised a parents' focus group with five members of teaching staff. Maybe the lack of financial incentives and any tangible benefits made recruiting parents difficult for Phase One.

Staying in touch with the relevant gatekeepers, school staff, parents and pupil participants was important with regard to the adolescent focus groups. Rubin and

Chisnell (2008: p. 298) wrote that when working with participants under the age of 18-years-old, difficulties may arise because, 'You are recruiting the parents as much as the kids' and that winning parental support is 'integral to getting their approval and cooperation.' Two adolescent focus groups were negotiated at Schools A and B as a compromise because they were unable to organise the parents' focus groups. Pastoral staff selected eight to twelve Year 7 and 8 pupils to partake in each of the focus groups, this was to account for dropouts, non-response and attrition (Dawson, 2009). This worked out well as all the adolescent focus groups had at least seven participants (Table 3.6.):

Phase Two Focus Group Participants	School				
	A		B		C
Focus Group	1 A	2 A	1 B	2 B	1 C
Female	4	3	3	4	4
Male	4	4	4	4	8
Total Number of Participants	8	7	7	8	12

Table 3.6.: The number of adolescents that took part in Phase Two

In total, forty-two participants took part across the five focus groups, 43% (n=18) of the sample were female and 57% (n=24) were male. The focus groups conducted at School B and C were mixed year groups. Roughly, half of the participants were in Year 7 (11- to 12-years-old) and half were in Year 8 (12- to 13-years-old), though participants were not required to disclose their age or year group on their assent forms. However, the focus groups at School A were solely Year 7s and solely Year 8s as adolescents were taken directly from their lessons. Consequently, participants from School A seemed much more at ease and willing to give more in-depth answers in comparison to the mixed focus groups at other schools.

PhD supervisors recruited university staff with adolescents aged 11- to 13-years old via email for the Phase Three parental focus groups. A free lunch provided an incentive for the 35- to 45-minute sequential focus groups. Using convenience sampling to recruit internally from the university staff cohort was beneficial in two respects. Firstly, the participants had a middle-class demographic because they were working within ABC1 roles at a higher educational establishment (Cambridge Dictionary, no date). Secondly, internal staff recruitment proved convenient, as the participants were required to take part in the sequential focus groups twice, two

weeks apart. The focus groups on the university campus were accessible and within close proximity of their working environment.

Notably, the sample lacked representativeness of the entire population of adolescent parents because those working in universities tend to be middle-class. This limitation was expected because middle-class participants were purposely sought, being *Puffin Produce*'s target market, essentially as they are more likely to purchase branded vegetables and healthful snacks. This table shows the number of female and male participants that took part in the Phase Three parental focus groups (Table 3.7.):

Phase Three Focus Group Participants	Group			
	First (12:15pm)		Second (1:15pm)	
Focus Group	First	Second	First	Second
Female	3	5	4	4
Male	1	3	1	3
Total Number of Participants	4	8	5	7

Table 3.7.: The number of parents that took part in Phase Three

Up to eight participants took part in each of the four focus groups (n=16) and, 56% (n=9) were fathers.

Participatory Research Design

Two Year 8 Food Technology classes took part in the participatory design research (Table 3.8.):

	First Session	Second Session	Total
Female	11	13	24
Male	9	8	17
Total Number of Participants			41

Table 3.8.: The number of adolescents that took part in Phase Three

Overall, forty-one adolescents took part in the two participatory design research sessions, 59% were female (n=24) and 41% were male (n=17).

3.5. Ethical Considerations

As well as the immediate relationships with participants, the micro-ethics of the data analysis and presentation were considered (Flick, 2007). Ethical issues were

discussed with participants beforehand, and various issues such as confidentiality, anonymity and personal disclosure were explained before participants were provided with the opportunity to ask questions.

3.5.1. Ethical Approval

The research abided by the ethical procedures outlined by Cardiff School of Art & Design (CSAD) at Cardiff Metropolitan University. The Ethics Committee approved the study (see Appendixes B.1., B.9. and E.1.). The following ethical considerations were taken into account:

- A *Disclosure and Barring Service* (DBS) check was essential as the research involved schools and adolescent participants. Renewal was unnecessary during the study as there was no official expiry date.
- An early ethical application was submitted, allowing time for a lengthier process because young research participants are considered a vulnerable group of people.
- All participants were provided with a detailed information sheet disclosing their role in the research, the confidentiality and anonymity of the results as well as any potential risks of taking part.
- Written informed consent was required to prove that participants fully understood the nature of the research and their right to withdraw at any time (see Section 3.5.2.).
- Adolescents needed to sign an assent form in addition to their parents signing an informed consent form.
- Results were kept confidential on a secure, password protected university computer. No photographs were taken of any participants. Names were not attached to the transcription notes.

3.5.2. Informed Consent

All participants were provided with information sheets detailing the overall purpose of the research study, their right to withdraw, data privacy, how the data would be used as well as the risks and benefits of participation (see Appendixes B.3., B.6., B.10., B.13., B.15., E.2. and E.4.). Consent forms were signed before proceeding with the focus groups (see Appendixes B.4., B.7., B.14., B.16. and E.5.).

Loco Parentis

Loco parentis is a Latin term meaning, ‘In the place of a parent’ (Duhaime’s Law Dictionary, no date). Adult gatekeepers from all three schools acted in *loco parentis*,

acting legally to give the researcher permission to conduct research within the school (see Appendix B.11.). It would have been unfeasible to collect informed consent from all the pupils' parents before the school canteen observations. Furthermore, full information about the purpose of the study would have been inappropriate because a degree of deception was required to ensure that the covert observations remained internally valid (Kvale, 2007). Regarding the participatory design research, the Food Technology teacher signed the consent form, acting in *loco parentis* (see Appendix E.3.). Parental consent was not required for every pupil because the researcher did not speak to or interact with any of the pupils.

Parental Consent

Participants under the age of 18-years-old are considered vulnerable and too young to make a properly informed decision about taking part in research (Kim, 2012). Adolescent focus group participants required signed parental informed consent authorising their adolescents' involvement because they have a 'protective responsibility as gatekeepers.' Parental consent had to be navigated before adolescents can provide assent (see Appendixes B.15. and B.16.) (Lambert & Glacken, 2011: p. 786; Szulc *et al.*, 2012). Information sheets, assent and informed consent forms used official school logo-headed paper to improve the rate of returned forms from the participants.

Adolescent Assent

Age-appropriate terminology and language were used for the adolescents' information sheets to ensure that adolescents comprehended the potential risks and benefits of their participation as well as their right to withdraw, and knowledge that doing so would not result in any negative consequences (see Appendixes B.13. and B.14.) (Phelan & Kinsella, 2013). Plus, adolescents were made aware that there are no right or wrong answers and were provided with an opportunity to ask the researcher questions before, during and after the focus groups (Lambert & Glacken, 2011).

3.5.3. Ethical Concerns

Anonymity

Anonymity is defined as lacking any outstanding or individuating features (Lavrakas, 2008). Full names were not given during the audio recordings and the research write-up omitted ‘concrete information about real persons and situ’ (Flick, 2007: p. 75). In addition, no individualised descriptions or remarkable characteristics were documented and no photographs of participants were taken, ensuring that participants cannot be traced from the final report. Data was stored in an anonymised format, separate to the overall findings on a university computer and all files were destroyed after use, in accordance with the *Data Protection Act* (Dawson, 2009; Denscombe, 2017). As aforementioned, each school was allocated a pseudonym letter for identification purposes throughout the research study (Table 3.4.).

Confidentiality

Confidentiality is the condition of being kept secret or private (Lavrakas, 2008). Participant confidentiality is achieved despite sharing results in the thesis document, in publications and at conferences. This is because, ‘Confidentiality in research implies that private data identifying the subjects will not be reportable’ (Kvale, 2007: p. 27). By taking the precautions outlined above, schools and individual participants should be unidentifiable in any publications. However, confidentially cannot be completely guaranteed because other participants were present during data collection.

Potential Distress to Participants

Participant information sheets detailed that no distress or risk to participants was anticipated. There was a minimal risk of participants becoming upset in the adolescent focus groups. If the researcher felt that further input was necessary then they would have contacted a member of the pastoral care staff at the school for further advice (Kvale, 2007). For ethical reasons, one school requested that a member of staff was present during the adolescents’ focus groups. When there are people in a position of power sitting in on focus groups, this can prevent participants from expressing their opinions (Dawson, 2009). In spite of this, their presence did not appear to deter participants from speaking their opinion in comparison to the focus groups conducted without a member of staff. Conceivably this was because they felt comfortable with the member of staff.

3.6. Method of Analysis

Data was collected between February 2018 and June 2019 for Phases One and Two of the study. The data for the third phase of the study was collected during October and November 2019. Data analysis occurred throughout regardless of data collection not following the same chronological order at each of the three schools (Table 3.9.):

Research Method	School A	School B	School C
School canteen purchase data	March 2018 and July 2019	February 2019	April 2019
School canteen observations	January to February 2019	January 2019	October 2018
Focus groups	July 2019	May 2019	April 2019
Participatory design research		October 2019	

Table 3.9.: The dates that research was conducted at the three schools

3.6.1. Quantitative Data Analysis

Nominal quantitative data was collected from school canteen purchases (see Appendix C). Data was used to generate measures of dispersion, percentages, averages, tables and graphs using *Microsoft Excel*. Pivot tables helped to extract, summarise and compare data in the *Excel* worksheets, checking between schools and categories for commonalities and differences. As aforesaid, quantitative data can be limiting as it 'can only be understood in relation to the purposes for which they are created' (Bryman, 1992: p. 13). Therefore, the triangulation of research methods helped to contextually understand the quantitative data.

3.6.2. Qualitative Data Analysis

To a degree, analysis began during the collection of interview data as the researcher asked participants to clarify certain points (Kvale, 2007).

Transcribing

School canteen observational notes were documented in a *Microsoft Office Word* document, spurring on the start of thematic analysis as patterns began to emerge.

All focus groups were audio-recorded and verbatim transcribed by the researcher within twenty-four hours. By transcribing all the audio recordings, the researcher became much more familiar with the data in comparison to if they had outsourced transcription services. Each of the thirteen focus groups lasted between 20 minutes and 40 minutes. Neumark-Sztainer's research similarly involved adolescent focus groups within a school setting, audio recording and transcribing verbatim to 'ensure systematic analysis of the discussions' (Neumark-Sztainer *et al.*, 1999 p. 930). The transcription process became an interpretative process because ideas about relationships and categories may begin to emerge during the process (Hammersley & Atkinson, 2007; Maxwell, 2013).

Thematic Analysis

Braun and Clarke write that, 'Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data' (Braun & Clarke, 2006: p. 79). Braun and Clarke's six phases of thematic analysis are: (i) Familiarisation with the data; (ii) Coding; (iii) Searching for themes; (iv) Reviewing themes; (v) Defining and naming themes; and, (vi) Writing up (Braun & Clarke, 2006). Initially, the qualitative data was studied to determine whether any patterns could be derived or anything stood out particularly. Thematic analysis is an appropriate method for qualitative analysis and has been utilised in similar research studies involving adolescent focus groups (Stevenson *et al.*, 2007; Fitzgerald *et al.*, 2010; Day *et al.*, 2013). Manually transcribing the focus group data and re-reading transcriptions allowed an in-depth engagement with the material.

In the current study, an abductive, open coding approach was applied during the thematic analysis. Specific characteristics within the text were attached to specific keywords and codes were assigned for identification. After coding, themes were organised into categories to help manage the data for further analysis. This prevented hasty inferences and allowed emergent themes to be determined through a process of categorisation based on existing theory (Gray, 2004; Clarke & Braun, 2013; Maxwell, 2013; Miles, Huberman & Saldana, 2020). Initially, *QSR NVivo10* (Copyright® QSR International Pty Ltd) qualitative analysis software was used to assist the researcher in the coding and categorisation of the data (Bazeley & Jackson, 2013). However, most coding was done using *Microsoft Office Word* and by hand through the use of mind mapping and colour. The creation of A3 maps and

diagrams allowed the researcher to creatively analyse the data abductively in an in-depth way. *Adobe Illustrator* software was used to create the thematic analysis maps, showing the themes and subsequent sub-themes (see Sections 4.1.2., 5.1.2., 6.3.2. and 7.4.).

Writing Up

Quotations were contextualised during the research write-up. In some cases where the sequence of social interactions was considered noteworthy, the question asked prior to the participant's answer was included (Hammersley & Atkinson, 2007). Contextualisation was particularly pertinent in the presentation of the focus group findings as the interactive dynamics of participants' responses may be situational (Morgan, 2010).

3.7. Quality Assurance

Quality assurance was considered prior to data collection, as it has a fundamental impact on the data transparency and clarification of the findings. When evaluating research quality, consideration of the reliability, validity, objectivity, generalisability and researcher reflexivity were crucial because these factors determine the suitability of each research method within the overall methodology of the study (Flick, 2007).

Reliability

Reliability is the consistency and dependability of the findings and whether they could be repeated by another researcher (Patton, 2015). Reliable transcriptions were done through the use of a high quality audio recorder and listening to the recording a few times to identify any mishearing, discrepancies and misinterpretations. Transcriptions were rechecked and codes were cross-checked again (Flick, 2007; Kvale, 2007).

Validity

Validity is when the method of measurement truthfully measures what it intends to (Blumberg, Cooper & Schindler, 2011). It has been said that some researchers feel that validity 'has no place in qualitative inquiry,' however, using the term 'validity' suggests greater research rigour and transferability (Miles, Huberman & Saldana,

2020: p. 306). Triangulation improved the validity by overcoming some 'context-boundness' through the data comparison collected from various research methods, which helped determine 'whether they corroborate one another' (Silverman, 2010: p. 290). Internal validity can be defined as 'The ability of a research instrument to measure what it is purported to measure.' Threats include: (i) history; (ii) maturation; (iii) testing; (iv) instrumentation; (v) selection; (vi) statistical regression; and, (vii) experiment mortality. In contrast to experimental research, the exploratory nature of the current study made it difficult to control all extraneous variables (Blumberg, Cooper & Schindler, 2011: p. 487). Yet, in contrast to contrived experimental laboratory research, as long as the sample is representative then qualitative research is usually generalisable to other similar contexts. The study was conducted in a naturalistic environment representative of real world situations, resulting in a relatively high external validity.

Objectivity

It was important that the research remained objective and focused on answering the research questions throughout the study whilst trying to avoid bias. With the intention of achieving objectivity, standardised methods were used for the data collection, analysis and interpretation. Whilst reliability and validity issues are important, they 'go beyond technical or conceptual concerns and raise epistemological questions of objectivity of knowledge and the nature of interview research' (Kvale, 2007: p. 120). Therefore, the use of interview prompt sheets, focus group questioning schedules and using standardised methods for writing field notes significantly helps to improve the trustworthiness of the data (Silverman, 2010).

Generalisability

Regarding quantitative research, generalisability is 'normally achieved by statistical sampling procedures' whereas, qualitative samples are liable to being smaller and chosen 'simply because it allows access.' Random sampling would have increased the statistical generalisability of the findings, however doing so was unfeasible in the current study (Silverman, 2010: p. 304). Whilst the research methodology and findings may be objective, reliable and valid, the overall generalisability is dependent on the number of participants and whether the data collected is generalisable to other contexts. Similarly, the findings should 'include enough "thick description" for readers to assess the potential transferability and appropriateness for their own

settings' (Miles, Huberman & Saldana, 2020: p. 307). Sufficient numbers of participants were questioned in order to collect similar, saturated data that is generalisable (Patton, 2015). Interviewing the catering managers at the three schools appeared sufficient because the catering managers frequently described similar situations and trends within their interviews.

Experimenter Effects

Observer or experimenter effects refers to how participants may alter their behaviour accordingly if they are aware that they are taking part in a study. For instance, if the adolescents had known that they were under observation during the school canteen observations then they may have acted in a more socially desirable way (Blumberg, Cooper & Schindler, 2011). Besides, researcher subjectivity is an issue. During qualitative research, 'The validity of interview-produced knowledge rests on the quality of the craftsmanship of the interview researcher, continually checking, questioning and theorizing the interview findings.' Thus, the researcher must try to keep the participant's sensitivity to being in experimental conditions to a minimum (Kvale, 2007: p. 128; Coolican, 2009).

Familiarisation of the adolescents' culture and etiquette whilst remaining mindful of their behaviour, body language and spoken language helps researchers remain within the same 'cultures of communication' when conversing with adolescents. Power imbalances were avoided by offering comfortable ways to withdraw, dressing comparably to school staff, using age-appropriate language and striving to create a 'safe and reassuring environment from the beginning' (Phelan & Kinsella, 2013: p. 85). Moreover, the researcher strived to lower power imbalances and make adolescents feel more at ease through the use of colloquial language such as: 'so,' 'think,' 'like,' 'stuff' and 'thing.' In addition, smiling and acting in an approachable manner helped encourage participation amongst adolescents (Kim, 2012).

3.7.1. Reflexive Research

Ideally, reflexive scrutiny and ethical reflexivity should occur before, during and after the research process as well as during the formal data analysis (Aarsand & Forsberg, 2010; Phelan & Kinsella, 2013). In social research, the researcher should aim at all times to maintain a degree of distance from what they are studying through

reflectivity and reflexivity. Being reflective involves paying attention to one's unspoken inner 'self-dialogue' and 'make the effort to investigate prevailing notions, examine what these could signify, and interpret how and why this is noteworthy' (Herland, 2017: p. 578). Reflexivity involves critical self-reflection, self-awareness and insight into how one's own social background, values, interests, beliefs, prejudices and assumptions may unconsciously influence their responses to the research. Closely focusing attention on 'one's own actions, thoughts, feelings, values, identity, and their effect upon others, situations, and professional and social structures' is imperative (Bolton, 2005: p. 10). Recognising and acting on this insight, and the ability to 'put aside personal feelings and preconceptions' is a sign of becoming a reflexive researcher. For, example, data analysis and the write-up should be unbiased and not feature excessive quotations from one participant (Ahern, 1999: p. 408). The results chapters include a diverse range of quotations that are both in support of the majority as well as ideas that were contrary and unique to particular participants. This increases the depth of the results and richness of the qualitative data.

Reflexivity can be beneficial, because self-criticality can prompt changes within the research process, such as using alternative methods and discarding original plans (Ortlipp, 2008). Further, the researcher's 'personal values, attitudes, and beliefs from and toward fieldwork cannot be avoided' and will influence both the data collection and the data analysis process (Miles, Huberman & Saldana, 2020). Personal reflexivity can be challenging as it focuses on the subjective feelings and thoughts experienced by the researcher and strives for a deeper understanding of the part they play in constructing the research. Unconscious reactions can reduce subjectivity, so being reflexive applies a rigour to qualitative research that improves the overall quality and trustworthiness of the research (Finlay & Gough, 2003; Phelan & Kinsella, 2013). Accordingly, reflexivity can be an uncomfortable process as it encourages honesty and highlights the researcher's issues (Pillow, 2003). Finlay writes that engaging in reflexive practice 'is full of muddy ambiguity and multiple trails as researchers negotiate the swamp of interminable deconstructs, self analysis and self disclosure' (Finlay, 2002: p. 209).

3.8. Summary

This chapter outlined the organisation of the current study and diagrammatically showed which methods were utilised for each research phase. The advantages and disadvantages of quantitative and qualitative data collection were deliberated before explaining the interpretative constructionist approach taken by the current study. After this, the rationale behind the inclusion of each research method provided an insight into the decision-making process. Issues regarding collecting data from schools and the disadvantages of opportunity and convenience sampling methods used to recruit voluntary participants were clarified. Braun and Clarke's thematic analysis process was used to analyse the qualitative data and diagrams drawn using *Adobe Illustrator* software are presented in each of the three research chapters. The chapter ends by discussing the quality assurance of the study and describing why reflexivity is important in social research. The methodology covered in this chapter will be referred to in the results chapters. The following chapter presents the results from Phase One: (i) catering manager interviews; (ii) data mining; and, (iii) adult focus groups.

CHAPTER FOUR – ADULT RESULTS

4.1. Introduction

The purpose of Phase One of the data collection was to quantify what pupils purchased in the school canteen and to explore the factors influencing adolescents' food consumption from the perspective of catering staff and parents. Initially, the methodology and three research questions are listed before summarising the thematic analysis results in a table and diagrammatically. A detailed breakdown specifying the foods available in the school canteen are presented alongside commentary from the catering managers' and catering staff. Relevant quantitative school canteen purchase data from sales data collected from 8th February to 8th March 2019 is then visually presented in graphs and charts. The quantitative and qualitative data concerning drinks is omitted as it lacks relevance to the current study. Following this, each of the three themes deduced during the thematic analysis are presented: perceived quality of school foods; extrapersonal factors that drive food choice; and, intrapersonal factors that drive food choice. Quantitative and qualitative data are organised alongside each other in this chapter, as the data is interrelated.

4.1.1. Methodology

This chapter presents the results from three triangulated methods: (i) School canteen purchase data; (ii) Catering manager interviews; and, (iii) Focus groups with catering staff and parents.

Research Questions

1. What food and drink are available in the school canteen and what options are more popular?
2. What do catering staff and parents perceive to be Welsh adolescents' (aged 11- to 13-years-old) attitudes and behaviours concerning vegetables and healthy eating?
3. What do catering staff and parents believe are the main factors that influence what Welsh adolescents' choose to purchase and consume?

Collecting quantitative sales data enabled cross-validation with the qualitative interview and focus group data. All school canteen purchase data was input into *Microsoft Excel* to allow descriptive statistics and visual comparisons from graphs and charts to be generated, assessing the measures of dispersion, standard deviation and range (see Appendixes C.1., C.2. and C.3.). This answered the first research question.

Catering manager interviews were completed prior to the focus groups. Most discussion related to the first research question and determining what foods were on offer as well as the managers' comprehension of the popularity of various food and drink items. Furthermore, the catering managers were keen to share how they had seen pupils behave during breakfast, break time and lunchtime at school and any trends that they had witnessed. The focus groups with parents and catering staff sought to answer all three research questions, but predominantly focused on the latter two questions. A more detailed explanation of the methods and participant sampling can be read in the Methodology Chapter (see Chapter Three).

4.1.2. Thematic Analysis

Interview notes and verbatim transcriptions from the focus groups were abductively analysed through the application of Clarke and Braun's method of thematic analysis (Clarke & Braun, 2013). Abductive analysis was relevant as although the research was exploratory, the researcher already had some preconceived thoughts following the literature review and prior theoretical perspectives. Three key themes emerged: (i) Perceived quality of school foods; (ii) Extrapersonal factors that drive food choice; and, (iii) Intrapersonal factors that drive food choice. The themes embodied several sub-themes (see Table 4.1. and Figure 4.1.):

Theme	Sub-themes
Perceived Quality of School Foods	Fresh and Homemade Stealth Vegetables
Extrapersonal Factors that drive Food Choice	Staff Encouragement Peer Pressure Parenting Education Social Media
Intrapersonal Factors that drive Food Choice	Health Consciousness Vegan and Vegetarianism Appearance Taste Preferences Price Consciousness Convenience

Table 4.1.: Thematic Analysis of key themes and sub-themes

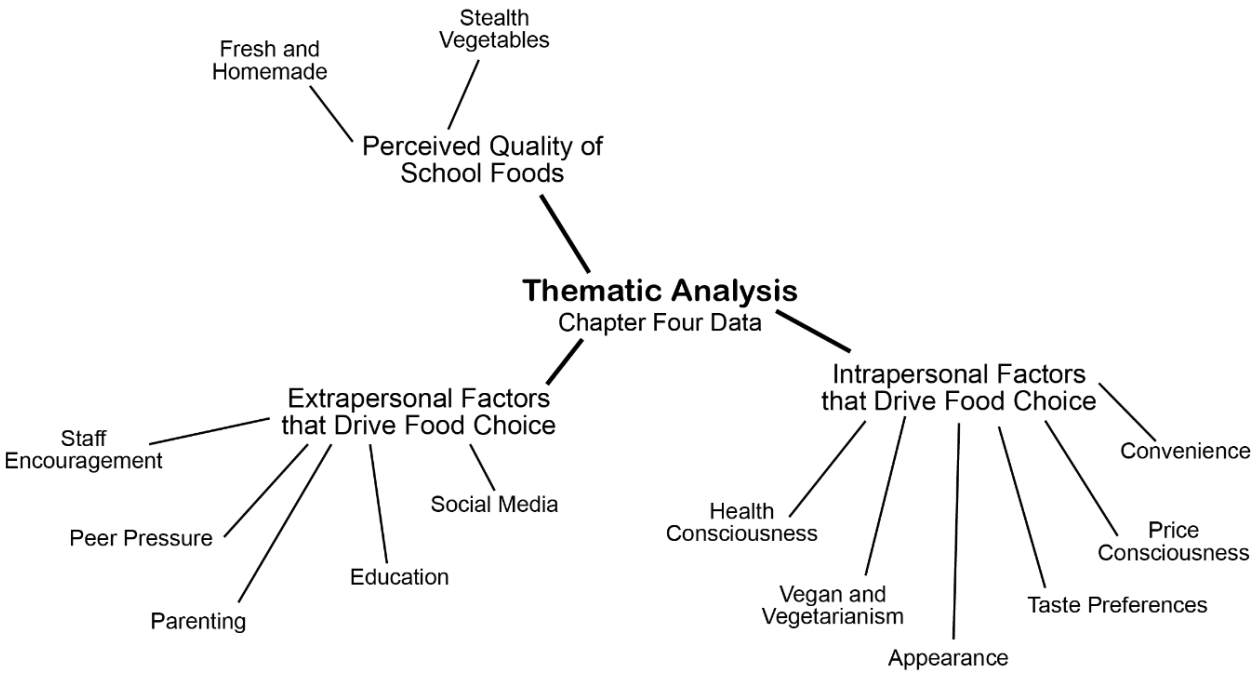


Figure 4.1.: Figure created using Adobe Illustrator, showing the three themes and sub-themes

4.2. A Breakdown of Food Available in the School Canteen

This section of the results chapter details the foods available and incorporates various visual representations. The catering staff were keen to emphasise the 'variety' and 'choice' of food and drinks offered. A three-week rotating menu was collaboratively designed by the catering staff, being updated approximately every six months to prevent pupils becoming 'fed up.' Staff emphasised that food and

drinks were continuously topped up to maintain availability and choice for pupils. One catering staff participant exclaimed that she thought pupils were 'spoilt' at the school because there were so many options available.

Vending Machine

School A was the only school recruited that had vending machines. In the previous academic year, sandwiches and wraps were available, but during the current study it offered pupils convenient snack options such as *Mini Cheddars*, biscuits and cereal bars (see Table 4.2.):

	Menu Item	School A
	Mini Cheddars	£0.57
Biscuits	X3 gingerbread men	£0.45
	X2 Oreos	£0.45
	Packed 'Bronte' biscuits	£0.45
Flapjacks	Sultana flapjack	£0.85
Bars	Marshmallow Square	£0.70
	Frosties bar	£0.65
	Coco Pops	£0.65
	Nutrigrain Bar	£0.65

Table 4.2.: Items available in the vending machine at School A

Foods Available Throughout the School Day

Foods such as fruit, yogurt and tomato ketchup were available during both break time and lunchtime (see Table 4.3.):

	Menu Item	School		
		School A	School B	School C
Fruits and Vegetables	Fresh fruit	£0.45	£0.50	£0.30
	Fruit pot	£0.85	£0.90	£0.60
	Slice of melon / pineapple			X [†]
	Cucumber and carrot crudités with hummus		X	X
Yogurt	Standard Yogurt	£0.60		£0.45
	Luxury Yogurt	£0.90		
'Crisps'	Mini Cheddars	£0.57		£0.87

[1] An "X" is shown where the product is available but the price is unknown.

	Hippeas (puffed chickpea crisps)		£0.75	
Sauce	Tomato ketchup portion	£0.15	£0.12	X

Table 4.3. Foods available throughout the school day at the three schools

Two of the schools sold carrot and cucumber crudités with hummus during the summer term. The catering manager at School C spoke about the importance of presentation in enticing pupils to purchase and consume the vegetable crudités. Fresh whole fruit was available at all three schools. School A's catering manager said that fruit sales remained stable throughout the academic year. Pupils at this school were able to either purchase two small satsumas or a larger whole piece of fruit for £0.45. All the schools provided homemade fruit pots, including fruit such as green grapes, purple grapes, pineapple and melon. The catering manager at School A remarked that sales of fruit pots were higher at lunchtime than at break time, alluding to pupils who had skipped breakfast wanting something more filling such as toast at break time. School A provided separate sales data for fresh whole fruit and fresh fruit pots for years 7, 8 and 9 (Figure 4.2.):

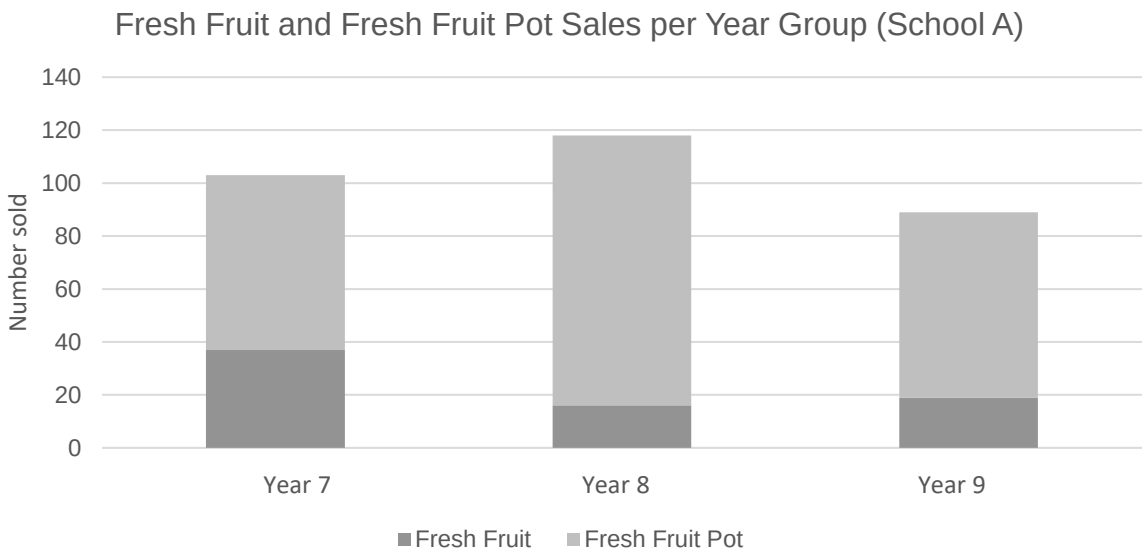


Figure 4.2.: The proportion of whole fruit and cut fruit sold per year group at School A

The bar chart illustrates that over the data collection period, Year 8 purchased the most fruit. This was primarily fruit pots, rather than whole fruit (n=16), whereas Year 9 pupils purchased more (n=19) and Year 7 purchased the most whole fruit (n=37). School A admitted 210 pupils per year group, showing that fruit sales were minimal.

There is a lack of research regarding adolescents' attitudes to cut fruit versus whole fruit. However, Ang *et al.*'s (2006) research with younger pupils in grades 2 and 3 (7- to 9-years-old) showed that consumption was considerably higher when the fruit was cut. In the study, pupils consumed 62% of a cut apple in comparison to only 36% of a whole apple (Ang *et al.*, 2016).

School C organised 'Free Fruit Fridays,' allowing pupils to take a piece of fruit free of charge. This was a good way to use up surplus fruit and at the end of the week pupils often had less money on their fobs, so were more willing to take free food (Figure 4.3.):

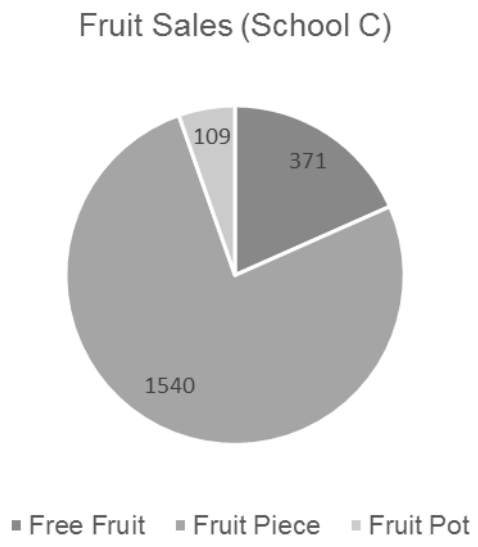


Figure 4.3.: Pie chart showing the proportion of free fruit, fruit pieces and fruit pots chosen by Year 7 and 8 pupils at School C

The pie chart shows that whole fruit was the most popular (n=1540), followed by fruit given away on 'Free Fruit Fridays' (n=371) and fruit pots (n=109). A previous case study intervention at an American high school provided pupils with a portion of fruit or vegetables free on a daily basis. However, having this access to a free fruit and vegetable programme failed to improve reported exposure to the fruits and vegetables nor their individual preferences. Potentially this was because preferences were already high for certain fruits and vegetables (Cullen, Watson and Konarik, 2009). Therefore, in spite of free fruit outwardly seeming beneficial, it may not necessarily improve adolescent preferences.

Breakfast

Breakfast items included bagels, toast, teacakes, cereal and porridge (see Table 4.4.):

	Menu Item	School		
		School A	School B	School C
Bagels	Plain Bagel		£0.60	
	Bacon Bagel		£1.55	
	Bacon Bagel Two Fillings		£2.50	
	Bacon Bagel Three Fillings		£3.00	
Toast	Toast	£0.16	£0.25	£0.16
	Teacakes			X
Cereals	Porridge	£1.25		£1.20
	Rice Krispies			X
	Cornflakes			X

Table 4.4.: Breakfast foods available at the three schools

Ever since School C introduced its 'Breakfast Club,' the catering manager had not witnessed any pupils drinking energy drinks such as *Red Bull*. This is positive because prior research associates breakfast omission and energy drink consumption with increased stress in a cross-sectional study (Richards and Smith, 2016).

4.2.1. Break Time

A large array of foods were available at break time (see Table 4.5.):

	Menu Item	School		
		School A	School B	School C
Breads	Toast	£0.16		£0.16
	Teacake	£0.75		X
	Crumpet	£0.35		
Meats	Bacon Muffin		£1.26	£1.20
	Sausage Muffin			£1.20
	Bacon Roll	£1.00	£1.10	£1.20
	Sausage Roll / Bap	£1.00	£1.10	£1.2
	Double Bacon Roll	£1.50		
	Bacon and Sausage Roll	£1.50		
	Crusty Bacon Roll		X	
	Sub Roll	£1.60		
	Hot Dog		£1.05	
Bagels	Bagel		£0.55	
	Bacon Bagel		£1.55	
	Cheese Bagel			£0.48
	Breakfast Calzone			£0.97
Paninis	Full Panini		£1.70	

	½ Panini		£0.85	
	Mini Panini			X
Sandwiches	Sandwiches	£1.45+	£1.50	£1.32
Pizzas	Pizza			£1.40
	Foccacia Pizza		X	
	French Bread Pizza		X	
	Spicy Potato Wedges		£1.10	
	Cheese on Toast	£0.70		
	Cheese Wheel	£1.00		
	Cheesy Beans on Toast			£1.65
	Cheese and Beans and Pepperoni and Bacon Ultimate Roll			£1.38
	Pretzel		£0.90	
Waffle	Waffle		£0.90	X
	Waffle and Fruit		£1.10	
	Pancake and Syrup		£0.60	
Pastries	Croissant	£0.65	£0.90	
	Danish		£0.90	
	Pre-packed Muffin			
	Baked Doughnuts		£0.60	
Cereals	Porridge	£1.25		£1.20
	Cereal Pots			£0.60
	Small Box of Cereal	X		
	Cereal and Milk	£0.80		

Table 4.5.: Foods available at break time at the three schools

During the focus groups, one catering staff participant expressed:

> ‘I think they get so hungry. Especially the bigger ones. By half past eleven they are absolutely starving then, aren’t they?’

The most popular item at Schools A and C was toast, this bar chart from School A indicates (Figure 4.4.):

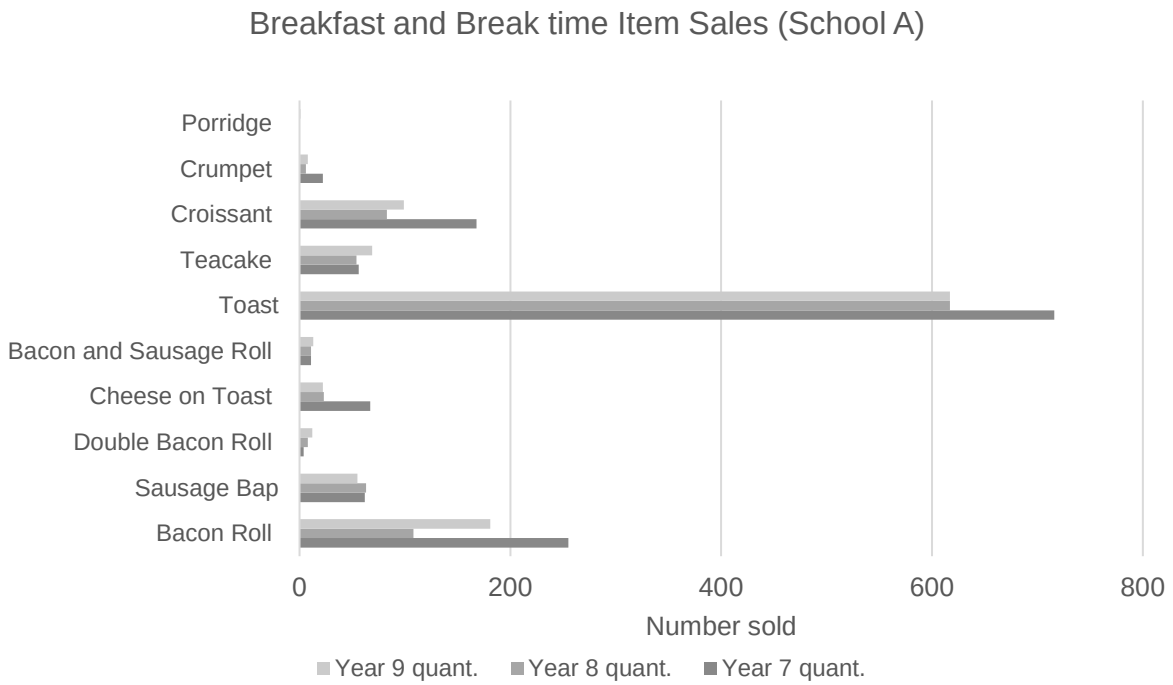


Figure 4.4.: The quantity of items sold at breakfast and break time at School A

Catering managers avoided purchasing bread containing soya or seeds due to pupil allergies. The catering manager at School A revealed that the school canteen uses approximately 20–22 loaves of bread a week. Only white bread or 50/50 bread (white bread with 50% wholegrain flour) were available because previous wholemeal bread introductory attempts had a low uptake. School A lacked the catering staff resources for spreading jam onto the toast. In comparison, School C used approximately 90–95 loaves of bread a week and the toast was spread with margarine (*Flora Butterly*), jam (mixed fruit seedless jam, as strawberry jam was prohibitively expensive) or *Marmite* from a 600g tub. Both white and wholemeal toast were available for pupils and the catering manager was considering swapping the white bread for 50/50 bread with the aim of improving the healthiness of the toast. The ends of bread were more popular amongst pupils as they acquired more bread for their money.

The bar chart below presents the top ten break time items at School B by the cash sales and FSM sales (Figure 4.5.):

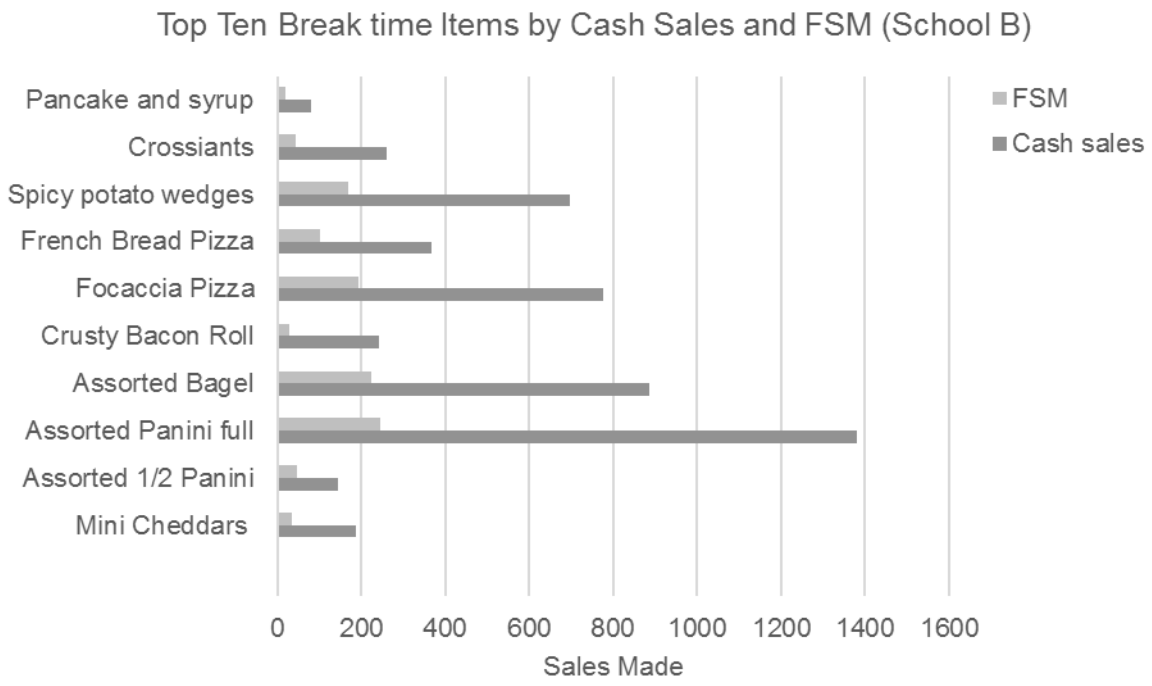


Figure 4.5.: The ten top break time items by cash sales and FSM at School B

Unlike the two other schools, School B did not offer toast during the morning break time. Rather, the product that achieved the largest sales was 'Assorted panini Full,' which made £1,380.12 cash sales and £245.76 FSM sales over the data collection period. Bagels, Focaccia pizza and spicy potato wedges were popular too. Like School A, fruit fails to feature in the top ten food items sold at break time.

This figure shows the eight break time items with the highest sales at School C (Figure 4.6.):

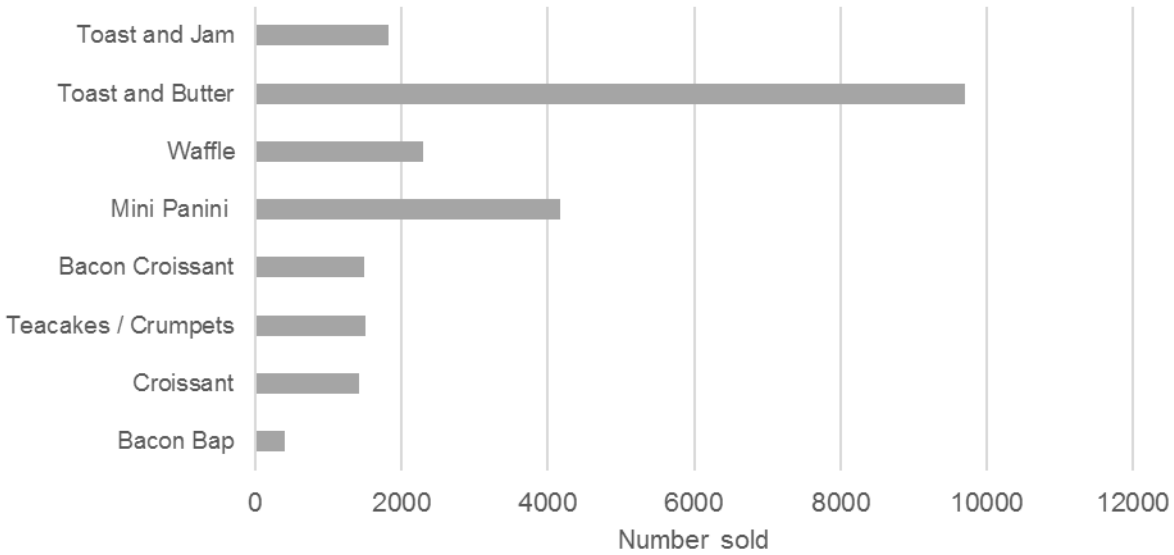


Figure 4.6.: The top ten items sold at breakfast and break time at School C

The most sold item by far was toast and butter (n=9701), followed by mini paninis (n=4170), waffles (n=2291) and then the toast and jam (n=1831). All top ten items shown in the bar chart are starchy carbohydrates, alluding to pupils seeking something warm and filling during their morning break time. Research confirms that carbohydrates have an immediate effect on satiety (Benelam, 2009). Apart from this, toast was the cheapest item on the menu at only 16p per slice of toast and margarine, thus it could be hypothesised that the inexpensiveness drove sales amongst pupils. The price consciousness of adolescents was explored in future focus groups, as the quantitative sales data does not provide insight as to why certain products were more popular.

The 'Breakfast Calzone' offered at School C was a food-to-go breakfast consisting of scrambled eggs, ham and melted cheese inside a baked roll. School C sells about 350-400 'Mini paninis' daily across the whole school. These are petit pan bread rolls filled with cheese, tomato and ham and then cooked in a griddle. School C considered waffles a 'treat,' only selling them on Tuesdays. School C had lunch lessons, so pupils would often purchase a sandwich at break time to eat before or after their lunch lesson.

Furthermore, at School C, only ten porridge pots sold over the period of the data collection, but the catering manager said that uptake tends to be higher when branded porridge pots are in stock (see Appendix C.3.). This was in concordance with the literature, which found that branding influences consumption. Most experimental research concerning branding and consumption involves significantly younger children of preschool-age rather than adolescent participants. A systematic review of studies established that branded food products increase calorific consumption (DeCosta *et al.*, 2017). One such example is Keller *et al.* (2012) who found that 4- to 6-year-old females consumed an additional 100 calories in the branded condition. Therefore, individuals may choose products to eat based on the visibly branded packaging.

4.2.2. Lunchtime

Table 4.6. shows the foods available at lunchtime at the three schools:

	Menu Item	School

		School A	School B	School C
Main Meals	Meal Deal		£2.35	
	Dish of the Day	£2.00	£1.86	£1.89
	Hearty Meal	£2.00		
	Hearty Meal & Dessert	£2.45		
	Vegetarian Dish	£2.00		
	Vegetarian Dish & Dessert	£2.45		
	Curry & Chips	£2.00		
	Half & Half (curry, rice and chips)	£2.00		
	Lunch Pot	£1.95		
Potatoes	Plain Jacket	£1.00	X	X
	Jacket & 1 Filling	£1.50		
	Jacket & 2 Fillings	£1.75		
	Sweet Potatoes			X
	Portion of Chips		£0.95	£1.42
	Chips and Tomato Sauce	£1.15		
	Roast Potatoes		£0.95	
Pasta etc.	To-go (noodles, pasta, rice)	£1.95	X	£1.89
	Plain Pasta		£0.95	
	Pasta	£1.80	£1.75	
	Pasta with Extra Cheese		£1.95	
Bread-based	Pizza	£1.05	X	X
	Soup of the Day and Bread Roll	£1.50		X
	Sandwich Meal Deal	£1.80		
	Bread		£0.20	
	Garlic Bread / Half Naan		£0.25	
	Sandwich Classic	£1.45	£1.50	£1.32
	Sandwich Luxury	£1.80		
	Deli Sandwiches		X	
	Solo Sandwiches		X	
	Premium sandwich			£1.49
	Baguette Standard	£1.80		
	Baguette Classic	£1.65+	X	
	Baguette Deli		X	
	Baguette Solo		X	
	Hot Savoury Roll	£1.25		
	Hot Baguette	£1.80		
	Tortilla Wrap	£1.60+	£1.60	£1.60
	Basic Wrap	£1.65		
	Luxury Wrap	£1.90		
	Hot Wrap	£1.80		
	Filled Roll			£1.50
	Sub Roll	£1.65		
	Filled Bagel		X	
	Panini	£1.75	£1.80	
	Hot Dog	£1.25		
	Burger in a Bun	£1.50		
	Burger Meal Deal		X	
Salad	Salad Bar Pot	£1.50		
	Small Salad Pot		375ml (£1.80)	

	Salad		500ml (£2.00)	£0.42+
Extras	Extra Cheese	£0.40	£0.55	
	Coleslaw		£0.55	
	Cheese Wheel	£1.00		
	Baked Beans	£0.60		
	'Nando's Style Macho Peas'			X
	Vegetables / Baked Beans Portion		£0.55	
	Tortilla Crisps		£0.55	
Puddings	Jelly	£0.60	£0.65	£0.50
	Jelly with Cream		X	
	Angel Delight	£0.60		
	Raspberry / Strawberry Mousse with Cream		£0.70	
	Crumble	X		
	Dessert Pot		£0.65	£0.82
Cakes	Tray Bakes / Home Bake	£0.55	£0.75	£0.82
	Luxury Home Bake	£0.70		
	Deli Tray Bake		£0.90	
	Pudding and Custard	£0.80	£0.75	
	Cheesecake	X		
	Muffin	£0.85	X	X
	Iced Muffins		X	X
Biscuits / Cookies	Biscuits			£0.52
	Digestives x2 Packet		£0.55	
	Hobnobs x2 Packet		£0.55	
	Shortbread			£0.78
	Cookie 45p	£0.45		
	Cookie 55p	£0.55		
	Luxury Cookie	£0.70		
	Giant Cookie		£0.95	
'Crisps'	Bags of Popcorn		X	
	Chippeas Crisps		X	
Fruity snacks	Bear Fruit Snacks		X	
	Dried Urban Fruit		X	
	Yo Yo Fruit Snack		X	
Dairy products	Ice Cream / Sorbet	£0.60	X	
	Nutri Grain Yogurt		£0.85	
	Yogurt	£0.60		
	Luxury Yogurt	£0.90		
	Muller Pots	£0.50		
Other	Caramel Wafer Bars	X		
	Teacake Marshmallows	X		
	Chocolate Brownie	X	X	
	Go Ahead Bar		£0.95	
	Nutri Grain Bar		£0.95	
	Doughnuts		£0.65	X

Table 4.6.: Foods available at lunchtime at the three schools

All schools provided Halal meat and ‘Free From’ options such as gluten-free foods were available on request. School A had a ‘Sandwich Meal Deal’ that included a sandwich, piece of whole fruit and a bottle of water. Soup was available at School A three times a week during the winter, but less during the summer term. Sales data from School A (see Appendix C.1.) showed that the sales of the ‘Hearty Meal’ remained similar across all age groups (Year 7: n=556; Year 8: n=569; and, Year 9: n=554). Interestingly, the ‘Hearty Meal and Dessert’ uptake was low at between 16 to 18 per year group. Quite the opposite was evident at School B, where the ‘Meal Deal / Meal and dessert’ options were highly popular (Figure 4.7.):

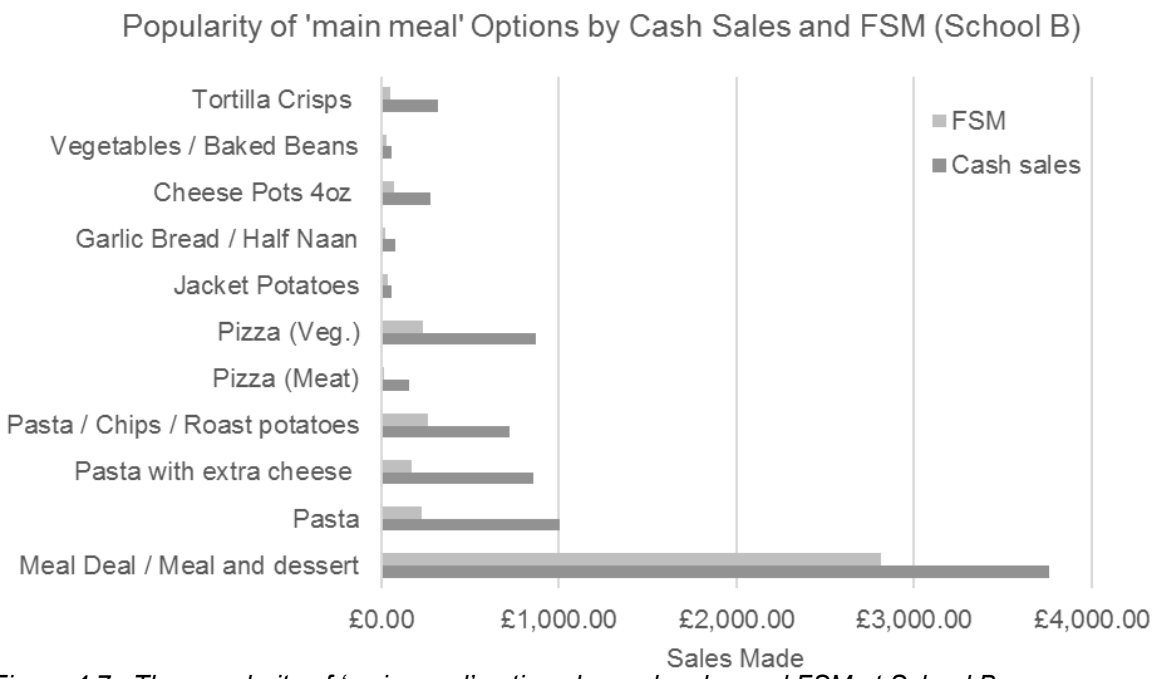


Figure 4.7.: The popularity of ‘main meal’ options by cash sales and FSM at School B

Sales of the ‘Meal Deal / Meal and dessert’ totalled £6574.05, 42.78% of which was from FSM eligible pupils (£2812.46), surpassing all other main meal options. In contrast, the second best-selling FSM menu items were ‘Pasta / Chips / Roast potatoes’ (£263.53) followed by vegetarian pizza (£234.86) and pasta (£226.60). Next, the five most popular hot lunchtime options at School C are shown in the following bar chart below (Figure 4.8.):

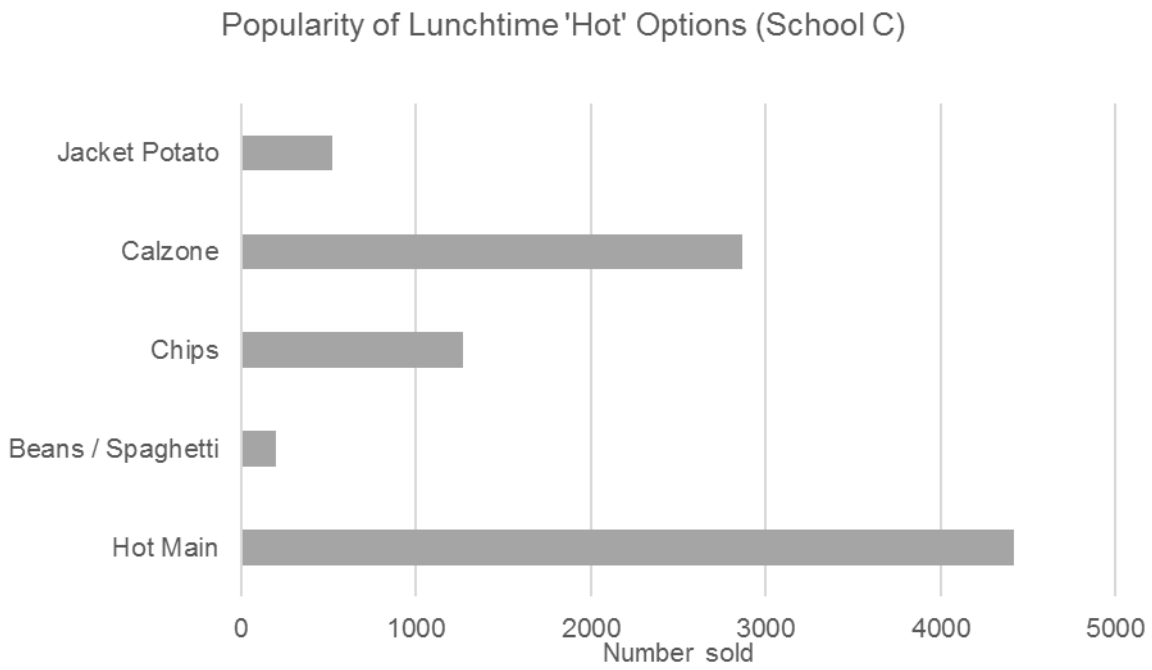


Figure 4.8.: The popularity of 'hot' lunchtime options at School C

Although chips were only available once a week, they make up a substantial proportion (n=1271) of the sales, in comparison to 'Hot Main' meals which were available daily (n=4422). During the initial catering manager interviews, the researcher asked which other carbohydrates were favoured. The response was identical across all three schools: (i) Pasta; (ii) Rice; (iii) Potatoes. This ordering was as predicted because these three carbohydrates are popular in the UK and fresh potato sales have declined considerably since 1981 (Hess *et al.*, 2016). White pasta and rice were used by the schools. School C had tried wholegrain rice, but it was disliked by the pupils, so they changed to a 50:50 *Tilda* rice mix.

The cookies at School A were made using an oat-based dough. 'Home Bake' refers to pre-packed and homemade blueberry muffins, flapjacks and baked doughnuts. Whereas, 'Luxury Home Bake' refers to a bigger piece of cake, which could be a chocolate and beetroot muffin or a carrot cake. The bar chart below reports the eight most sold desserts at School A for each year group in KS3 (Figure 4.9.):

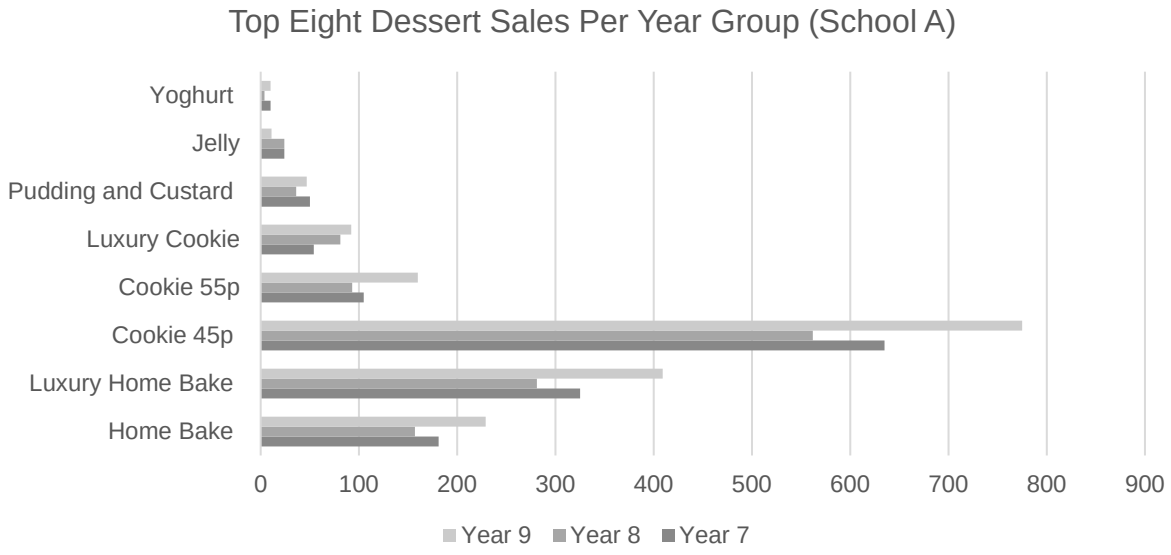


Figure 4.9.: The eight most sold dessert options at School A per year group

Noticeably, sales of the 45p homemade oat-based cookies exceeded all other desserts sold at the school. Perhaps the lower sales of the 55p cookie and 'Luxury Cookie' can be attributed to the fact they are less frequently available in the canteen. Cookies were favoured at School B as well (Figure 4.10.):

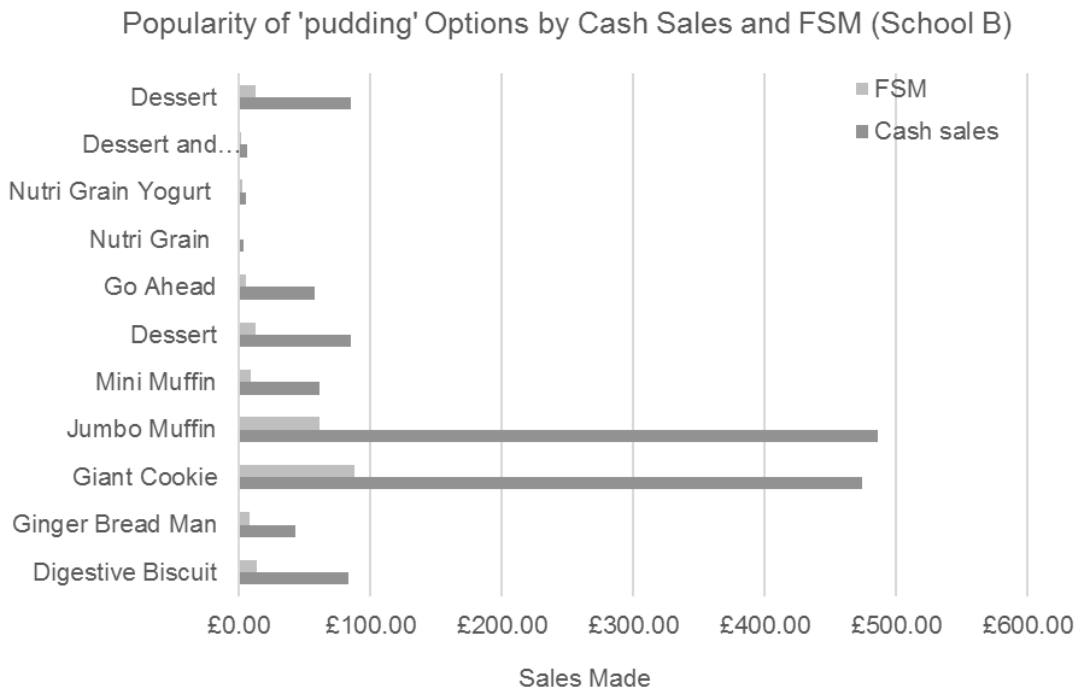


Figure 4.10.: The popularity of pudding options by cash sales and FSM at School B

The least popular pudding options are the *Nutri Grain bars* (n=4) and the *Nutri Grain yogurt bars* (n=10). The two puddings with the highest sales were with the 'Giant Cookie' (cash sales=£473.95 and FSM=£87.50 FSM) and the 'Jumbo Muffin' (cash sales=£485.90 and FSM=£61.30). Lastly, the popularity of pudding options at School C is shown below (Figure 4.11.):

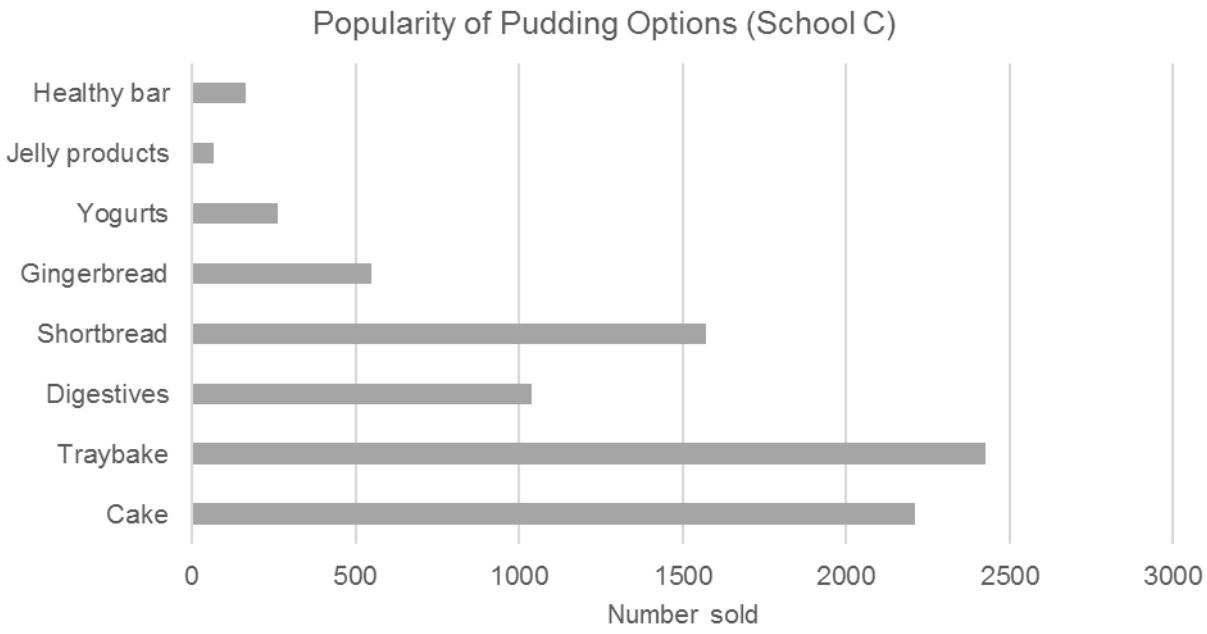


Figure 4.11.: The popularity of pudding options at School C

Figure 4.11. clearly indicates that cakes are a highly popular pudding option at School C, with tray bake (n=2427) and cake (n=2212) exceeding the other options. However, three types of biscuits: shortbread (n=1572), digestives (n=1038) and gingerbread (n=550) were well-liked as well. The total cake sales (tray bake plus cake) equals 4639, compared to only 164 'Healthy bars' (cereal bars with added fruit) sold within the same time period. Then, proportionately, the sales of healthful bars is only 3.53% of the total cake sales.

4.3. Perceived Quality of School Foods

The researcher sought to determine the catering staffs' perceptions of the quality of food available in the school canteen. The two sub-themes are detailed below.

4.3.1. Fresh and Homemade

Throughout the focus groups there was much emphasis on the food available being 'healthy,' 'fresh' and cooked from 'scratch' using 'quality' ingredients. A self-serve salad bar was available throughout the academic year at all of the schools, though less popular during the winter months. All the schools baked apple crumble, cookies and cakes from scratch rather than buying prepared frozen stock. School catering staff within the UK need to carefully consider their costings as FSM are worth £2.30 per pupil, so this may play a role in the prevalence of scratch cooking (Mackley and Long, 2018). No junk food was available on the school premises:

> 'There's not a lot here, like I said, a few cakes, isn't it? We don't do a lot of that. There's nothing here that isn't really good for them. It's not like they can go down and buy a packet of crisps anymore is it?'

School C did a Food Analysis on their scratch cooked meals. Results showed that meals were often deficient in iron; to rectify this the catering staff began adding spinach, frozen peas, lentils and dried herbs to more dishes. For example, using frozen peas to produce fresh pesto. The catering manager at School C seemed devoted to making meals as flavoursome as possible such as when making a Bolognese they dry fried the onions to caramelise them before adding garlic and herbs. The catering manager at School A explained how she was keen to incorporate more vegetables into existing school meals. The introduction of new dishes to the menu is a three-stage process to ensure that the new food is trialled by a 'broad spectrum' of pupils: (i) conducting a focus group; (ii) asking the school council; and, (iii) putting tasting pots in the canteen for pupils to try. Catering managers stressed that any menu developments or alterations could not be overly labour intensive.

4.3.2. Stealth Vegetables

Carrots were categorically described as the 'top vegetable' by all the catering managers. A content analysis of pupils' favoured vegetables named during the catering manager interviews is presented below (Table 4.7.):

	School A	School B	School C
Carrots	X	X	X
Peas			X
Onions	X		

Broccoli	X	X	
Sweetcorn / ‘corn on the cob’	X	X	X
Cauliflower	X	X	
Green beans		X	
Peppers	X		X
Unpopular	Cabbage	Cabbage	

Table 4.7.: Vegetables mentioned during the catering manager interviews

These favoured vegetables differ considerably to another study whereby 138 9- to 12-years-olds were asked what their favourite vegetables were. Most liked vegetables were cucumber, red pepper, peas, corn and carrot (Olsen *et al.*, 2012 (a)). Perhaps cucumber was not mentioned by the catering staff as it does not feature in cooked meals, however it could remain popular for adolescents at other times of the day. When asked about vegetables, carrot cake was promptly referenced in all three of the catering staff focus groups. Chips were referred to as ‘still a vegetable… just its fried.’ One catering staff participant at School C stated that pupils liked peas, broccoli, sweetcorn, carrots and mashed potato, announcing that:

> ‘The majority of the kids like vegetables. It’s only the odd few that say ‘Ooh, no I don’t like this.’’

On the contrary, staff at School B were convinced that vegetables were disliked:

> ‘They aren’t that good with their vegetables.’
>
> ‘They don’t like their veggies.’
>
> ‘…we always have loads left over.’
>
> ‘If they had a choice, they are not going to pick them [vegetables].’

The catering staff affirmed that the school had ‘plenty of options,’ thinking that it was ‘easy’ for pupils’ to consume their 5-A-Day, but pupils chose not to. In particular, the majority of pupils opt out of a portion of vegetables when purchasing a hot main meal and the staff are reluctant to serve vegetables regardless as, ‘they will just leave it, scape it in the bin.’ Poor vegetable intake was justified by a couple who claimed that pupils ate plenty of fruit.

Overall, the participants appeared enthusiastic about disguising vegetables to contribute to pupils’ *5-A-Day* and subsequent consumption of fibre and vitamins,

making it easier for them to eat healthier. Nonetheless, a couple doubted the provision of stealth vegetables in school dinners:

> ‘They don’t want that. So no, it don’t work. You can trick a kid that’s six, but you can’t trick an older kid. They know what you are doing.’

Most stealth vegetable research is centred around the weaning process. However, a qualitative longitudinal study involving 37 low socioeconomic Australian parents with at least one child aged 5- to 9-years-old explored stealth vegetables. 24 of the parents regularly hid vegetables, most commonly courgettes and carrots. Bolognese sauce was the most frequently cited dish. Parents perceived stealth vegetables as beneficial, helping to avoid dinnertime arguments. However, several parents felt that stealth vegetables were inappropriate and several alternative techniques could be employed to encourage vegetable consumption, such as multiple tastings (Pescud & Pettigrew, 2014).

Examples of how catering staff ‘hid’ vegetables when cooking:

- Vegetables in meat curries.
- Blending kidney beans with tomato sauce to create a pizza topping.
- Adding carrots and lentils into mincemeat lasagne.
- Layers of carrots in cottage pie.
- Adding vegetables to pasta bake such as onions and tomatoes.
- Courgettes in pasta sauce.
- Beetroot chocolate cake, ‘And they think its chocolate cake.’
- Banana muffins.
- Using the water left over from cooking vegetables to make the gravy.
- ‘Puree it down like a bit of baby food.’
- Celery in the lasagne.
- Dicing carrots up very small and putting them in cottage pie.
- Blending cauliflower into gravy.
- Blitzing peas into a Bolognese.

4.4. Extrapersonal Factors that Drive Food Choice

Extrapersonal factors perceived to drive adolescents’ food purchasing and consumption behaviours were discussed during the interviews and the focus groups. Five sub-themes were deduced in the thematic analysis: staff encouragement, peer pressure, parenting, education and social media.

4.4.1. Staff Encouragement

This sub-theme was found predominantly within the catering staff focus groups and catering staff gave the impression of encouraging pupils to try 'new stuff,' with theme menu days being used to encourage pupils to broaden their palates. For instance, 'We try to encourage them, to eat their vegetables.' Despite most pupils disliking Brussel sprouts, 'we keep giving them.' This form of encouragement may be ineffective, as Day *et al.*'s (2013) study involving primary school catering manager interviews suggested that verbal encouragement largely went unacknowledged by pupils and was not enough to motivate the selection of more healthful options. Half of the eight schools studied let pupils choose whether or not to take a side portion of vegetables because the catering managers accepted that enforced vegetables would end up in the bin (Day *et al.*, 2013).

4.4.2. Peer Pressure

Opinions differed with regard to the role of peers influencing adolescents' purchasing and consumption choices. One catering staff participant expressed that peer pressure was insignificant because she had seen peer groups eating a combination of both healthful and unhealthful foods. However, most of the catering staff and all of the parents taking part in the study deemed peers as highly influencing food consumption both inside and outside school:

> 'They all go with the crowd.'
>
> 'Yeah, they copy, don't they?'
>
> 'They look at what everyone else has bought… whatever their friends are having.'
>
> 'Well it's basically what everyone else has, isn't it? They like to be seen to be eating the same as everyone else.'
>
> 'If their friends have got it, they will.'

Parents highlighted that some adolescents' perceived buying food in the school canteen to be more socially acceptable than consuming a packed lunch, notwithstanding the extra cost:

> '[My son] won't bring in a packed lunch because he says it's "really sad" to open a packed lunch with sandwiches rather than eat like a wrap with his friends. And I could do a nicer wrap for him at home. For half the price. But, it's not the same is it?'

> ‘Peer pressure… I know mine has ditched her packed lunch some days to eat chips, the same as other people.’

These findings were as expected because previous research has indicated that when adolescents buy food outside of the home and away from parental influence, peers play a larger role in purchase decisions (Nørgaard, Sørensen and Grunert, 2014). None of the participants alluded to the peer pressure positively, only negatively, as one mother said:

> ‘I just know that when my kids get together with their friends, I just know that they eat junk food. I do just turn a blind eye… I just think that I would never consume that many calories in one go.’

The catering staff had noticed a trend of peer influence changing over KS3. Upon starting secondary school and particularly in the first term, parents were believed to have the greatest influence in what adolescents chose to consume. However, catering staff suggested that during the second year of secondary school, pupils began to ‘be sheep, be followers,’ being much more influenced by their peer group. Following this, in the third year of secondary school, ‘they have got their own mind then.’ This anecdotal evidence from the catering staff is partially supported by Steinberg and Monahan’s research which demonstrated that resistance to peer influence decreased between the ages of 14- and 18-years-old but they found limited evidence for resistance to peer influence in 10- to 14-year-olds (Steinberg & Monahan, 2007). Likewise, focus group discussions with 29 young people aged: 9 to 10; 13 to 14; and, 16- to 18-years-old demonstrated a link between intra-familial factors and food intake decreased with age (Fitzgerald *et al.*, 2010).

Another way in which peers may influence food choice is through the way many primary schools segregate pupils according to what they are eating. The catering manager at School A described how when Year 6 primary school pupils come for their transition days in July, she is always asked, ‘Will I be allowed to sit with my friends?’ She believes that segregation has contributed to the decline in school meals. A Norwegian focus group study involving 165 11-year-old participants in their last year of primary school discussing their current eating environments, discovered that the main issue raised by the pupils was related to who they were allowed to sit with whilst eating their packed lunch (Fossgard *et al.*, 2019). This indicates that socialising with peers is imperative, however all three schools had addressed this

and allowed pupils to sit with their peers regardless whether they were eating a packed lunch or food purchased from the school canteen.

4.4.3. Parenting

Overall, both parents and non-parent participants were convinced that parenting significantly contributed to adolescents' attitudes and behaviours towards food and healthful eating. Participants stressed the importance of starting vegetable consumption whilst they were 'at a young enough age,' deducing that this would improve long-term vegetable acceptance. Some parents referred to how they intentionally set a good example by parental modelling the eating of vegetables:

> 'You can't tell your kids to do something and then you don't do it yourself.'
>
> 'So I'll eat veg that I don't like, just because it's in front of my kids.'

Parental modelling is connected to SLT as vicarious learning can occur through observing parents. A systematic analysis of 78 studies established a correlation between parents explicitly showing that they enjoyed certain foods and the children having more desirable eating behaviours (Yee, Lwin & Ho, 2017). Strictly disciplining children, making 'them eat it' and consistency were emphasised, as two mothers explained:

> 'Mine are eight and ten, and even now I put carrots on their plate the other day, and I am quite a harsh mum sometimes, and I am like, "You are not moving until you have eaten at least three or four of those, you are trying them." And I will make them, to the point where they get teary, but it is like, come on, how else am I meant to get them to try and do it. Do you know what I mean?'
>
> 'I just chop them up so small that they can't be bothered to fish them out of the sauce. ((Laughter)) It's just too much. Although, with my daughter, mushrooms will come out no matter what, she will fish them out no matter how small they are.'

In addition, parents mentioned stealth vegetables and providing vegetable crudités with a hummus dip. Another parent revealed that they encouraged vegetable consumption by suggesting 'the health benefits of eating [vegetables].' This can improve dietary behaviours as a cross-sectional survey found that parents motivating healthful intake rather than restricting unhealthful foods was more beneficial for improving dietary intake amongst 10- to 12-year-olds (Melbye & Hansen, 2015).

One father only allowed his adolescents' access to a 'treat box' if they finished their dinner, however they were allowed to 'gorge on healthy snacks' such as fruit. Research shows that parents enforcing a low level of restriction is an effective strategy for reducing adolescents' consumption of palatable snack foods (Loth *et al.*, 2016). Controlling snacking was prevalent amongst parents taking part in the focus groups. Parents may use deception:

> 'Like, ((daughter's name)) until she was about six years old thought that raisins were sweets. She used to say, "Mum, please could I have some sweets," and I would say, "Yeah, here's a bag of raisins." And she used to sit there and say, "Ah, I have got my sweeties!"'

Participants with older adolescents were willing to negotiate with the vegetables that were consumed because 'they either do [eat vegetables] or they don't:'

> 'I only buy what they want to eat. That is a bit of an out thing… they have a mixture. They have asked for broad beans, but they don't like them so I just don't buy them anymore.'
>
> 'We do trade-offs. So one doesn't like carrots, so we do something else instead of the carrots. The one who will eat carrots, has the carrots. So it's a trade-off basically.'
>
> 'But you know, if you don't eat that then you have to eat a different vegetable.'
>
> 'Like I said, as long as they are eating vegetables then I don't mind which in particular it is.'

Comparatively, Hill *et al.*'s (2018) study with adolescents aged 13- to 16-years-old found that parents negotiated with their adolescents, as well limiting or reserving less healthful items for certain occasions. For instance, the parents in the study encouraged their adolescents to consume a sandwich or piece of fruit as a snack instead of unhealthful snacks (Hill *et al.*, 1998). The majority of parent participants did the main family grocery shop, and nearly all forbid their adolescents' accompaniment:

> 'No, I couldn't afford the bill if they went food shopping with me. They can only choose from what's in the house. They don't get a choice.'
>
> 'Mine come shopping with me still. The smaller one does [10 years old]. And if she asks for any fruit or vegetables, like the other day she asked for cherries, and I saw the price and I thought ((gasp)), "Yeah, you can have that" because I just know she'll eat them… Whereas when you get further around the supermarket and I can say, "Oh, no you have had the cherries"… So, it's quite good having the fruit and the veg near the first door. "No, you have had the cherries. You have had that." So, yeah.'

Not allowing adolescents to come to the supermarket has the potential to reduce pestering for unhealthful foods seen advertised. Research shows that parents and children often have oppositional views because the parent is more focused on the nutritional value of foods (Baldassarre, Campo & Falcone, 2016). Then again, participants accepted that whilst the adolescent was at school, it could be difficult to control eating habits:

> ‘Their Mum’s not there to tell them, “No, you are not allowed it.”’
>
> ‘But you know, if my daughter came home and I said to her, “don’t eat that in school, it’s not nice.” … She is going to be like, “Have a day off, Mum.”’
>
> ‘Because, you know, your Mum and Dad are going to give you what you are going to have for tea, whereas in the school they have got a choice of what they want for food, and if they are going to have vegetables or a pizza, they are probably going to pick a pizza if they have got to go home and have vegetables.’

Previous research has established that adolescents have a greater autonomy over what they eat at lunchtime compared to their evening meal with their parents (Bassett, Chapman and Beagan, 2008). These inferences support a recent study with 6- to 11-years-olds whereby parents perceived their lack of presence as one of the major barriers to the child consuming healthful foods (Eck *et al.*, 2019). All the schools had a facility for parents checking online what their adolescent purchased; this was viewed positively because previously ‘you had to rely on what your kid told you they ate.’ The possibility of some parents being shocked by their adolescent’s school canteen purchases was hinted at.

Although cookery skills were considered essential, both parents and non-parents reasoned that a parents’ reluctance to allow their adolescents to help in the kitchen or prepare ingredients for Food Technology lessons at school was understandable:

> ‘…and she comes home and she goes, “Oh, what are you making for tea?” And I say, “Spaghetti Bolognese” ... She goes, “Ahh, can I help?” And I was like, “No, you are not messing my kitchen up!” … So she showed an interest, and then it has gone.’
>
> ‘I know if mine come home and said, “I have got to take that,” I would say, “Oh, you are not messing up the kitchen, I will just do it for you myself.”’
>
> ‘I wouldn’t imagine many parent say, “Oh go on then, the scales are over there. Have free rein in the kitchen.”’

Moreover, convenience and time pressures influence parental decision-making:

> ‘But I think as a society now, we are all so busy, that people don’t have as much time anymore to try and teach their kids cookery and things like that.’
>
> ‘It’s easier to go to *Farm Foods* and grab a bag of chicken nuggets than it is to go and cook a fresh chicken. Especially when you have got kids that you have got clubs to run to… and you have been at work all day yourself…’
>
> ‘When we get back in late it’s very easy to grab a pre-done meal or something. Like get a pizza out of the freezer or something rather than go to the extent of getting the saucepans out, making the veg, and excreta, so…’

These findings are supported by findings from *Project EAT-I* and *EAT-II* which found that busy parents were often too tired to cook when they got home from work (Neumark-Sztainer *et al.*, 2010).

4.4.4. Education

The researcher asked, ‘What would make it easier for adolescents to consume healthier foods?’ and this elicited responses related to education. A literature review found that six of the nine studies demonstrated a positive association between food literacy and healthier dietary practices. However, there is a lack of longitudinal research studying food literacy (Vaitkeviciute, Ball & Harris, 2015). Explicitly, participants stated, ‘better education from an earlier age,’ referring to many adolescents not ‘know[ing] what half of it is.’ Staff from School C gave anecdotal evidence regarding a courgette cake and carrot cake available recently. One participant exclaimed that pupils assumed, ‘Ew, you have shoved a load of carrots’ as well as, ‘I’m not eating that, I’m not eating that.’ Apparently, the carrot cake received much scepticism, which catering staff blamed on a lack of education. Disappointingly, the pupils ‘wouldn’t even eat’ the courgette cake.

Food Technology lessons were discussed, with a unanimity amongst all participants that nowadays lessons were inadequate. One mother complained that her 16-year-old daughter only did a single year of cookery throughout her secondary education. Additionally, educational taste testing sessions at school could have a strong impact. A father explained that when his child was at primary school, they had a ‘taster day where they bought in different vegetables for the pupils to try.’ Several participants demonstrated nostalgia as they begun reminiscing about what they did

whilst at school and how education has changed. Pupils nowadays are required to weigh out tiny portions of some ingredients before lessons:

> ‘She used to take so much salt, or whatever. And that had to be weighed as well and I was like, “You serious, well you weigh it then.” So I told her to weigh it at home. Because they are not teaching them that either…’

The opinion that ‘the school itself could play a bigger part in educating’ prevailed. On the other hand, one staff member believed that pupils were educated and that ‘They know what’s good and what’s bad’ but this knowledge did not influence decision-making around food. Equally, one of the parents was a secondary school science teacher and said that:

> ‘By the time they come in Year 7 they do seem to have a basic knowledge of what food to eat and what food not to eat. So you get to the point, now at this age, where you have just got to let them make those right choices or wrong choices.’

Whilst the participants in the current study appeared to believe that education was necessary to improve eating habits, there is a lack of research into the longitudinal benefit of education. Nga *et al.*’s (2019) recent systematic review found that whilst school-based interventions may seem positive, a more holistic approach should be taken to tackle rising obesity levels.

4.4.5. Social Media

Most participants felt that the majority of social media advertising focused on deserts and unhealthful ‘rubbish’ foods:

> ‘You don’t see any healthy food advertised.’
>
> ‘I don’t think you see many adverts for vegetables, do you anyhow?’

Pleasingly, one catering staff participant recalled the ‘Eat them to Defeat them’ *Veg Power* advertising campaign that had aired on television at peak broadcasting times earlier that year (see Appendix A.1.). Moreover, a few catering staff participants identified social media as making adolescents more health conscious and ‘self-conscious about body image.’ This was either through television or through what adolescents read in the media.

Overall, participants perceived social media as minimally influential. Ferguson *et al.* (2014) illustrated this as their study with female adolescents aged 10- to 17-years-

old showed that peers had a greater influence than television and social media on body dissatisfaction. This challenges traditional social comparison theories through which adolescents compare themselves to individuals seen on television or in social media. Research concerning the impact of *Facebook*, *Twitter*, *Instagram* and *YouTube* is lacking although these social media platforms have the potential to promote healthful eating amongst young people (Dunlop, Freeman & Jones, 2016).

4.5. Intrapersonal Factors that Drive Food Choice

This third theme encompasses the following sub-themes: health consciousness, vegan and vegetarianism, appearance, taste preferences, price consciousness and convenience.

4.5.1. Health Consciousness

Health consciousness was minimally discussed within the parents' focus group. One catering staff participant described a trend that she had noticed whereby female adolescents' aged 13- to 15-years-old were beginning to select the more healthful canteen options, imagining it might be due to body consciousness. Besides this, catering staff contemplated that health consciousness 'just comes with age' and that older adolescents 'need more filling' so 'will go for the bigger, heartier meal then' rather than a single slice of pizza or only a pudding at lunchtime. The novelty of having autonomy and access to a wide range of choice upon starting secondary school was discussed. A catering staff participant suggested that this might lead to adolescents making less healthful choices over time and resultantly only eating pizza:

> 'The thing is, when they come from primary school at first, they tend to go for the veg option and that, because they are so used to it. I think once the novelty wears off and they think, "Oh, I don't have to have this anymore, I can have what I want." And I think that, obviously, that's when it is going to change.'

In addition, competitive sporting activities played a role, as 'a lot of them are very sports driven,' which leads them to 'concentrate on their diet.' These findings were as expected, because a large-scale questionnaire study with 50,168 ninth grade pupils (aged 14- to 15-years-old) in America found that adolescents who participated in sports were more likely to engage in healthful behaviours, such as eating at least

five servings of fruit and vegetables (Harrison & Narayan, 2003). Conflicting evidence was demonstrated by a cross-sectional study from *Project EAT-I* and *EAT-II* because males participating in sports teams were a risk factor for increased fast food intake (Bauer *et al.*, 2009).

4.5.2. Vegan and Vegetarianism

All three schools offered a vegetarian option daily. School C had a vegetarian option available at every counter: (i) hot main meals ('Hearty Dish,' i.e. vegetarian curries with chickpeas and lentils); (ii) hot food-to-go; and, (iii) sandwiches. The quantitative data showed that the vegetarian 'Hearty Dish' uptake was low at School A (Year 7: n=14; Year 8: n=11; and, Year 9: n=8) (see Appendix C.1.). However, ascertaining the quantity of vegetarian dishes sold was difficult because dishes often look the same to the staff working on the tills, meaning that they do not record it as vegetarian (see Section 3.3.1.). Equally, participants recognised that some vegetarian pupils could go unnoticed if every day they chose something from the cold counter such as a cheese sandwich rather than specifically asking for a vegetarian hot meal.

Staff remarked that veganism and vegetarianism were 'starting to lift up a bit' even amongst younger pupils, but particularly the older pupils had been asking for more vegetarian and vegan options. The catering manager at School A was reluctant to provide vegan meals as she was convinced that meeting adolescents' nutritional requirements on a plant-based diet was immensely difficult. Pupils at School B could request a vegan meal in advance, if required. The catering manager at School C said that in early 2017, pupils frequently requested soya milk and he assumed that this was a social media driven trend. School C took '*Veganuary*' on board in January 2019, because a substantial proportion of pupils decided to go vegan for the month (see Section 2.5.4.). To cater for their needs, the school introduced vegan options such as vegan cheese, but pupils were not keen:

> 'We tried doing it. But a few people tried and tasted it. They tried going for it. And the next day they say, "No. I don't want it."'

The researcher asked about vegetarian labelling. School A's catering manager said that labelling and promoting foods as 'vegetarian' dissuaded some pupils from trying it, particularly male adolescents. She found explaining the ingredients better, specifically, in the case of a *pakora* [Spicy spinach and chickpeas in a wholemeal

wrap]; it was more effective than simply labelling as ‘vegetarian.’ Similarly, dos Santos *et al.* (2019) found that male adolescents were negatively associated with choosing a vegetable-based dish. Furthermore, using a nudging strategy and labelling the vegetarian dish as ‘dish of the day’ did not increase sales (dos Santos *et al.*, 2019). School B’s catering manager said that labelling foods as vegetarian did not put pupils off, but they were often suspicious, as it looked ‘different,’ as *Quorn* [non-meat substitute] mince aesthetically looks different to beef mince. A focus group study with participants aged 14- to 15-years-old in England found that an individual’s ‘food identity’ was often cited as a reason for avoiding eating plant-based foods. Connotations of ‘plant-based’ foods can be negative, so labelling foods as ‘chilli’ rather than ‘vegetarian/vegetable chilli’ could increase plant-based meal consumption by stealth, if not by choice (Ensaff *et al.*, 2015a).

4.5.3. Appearance

The consensus was that appearance influenced adolescents’ food choice; ‘a lot of people eat with their eyes’ and that ‘the kids buy with their eyes.’ One mother said that her daughter stubbornly based her attitudes towards foods on their external appearance:

> ‘My daughter is very choosy and picky, and a pain in the neck, and if she decides she doesn’t like something, she doesn’t even have to taste it. She just has to look at it and once she has decided that she doesn’t like it, that’s it and you won’t budge her.’

Catering staff considered the visual presentation of foods imperative, as it had the potential to encourage pupils to think ‘Oh, this I can try’ despite encompassing exactly the same ingredients. This concept of eating with your eyes is well known amongst chefs and colour, gloss, shape and evenness can all influence perceptions of dishes (Delwiche, 2012).

4.5.4. Taste Preferences

Taste as a sensory attribute influences food choices depending on an individual’s preferences. Whilst some may judge a food as ‘vile,’ most participants supposed that perseverance and repeated tastings meant that eventually an individual would

like the food because 'your taste buds just adapt to it anyway.' Everyone acknowledged that taste preferences could and would change over time:

> 'But they do change. Some kids just don't like stuff. All three of my kids have always loved cauliflower, all three of them. Well two years ago, all three of them decided that they hate it, none of them touch it now.'
>
> 'Yeah, as like I said earlier, if they don't like it, like the broad beans, they just won't, And once they have hit that… I have even said 'try them again' and they have said "No." You know… they have made that decision.'
>
> 'But it's got to be their taste preferences because they are not going to force it down their throats if they don't like it. Because my one daughter loved broccoli, whereas the other one hated it and never touched it, ever, ever, ever.'

The catering staff reckoned that adolescents would always choose the 'unhealthy option' or the 'sweeter snack:'

> 'Yeah, because if they had the unhealthy option… they take that first, I think. At that age.'

Adolescents selecting unhealthful options over healthful foods supports the quantitative data collected. Unambiguously, fruit fails to feature in any of the top break time sales, perhaps being forsaken for the more unhealthful and tasty items. Conversely, staff recognised that, 'You have got to give the customer what they want, to a degree' because if all the unhealthful options were omitted from the school canteen offering then this would severely affect sales. This finding is in support of the literature, particularly Moore *et al.*'s (2010) qualitative case study with 11 Welsh primary school head teachers and catering managers. In spite of national and *Local Educational Authority* (LEA) policy, tensions arose as external policy interventions often differ from the requirement to meet pupil's food expectations and ensure that the school catering remains viable. Financial viability means that pupils' preferences are prioritised above the promotion of healthful eating policies (Moore *et al.*, 2010).

School A's catering manager explained how she has worked in primary schools and secondary schools for years and noticed a lower uptake of school meals on Tuesdays regardless of the meals on offer. To counteract this, every week there is a 'hot grab' menu of well-liked foods on Tuesdays, and 'special menu' days are allocated to this day, preventing a significant dip in sales. Thus, two of the three-week rotating menus featured a 'chicken burger' (a seasoned whole piece of chicken breast) and the other week includes *Frankfurter* sausages (98% meat). Conceivably,

the ‘hot grab’ Tuesday menu at School A may be a result of maintaining the financial viability of the school canteen.

4.5.5. Price Consciousness

School A’s catering manager declared that she does not believe in ‘premium prices,’ and healthful menu offerings such as fruit and water were priced to cover the canteen costs, inclusive of the add-ons, such as staff and equipment. Parents usually upload money onto their adolescent’s account either weekly, monthly or as and when needed, and all of the schools allowed parents to specify spending limits. There was a minimum of £20.00 on the system at School A and parents were able to cap spending for different times of day; for example, some pupils were allowed to spend more of their daily allowance at lunchtime. Spending at School B was universally capped to £7.00 per day but some pupils would defiantly ask the staff if they were allowed to spend more than this.

Some participants highlighted the importance of looking ‘at the family’s needs and where they are’ as they may only be able to afford frozen peas. This would utterly limit the variety of vegetables tasted during childhood and adolescence. Across all focus groups, there was disagreement between whether adolescents were price conscious or not. On one hand, many parents and a few non-parent participants believed that pupils were ‘not at all’ price conscious:

> ‘Kids don’t care, do they? They only care when there is nothing on their account.’
>
> ‘“Ohhhh, can you lend? Can you lend?”’
>
> ‘No concept of money whatsoever.’
>
> ‘My two wouldn’t think about it at all… they are still quite young in some ways… they don’t come shopping with me. And they don’t realise.’

The catering staff thought that school dinners were a ‘bargain’ and provided excellent value for pupils and their parents. They compared the ‘quality’ ingredients in a school dinner to that of a *McDonald’s Happy Meal* (currently priced at £2.60). School meals were commended as pupils got ‘a fair portion as well’ and they were ‘cheap’ in comparison. Participants admitted that pupils were inclined to keep their money to purchase brownies, because ‘if we don’t do brownies, we sell more food:’

> ‘So even if we made things cheaper for them, it would make no difference to them and they would just buy more rubbish then, they would be like, “Oh, now I have got enough for a brownie.”’

On the other hand, some participants felt that adolescents were highly price conscious and that the price of fruit and vegetables should be made ‘free or cheaper’ to encourage consumption. However, one parent admitted that the school canteen mixed fruit salad in a cup could be done ‘slightly cheaper, but not much cheaper’ than the same product in the supermarket. A few catering staff participants understood that, ‘the cheapest they are going to go for’ and that pupils would purchase foods at break time rather than buy the more expensive food at lunchtime ‘because it’s less money’ and they are ‘limited to a daily spend:’

> ‘And sometimes if they buy toast they don’t have lunch… Because it’s the cheapest option they have.’
>
> ‘Or a chocolate cookie, if they are available, not very often, they will buy three, four of those. And we can’t really control that.’
>
> ‘You have some of them that will stock up on that morning break and then just buy cookies then on the afternoon break.’
>
> ‘I think a lot of them as well; they only have so much money, so they don’t want to chance it. They think they might not like it.’

In summary, participants’ opinions were divisive regarding how price conscious adolescents are when purchasing foods. Interestingly, previous research into adolescents’ food consumption behaviour seems to negate this topic of price consciousness. Although some mentioned that adolescents would like cheaper food, the effect of reduced prices is inconclusive (Shepherd *et al.*, 2006). However, with adults there is evidence that those with little money will gravitate towards choosing foods that provide greater energy density for less expenditure (Drewnowski and Specter, 2004). If this remained the case for adolescents, the high sales of toast could be due to price consciousness.

4.5.6. Convenience

Participants emphasised that adolescents ‘just want something quick’ and that convenience significantly affected school food uptake. Of note, pupils at School B purchased more of the food-to-go pudding options rather than sit down puddings requiring a spoon such as the yogurt, jelly and ‘Pudding and Custard’ (see Figure 4.10.). Equally, the catering manager at School A had determined that making the

cake batter into muffins rather than cake slices increased sales, as they were more convenient. School B's catering manager pointed out that when they used a different company the takeaways stopped and meals were served on plates. The result of this was that the sales of canteen food 'massively dropped,' meaning that the school had to start doing takeaways again:

> 'They want something that is quick to eat. Quick to get and quick to eat.'
>
> 'They don't want to sit down and eat a meal, they want to grab and go.'
>
> 'Well we are the takeout generation, aren't we?'

Some participants reminisced about their school meals:

> 'When I was in school you weren't allowed to hang around, you had to eat your dinner and go, and you had to sit down with a plate. There was no option to have a takeaway; you had to sit down with a plate at a table.'

Parents perceived school food as convenient and said that their adolescents opted for foods that were quick to prepare when making food for themselves. Namely, toast and cereal for breakfast and microwavable vegetables for main meals. Listed healthful food-to-go options in the school canteen included fresh fruit, fruit pots and pasta pots that are 'convenient and fresh.' Many 'fast food' options offered by the schools such as pizza slices were more convenient to consume, but taste preferences could be a coinciding factor in this choice.

Within the theme of 'convenience,' catering staff remarked on an apparent gender disparity. Short 'rushed' lunchtime breaks resulted in many male adolescents purchasing and consuming their lunch at break time so that they could 'go out on the tennis courts on a lunchtime:'

> 'Yeah, like I find a lot with the boys then, they'll, they'll stay out for a lot of their break kicking a ball around and then they will rush in in the last ten minutes and will then normally grab something like a pizza or a panini. So then they have got five minutes to sit and eat it before they need to go again.'

Curiously, weather affected uptake of the convenient food-to-go options, with pupils more likely to purchase a hot main meal so that they can sit inside and 'eat more when the weather is rubbish:'

> 'Because they don't want to be kicked outside in the rain. But as soon as the weather is nice, they just want to grab pizza.'
>
> 'When the summer comes, now that's it, we are going to be dead; it's going to be quiet in here.'

4.7. Conclusion

This chapter presented the results collected throughout the first phase of data collection: (i) School canteen purchase data; (ii) Catering manager interviews; and, (iii) Focus groups with catering staff and parents. Phase One aimed to examine the quantitative data and to qualitatively explore how adults perceive the factors influencing adolescents' eating habits. Analysing the breakdown of school canteen sales proved useful because any discrepancy between what catering managers said would have been discernible. One such example is that School C's catering manager explained how the school uses many loaves of bread weekly and that toast is extremely popular at break time. This was supported by the data showing that almost 10,000 slices of toast and butter were sold over the data collection period. A second example is that participants claimed adolescents opted for foods based on their taste preferences, selecting unhealthful options over healthful options. Again, the quantitative data reinforced this, as cookies, cakes and tray bake sales surpassed sales of more healthful pudding options such as fruit or yogurt. This perceived lack of health consciousness requires further exploration with adolescent participants during Phase Two.

Both parents and non-parents regarded the sub-theme of parenting as one of the most influential factors for adolescents' food choices, eating habits and behaviour. Disciplined parenting, parental modelling and vegetable introduction were all mentioned. These discussions were as expected and consistent with the literature. On the other hand, one sub-theme with incongruence was adolescents' price consciousness. All the parents questioned said that adolescents were not price conscious, yet several catering staff participants referred to this as a barrier for eating healthfully. There is a lack of literature concerning the price consciousness of adolescents in relation to food, so this will be discussed further in the next phase of the research (see Chapter Five).

Triangulation of results from both parents and catering staff proved beneficial as parents have a limited experience. The catering staff had observed thousands of pupils over the years and were able to explain longitudinal trends that they had witnessed such as peer pressure decreasing during KS3 (see Section 4.4.2.). The use of three schools was advantageous as it strengthened the external validity of

the study. Pleasingly, all three schools had similar trends and norms. For instance, all the school catering managers declared that pasta was the most popular carbohydrate, followed by rice and then potatoes.

To conclude, extrapersonal factors were perceived as having a much greater influence than intrapersonal factors for adolescent decision-making and attitudes towards food. In hindsight, adults took an outsider perspective; hindering the extent to which they could empathise with the adolescents' thought processes. Merely questioning adults would be limiting, so the next phase of the research involved focus groups with adolescents aged 11- to 13-years-old. In addition to this, Phase Two involved observing pupils covertly at break time and lunchtime in the school canteen. This triangulation of research methods improves the cross-validity of the study as the results can be compared and contrasted.

CHAPTER FIVE – ADOLESCENT RESULTS

5.1. Introduction

The purpose of Phase Two of the data collection was to explore what adolescents purchased and consumed whilst in the school canteen and their perceptions around vegetables, healthful eating and the various factors that influence their consumption habits. First, there is a summary of the school canteen observations and adolescent focus group method, which were completed between October 2018 and July 2019. Next, the themes and sub-themes found through the process of thematic analysis are summarised. After this, the findings related to each of the four themes are presented: routines; extrapersonal factors that drive food choice; intrapersonal factors that drive food choice; and, interventions.

5.1.1. Methodology

This chapter presents the results from two research methods: (i) school canteen observations; and, (ii) focus groups with adolescents.

Research Questions

1. What do Welsh adolescents' eat and how do they behave in the school canteen at break time and lunchtime?
2. What are 11- to 13-year-old Welsh adolescents' attitudes towards vegetables and healthy eating?
3. What are 11- to 13-year-old Welsh adolescents' routines, behaviours and food consumption (particularly around vegetables)?
4. What are the main factors that influence 1, 2 and 3 above?

The findings from the KS3 school canteen observations were applied alongside the literature to develop a semi-structured questioning schedule for the adolescent focus groups (see Appendix B.17.). The observations sought to answer the first and third research questions and the focus groups explored all four questions. The research methods are rationalised in greater depth in the Methodology Chapter (see Chapter Three).

5.1.2. Thematic Analysis

The school canteen observational notes and the verbatim transcriptions from the adolescent focus groups were thematically analysed to deduce themes and categories (Braun and Clarke, 2006). Four key themes and numerous sub-themes were identified, including: (i) Routines; (ii) Extrapersonal factors that drive food choice; (iii) Intrapersonal factors that drive food choice; and, (iv) Interventions. Each theme encompassed a few sub-themes (see Table 5.1. Figures 5.1., 5.2. and 5.3.):

Theme	Sub-themes
Routines	Breakfast Break time Lunchtime Dinner
Extrapersonal Factors that drive Food Choice	Education Parenting Availability Peer Pressure Social Media
Intrapersonal Factors that drive Food Choice	Convenience Price Consciousness Health Consciousness Vegan and Vegetarianism Taste Preferences
Interventions	NPD (New Product Development) Marketing

Table 5.1.: Thematic Analysis of key themes and sub-themes

Figure 5.1.: Hand-drawn Thematic Analysis Mapping for the school canteen observations

Figure 5.2.: Hand-drawn Thematic Analysis Mapping for the school canteen observations and adolescent focus groups

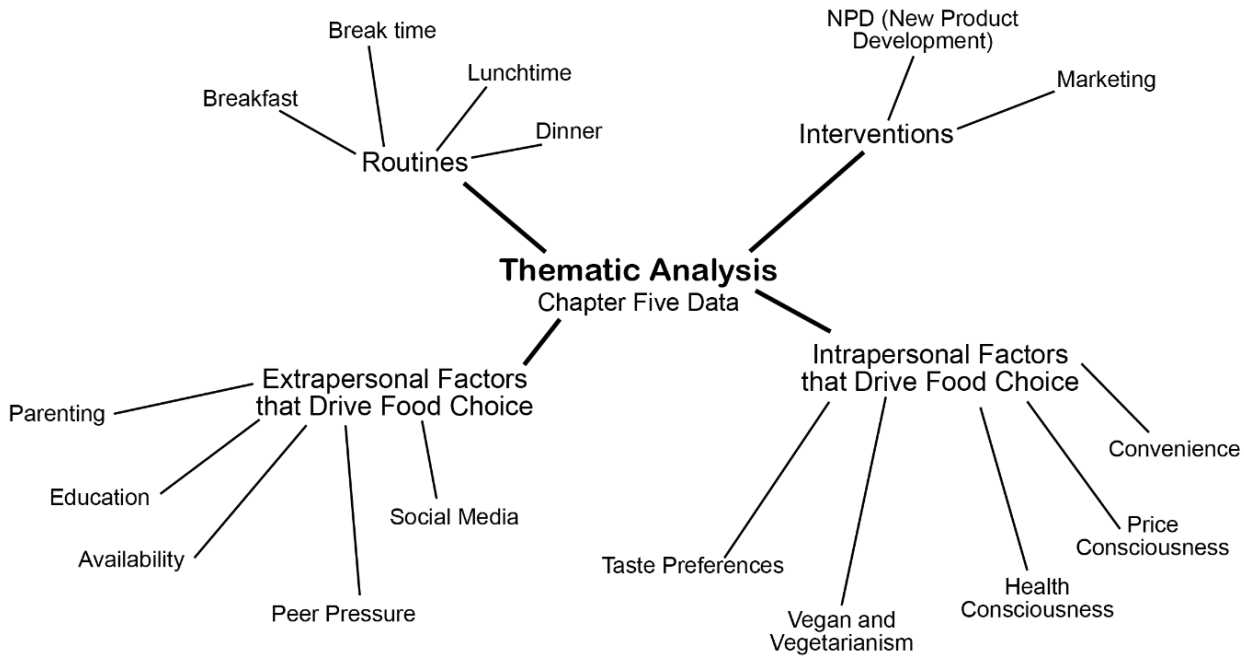


Figure 5.3.: Figure created using Adobe Illustrator, showing the four themes and sub-themes

5.2. Routines

Break time and lunchtime routines were observed in addition to asking adolescents about their daily eating routines during the focus groups.

5.2.1. Breakfast

Most pupils articulated that they ate breakfast, and those that skipped this meal acknowledged that doing so was unhealthful. Breakfast foods included cereal, *Weetabix*, bagels, toast, porridge, yogurt, smoothies and fruit. Skipping breakfast was primarily due to feeling rushed in the morning and lacking an appetite as soon as they woke up:

> ‘I will have a bowl of cereal, something quick to eat, but I don’t hang around having breakfast.’
>
> ‘I don’t have time for breakfast; sometimes I will have a yogurt.’
>
> ‘Because I am on the bus, if I have got enough time or am in the mood then I will have porridge. But, in other means I will just have a slice of toast, or a crumpet, or a bagel or something.’
>
> ‘I used to find that I would get up so early and so I am not hungry at like six or seven in the morning and I get to school and I am hungry and I

> would buy something in school. So I started forcing myself to eat breakfast so that I didn't have to buy stuff in the morning.'

Several participants revealed that they skipped breakfast. This was more than expected, as a previous research study involving individuals aged 8- to 15-years-old found that 89.6% consumed breakfast (Burrows *et al.*, 2017).

5.2.2. Break time

Photographs of the school canteen offering were taken prior to the observational periods (see Appendixes D.1., D.2. and D.3.). Some participants did not eat at break time, stating 'I have a huge breakfast, so I don't usually get that hungry.' Others claimed to seek 'filling foods' at break time, particularly those that had not eaten a substantial breakfast. Adolescents perceived school canteens to offer a 'lot of choice,' yet the majority of pupils at Schools A and C were seen purchasing three or four slices of toast. Two catering staff members at School C made toast continuously for the duration of break time. The fondness for toast was eminent, 'it's not very healthy, but it is good.' One male participant said that his friend would share his toast:

> 'My friend usually gets like five… most of the time he eats three of them, and then he is like, "free toasts!" and just puts them in the middle.'

Other common break time foods were starchy carbohydrate-based products such as teacakes, croissants, crumpets, sausage baps, bacon rolls and occasionally, waffles. In contrast to the popularity of toast and waffles, fruit was rarely purchased. Whole apples and slices of melon were the most commonly seen eaten fruit, negating the more costly fruit pots; one Year 8 male adolescent remarked that 'nobody buys them.' Other snack products observed included cereal bars, sandwiches, pasta pots, brioche buns, cake bars, *Digestive* biscuits, homemade cookies, yogurt and fruit from home; however, crisps were seen most frequently. This suggests similar perceptions of adolescents to those studied by McKeown and Nelson (2018). They found that dietary choice was largely affected by the desire for individuals to eat foods that were high in fat and carbohydrates yet have a low fruit and vegetable consumption (McKeown and Nelson, 2018).

5.2.3. Lunchtime

Observations showed that the majority purchased a school dinner rather than bringing a packed lunch. Many focus group participants alternated between a school dinner and packed lunch (Table 5.2.):

	School Dinners	Alternating	Packed Lunches
1 Focus Group School A	6	2	0
2 Focus Group School A	6	1	0
1 Focus Group School B	4	2	1
2 Focus Group School B	3	2	3
1 Focus Group School C	10	1	1

Table 5.2.: Number of pupils that had a school dinner, packed lunch or both

In sum, 31% consumed a packed lunch as some participants alternated between packed lunches and school dinners (n=8) and some solely had packed lunches (n=5). During the lunchtime observations, the researcher documented that some pupils brought snacks in from home rather than a full packed lunch:

- Buying pasta Bolognese with cheese and eating a packet of crisps from home.
- Buying a *SUSO* can [carbonated fruit juice drink] and eating their packed lunch from home.
- Buying a prepacked sandwich in the canteen and bringing an *Innocent* smoothie from home.
- Buying tomato pasta salad and eating a packet of crisps from home.

School dinner eaters listed what they regularly ate: pasta salads, sandwiches, pizza, pasta with Bolognese, paninis and baguettes. Pupils alluded that they ate the same familiar foods daily rather than trying new dishes. Numerous pupils at School B were observed purchasing plain white pasta with a handful of cheese in a takeaway pot. In particular, sandwiches, baguettes and paninis were favoured:

> ‘When we are in, if we are in like first or second and then I don’t like the meal then I tend to have that one day where I go and get a baguette because I like the baguettes here and they are nicer than most of the fast food or the jacket potatoes or something.’

Participants spoke little of the hot main meals on offer, but the consensus was that pupils did not opt for these:

> ‘I think and there are some meals that everyone goes for the main meal and then there are some meals that not many people like… And then they go for the fast food which is there.’

Adolescents showed an awareness that vegetables were included in the main meals, yet other participants were surprised when one pupil from School A announced that, 'Recently they started putting salad like with the lasagne.' School canteen observations displayed that pupils declined vegetables more often than not. Moreover, most were reluctant to purchase extra fruit and vegetables:

> 'But then if you have a baguette, then you are not going to buy a salad. Like a salad is a ... meal within itself, you don't really have it as a side. You don't go up, you have to have a salad pot to have the salad ... So it's more like you will just have a baguette.'

Throughout the observational periods, the following main meals were available: chicken curry with white rice and chips; fish and chips; sausages, potatoes and gravy; and, fish fingers, chips and peas. *The School Food Plan* states that the average school meal is healthful and meets the required nutritional standards, however 'many children still pick the less healthy dishes' or will opt for school food on the less healthful days. For instance, uptake is often higher on a Friday which is a 'fish and chips day' (Dimbleby and Vincent, 2013: p. 89). In light of this, entire tables of adolescents simply eating a plate of chips and tomato ketchup were observed during 'Fish and chips' Friday at School C. Participants were asked about the healthful options available:

> 'There's savoury, but I am not sure about healthy.'
>
> 'I don't think I have seen any anywhere.'
>
> 'I don't think many people actually get healthy things.'

Nonetheless, some adolescents mentioned their healthful purchases, such as, 'I usually buy an apple with my lunch.' Likewise, another adolescent said that she had a friend who purchased from the salad bar sometimes. Despite the availability of healthful options, countless observed adolescents opted for a relatively unbalanced lunch, walking straight past the savoury options to purchase brownies, cookies and cakes for their lunch:

- ¼ slice of pizza, a doughnut and a fizzy drink.
- Plate of chips and a Bakewell tart.
- Plain rice (no curry), naan bread and a waffle.
- Chips, orange jelly, chocolate doughnut and a drink.
- Hot dog and a doughnut.
- Two doughnuts.

Interestingly, a study with pupils in their first year of secondary school demonstrated that foods eaten at school were often in stark contrast to foods eaten at home. A third of UK origin respondents in the study said that their favourite meal was a roast dinner, quite the opposite to the commonly eaten food-to-go in the school canteen (Brannen and Storey, 1998).

Seeing whole tables of packed lunch eaters was common, but many pupils ate amongst peers eating foods from the school canteen. 16 focus groups with Welsh children aged 7- to 11-years-old found that the older ones in particular preferred packed lunches (Warren *et al.*, 2008). Preference for bringing a packed lunch from home included: the opportunity for parental control, more choice and variety, convenience, increased healthfulness and packing an additional snack:

> ‘Also, packed lunches are a bit like, your parents get to supervise what you eat instead of, I mean like, they get to supervise what you eat, but I don’t think they really have the time to check on the school website and like check everything that you are eating. It is better for them to just give you a meal to go in.’
>
> ‘I always have a packed lunch because my Mum does make me one in the morning.’
>
> ‘I am not a fan of hot foods.’
>
> ‘’Cause, like first of all you choose what you are having. Like, you exactly know what every day is going to be.’
>
> ‘School dinners are like the same every day. And it is nice to have a change some days.’
>
> ‘The thing is, it’s so much easier because you have to like queue up for quite a long time, and then buy it, and then sit down, and then you only have a few minutes to eat it. So then, some people just bring a packed lunch instead.’
>
> ‘Well I guess we don’t always know what goes into the school dinners, like we know what they are but we don’t what went into it, so… and then like, with a packed lunch, you can have more like fruit. And what you buy.’
>
> ‘I’m not allowed to buy anything [in the school canteen] … Because most of it is unhealthy.’
>
> ‘And I like to have a snack. Like at break. If you buy a lunch then you just have it at lunchtime.’

Although focus group participants commended the healthfulness of packed lunches, lunchtime observations periods exposed an abundance of lunches full of HFSS products and lacking in fruits and vegetables:

- *Mr Kipling* packet of two cakes, *Coco Pops* cereal bar and a *Blue Riband* bar.
- White tortilla wrap in cling film, drinking yogurt and small *Yorkie* chocolate bar.
- A white bread sandwich wrapped in tinfoil, *Dairylea* dunkers and *Walkers* salt and vinegar crisps.

These observations were as expected, as Neilson *et al.*'s (2016) research suggested that pupils with a packed lunch are much more likely to consume non-regulatory food and drinks high in fat and sugar. Pupils were observed eating apples, satsumas, cucumber and fruit pots; but, extremely few were observed consuming vegetables. This was unsurprising in light of a packed lunch observation study of packed lunches of children aged 7- to 10-years-old. The observational study discovered that vegetables were the least common packed lunch item and were most likely to be left uneaten in comparison to snack items and sugar-sweetened drinks which were seldom left (Neilson *et al.*, 2016). Moreover, a large-scale study of 80 secondary schools in England revealed that consuming vegetables and salad was approximately twice as common amongst those eating school meals in contrast to those with a packed lunch (Steven*s et al.*, 2013).

Eight participants alternated between packed lunches and school dinners depending on various factors: alternating living arrangements, money available on their school canteen accounts, the availability of suitable foods at home and depended on the day and the menu offering:

> 'I have both. So, when I don't like the meal, I have the packed lunch because it saves me buying other things that I don't really like. And then if I like the meal, I have the meal.'
>
> 'I bring a packed lunch to school on er, a Monday and Friday and on a Tuesday, Wednesday and Thursday I buy something in school.'

Disagreeably, one of the Year 7 male school dinner eaters opposed packed lunches:

> 'I just like having the actual enjoyment of actually having actual food. Because if you have a packed lunch, it is a bit bitty. So, if you are having a school dinner it is a bit more like food rather than picnic-y stuff.'

5.2.4. Dinner

Family dinnertimes were discussed in two of the focus groups. Adolescents described how vegetables featured in their evening meals and a few cooked food for themselves or their families: 'lots of times I just have to cook my own meal for

myself and the family.' Meals cooked included: chicken, curry, wraps, fish, fajitas, 'Bolognese, lasagne, risotto and stir fry.'

5.3. Extrapersonal Factors that Drive Food Choice

The thematic analysis sub-themes of: education, parenting, availability, peer pressure and social media are presented in this section.

5.3.1. Education

School canteens often displayed the *Eatwell Guide.* At School C, there was a humorous sign saying: 'Yawning is a silent scream for a banana… stop screaming. Eat a banana.' Participants discussed what they had learnt at school concerning eating and healthy lifestyles, for instance learning about 'wellbeing,' balanced diets, the E*atwell Guide* and that 'Healthy body is healthy mind:'

> 'Um, that it is not good to eat unhealthy food and that you should like eat the perfect amounts of everything because too much of one thing is always bad.'

Pupils learnt how to incorporate healthful foods into their diet and occasionally cooked:

> 'We try and make healthy foods, but not always.'
>
> 'We try and learn about what healthy things like are and how you can incorporate them, but we don't always learn how to make them.'

In addition, some participants believed that more lessons were necessary, particularly one group who mentioned that their lessons occurred fortnightly:

> 'I reckon we should have more of them though, because not everybody knows about all the different food types.'

Contrariwise, not all were keen on the lessons:

> 'I think that at our age we know what is healthy. But it is our choice whether we listen to it. And we don't really need to listen to it.'

Although the adolescents in the focus groups appeared to give the impression of having a good understanding of what constituted a healthful diet and lifestyle, research shows that knowledge alone is insufficient for adolescents to alter their dietary behaviours accordingly (Vaitkeviciute, Ball and Harris, 2015).

5.3.2. Parenting

The consensus was that parents encouraged healthful eating; but parents did not, as one said, 'force them down my throat.' Adolescents perceived parental modelling as vital because if their parents 'eat it, then it is more likely for us to eat it.' Overall, adolescents viewed their home environment and mealtimes with parents as healthful, for instance, 'my Mum puts vegetables in every meal we have' and 'I don't have anything unhealthy at home.' One female participant disclosed that she was expected to eat whatever her mum and dad made, 'and if you don't like it but are that hungry, you will eat it.' Previous questionnaire research with adolescents in the UK has discovered that an authoritative parenting style (whereby parents are strict but involved) correlates to adolescents consuming fewer unhealthful snacks daily (Pearson *et al.*, 2010). Both overt and covert parental controlling behaviours were evident:

> 'I have to ask before taking anything else. But like fruit, I can just pick up and eat because I know my Mum will be fine with that.'
>
> 'If I went to get a chocolate bar from the fridge, my Mum is going to… tell us to put it back and take a piece of fruit instead.'
>
> 'We don't have anything unhealthy in the cupboards; it's kind of take whatever you fancy.'

Parents may overtly control snacking by restricting what and where the child is able to eat and encouraging the child to eat. They may covertly control intake by restricting the unhealthful foods kept at home and avoiding eating at restaurants selling unhealthful food. Overt control has been linked to parents of a higher social class norm whereas covert controlling behaviours may be used by thinner parents trying to manage their own food consumption (Ogden, Reynolds and Smith, 2006). Possibly the overt control of restricting unhealthful snacking in the current study is in line with the higher SES sample of participants. However, the covert nature of only making healthful foods available is difficult to analyse because the definition of 'unhealthy' is subjective.

Adolescents explained how their parents would encourage them to eat more healthfully by saying that it would make them feel 'happier,' avoid them becoming 'fat' and make them 'healthier' when older:

> ‘They might say, “try this ((participant’s name))” and I am like, “no, I don’t want it, I don’t think I will like it” and then I try it and then actually I did like [it].’

> ‘Yeah, yeah. That is the same with me. Like if there is something that doesn’t look very nice, me and my sister will go, “we don’t like that,” but we haven’t even tried it before. So we have a little bit of a nibble and then by the time, the only thing that has gone is the thing that we said that we didn’t like. So, yeah, it works.’

Others asserted that they were only allowed a dessert if they finished their main meal. Furthermore, several participants said that parents needed to encourage vegetable consumption from a young age:

> ‘The way my parents got me to eat broccoli is by saying that they are mini trees.’

> ‘Give vegetables to you when you are younger, so you learn to like them… You need to eat vegetables when you are younger so that you can learn to like them more.’

Correspondingly, the literature promotes positive early life food experiences as a determining role in subsequent healthful eating behaviours (Scaglioni *et al.*, 2018).

Responses to the closed question: ‘Does anyone’s parents check online what you are buying?’ were wholly varied, with approximately half saying ‘yes’ and half saying ‘no.’ Specifically, one male participant explained that his parents always checked, ‘just in case I buy unhealthy things one day.’ Most adolescents felt that their parents would be unsurprised and not overly concerned by what they purchased in the school canteen. One Year 8 male commented that he did not feel ‘self-conscious’ about his parents checking. A number of adolescents made health conscious choices as they highly regarded their parents’ opinions:

> ‘You don’t want them to get worried about what you are eating at school, or anywhere else.’

> ‘At home I tend to eat like stuff that has vegetables in it, so I don’t want to ruin that by eating something that has fat and stuff, and oil and you know.’

5.3.3. Availability

This sub-theme was summarised by one female participant, who declared:

> ‘But at school there is always a healthy option, it is never impossible to eat like healthy. There is always a healthy option, no matter what.’

Whole and cut fruit was available in all the school canteens daily, including oranges, red apples, green apples, satsumas and bananas. However, the adolescents said that they 'don't really see people buying fruit that often' and that the fruit 'is always quite tucked away' because the catering staff 'don't make it stand out.' They referred to the fruit lacking any presence in the corner of the school canteen in a 'little' basket:

> 'I don't think they advertise it that much. So it's like, hardly any people get it, because they don't know that it is there.'

Pupils' perceptions of the fruit available at school was largely negative: 'It's not very nice,' 'old and mouldy,' 'It's out' and that 'it looks beaten up:'

> 'It's like in a shop when everything is reduced because it is about to go off.'

In contrast, the adolescents spoke about how having fruit bowls at home encouraged them to eat fruit spontaneously without first seeking their parents' permission. A literature review of quantitative studies discovered that home availability and accessibility of fruit and vegetables was positively associated with increased intake (Rasmussen *et al.*, 2006). Participants from School C described their 'free fruit Fridays' through which pupils 'get to take as much as you want' because 'they are trying to get rid of all the fruit for the next week.' The participants regarded the availability of free fruit as positive, claiming that it increased their fruit intake on Fridays (see Figure 4.3).

Besides fruit availability, participants identified the availability of appealing unhealthful foods such as chocolate brownies and cookies as detrimentally impacting their ability to make healthful choices:

> '… because there is loads of cheap fruit, but they are still offering like cookies, brownies and, I mean, they cut down in the vending machine and people buy like rice cakes and stuff now instead of other stuff.'

> 'I think they should not supply cookies because it just makes people more tempted to buy them.'

Regarding lunchtime food availability, the adolescents pointed out that sometimes the meals they wanted to purchase at lunchtime were no longer available:

> 'The other day there were no hot dogs left, so I bought a slice of pizza and then as soon as I sat down, they opened a tray and then there were another like fifty hot dogs and then everyone was getting them… It was so annoying.'

Nevertheless, some praised the canteen staff for ensuring that foods did not run out at lunchtime:

> ‘I think it is really, good though, with what they do because they like never run out of food. They are always working hard, like bring out the food.’

5.3.4. Peer Pressure

The researcher observed adolescents walking over to the canteen, queueing in friendship groups and sitting amongst their peers to eat. What is more, the researcher overheard a female adolescent in the lunch queue asking her friend, ‘What should we have?’ conceivably indicating a shared decision. A few pupils were observed sharing foods: grapes, a big packet of biscuits, *Haribo* sweets, *Pringles* crisps, homemade chocolate chip cookies and two males were leaning over the table to ask their friend for more carrot sticks. However, by solely carrying out the canteen observations, the influence of peer pressure on food consumption remained ambiguous, so the focus groups allowed greater exploration.

Particularly when asking participants about their peer group interactions, the researcher spoke colloquially; for instance, ‘But if all your friends were eating pizza, would you feel a bit uncomfortable going to get something healthy like a salad pot?’ This question resulted in all the participants chorusing together ‘No.’ This was in conflict to most literature which indicates that peers negatively influence food consumption. McKeown and Nelson’s study found that only 4% (n=2) of participants opted for a healthful meal on a menu when with their friends (McKeown and Nelson, 2018; McHugh *et al.*, 2019). Perhaps the focus group method was problematic in that individuals appeared evasive and unwilling to reveal any weaknesses, potentially being reluctant to indicate that their peers influenced themselves. Successive questioning exposed that a few adolescents would feel embarrassed about not fitting in with their peer group and that they ‘wouldn’t eat the veg!’ Equally, the following comments by one male adolescent could indicate a desire or pressure to fit in amongst their peers:

> ‘To be honest I would probably join them with a slice of pizza… The reason why I would probably have a slice of pizza is because if you can’t beat them, join them.’
>
> ‘If all of my friends were buying pizzas and I was buying something healthy, um, they would be a bit like, “Um, why have you bought something healthy?” So, usually, if loads of my friends are buying pizzas,

> if you can't beat them, join them sort of thing. But usually I try to eat healthily.'

The consensus was that adolescents felt they would not be made 'fun of,' and particularly the male participants supposed that their peers would not notice, let alone comment, on their food choices unless, 'you eat nothing or loads,' such as 'five paninis at break:'

> 'Like, personally, I don't think anybody really cares about what others are eating, but some people might.'
>
> 'You don't really talk about what you are eating at break…'
>
> 'Nobody really goes, "Oh, you are eating that, you are fat now."'
>
> 'Yeah, no one would mention anything. If everyone on my table got the same thing, and I got an… apple, they wouldn't mention it at all. And they wouldn't say anything.'

Conversely, some suggested that their friends might comment if their food was 'a bit out of the ordinary:'

> 'They might be like, "oh, why have you got something healthy?" and I would be like, "I just want to be healthy."'
>
> 'They might say, "oh, why did you get this?" And then you would probably have to explain why.'

However, the overall lack of peer commentary and concern over what others were purchasing could be problematic:

> 'And that's bad, because if everyone is getting the unhealthy stuff, say if everyone has something healthy and the one person has something unhealthy, like a pizza or something like that, then they wouldn't point it out. So it is unnoticeable. So they think that they can get away with it.'

Intriguingly, one male participant tries to influence his peers positively:

> 'I like try to influence them, like if they are all like buying really bad drinks... like *SUSOs* and pizza.'

During the lunchtime observational periods, many peer groups were eating a variety of foods rather than copying one another. The focus group discussions reinforced this individuality:

> 'No, because it is your own decision, you can make, what, it is your decision to choose what you want to eat, not everyone else's.'
>
> 'Not if I don't like it. Only if it was what I wanted to eat. I'd eat what I wanted to eat and [if] they were all having it, then I would have it.'

Besides this, the researcher observed a female adolescent selecting a croissant and then giving it to her friend to buy. The adolescents continued to purchase food and drink for their friends against their parents' advice. Ease of fooling catering staff working on the till stemmed from them neglecting to 'really pay attention to the picture that comes up' or 'pops up on their computer,' possibly 'because there is so many people queuing.' In the focus groups, adolescents said that they 'have to buy [their friend(s)] something small' if they 'don't have any money,' or had forgotten their fob, but expected to be paid back later.

Lastly, peer influence connected to the intrapersonal theme of 'convenience.' Adolescents were keen to spend time with their peers, so were influenced by their peers' choices. In particular, School B had a different queue for the hot main meals, meaning that 'if all their friends were queuing up for pizza,' adolescents opting for a main meal would end up queuing 'on your own.' Furthermore, participants chose pizza to avoid being left in the canteen if they took longer to eat a hot main meal:

> 'And they can just leave and you are there… Well I want to go too, but I don't want to waste it. If people leave me, I am a bit like, "I'm still hungry" and but, like… No, but I am still hungry but they have already left and I am like, "should I go? But I have still got all these beans left."'
>
> 'But I… if somebody else is having it, I might as well have it as well. It will, because if it is like one of your friends and you have got a big meal that is healthy and they have got like a small meal that isn't very healthy, then they will probably get out first…'
>
> 'The thing is they buy the fast foods… If you are like coming in, you are going on this part of the queue, and then you go and get something from here, like a salad, they will be out before you because they can just quickly eat it and go. So it is not the fact that you don't want to fit in, it is more that you want to go out with them and not be left in the canteen... then you spend ages eating that.'

Some declared that they had 'nice friends' that waited for them to finish. One female participant offered advice to those worried about being left alone to finish eating, suggesting that they 'Try to guilt-trip them into staying.' Towards the end of the focus groups, participants were asked if they had any advice for people their own age:

> 'Don't be affected by anyone else.'
>
> 'If you see like all your friends eating pizzas and that, it doesn't mean that you have to eat that.'
>
> 'Eat what you know you like.'

> ‘Don’t follow the crowd… That is just like another level of weird… If somebody does that you should say, “Why are you following the bandwagon?” And eating something that you don’t want to eat for no reason, it is not going to gain you any [respect].’

5.3.5. Social Media

The perceived impact of social media was disputed. Many participants felt that it did not have much, if any, influence or effect on themselves. For example, ‘That wouldn’t affect my food’ and ‘I don’t listen to any of that.’ Conversely, a few thought that their parents were overly concerned about the influence of social media despite it not making ‘a big impact on us.’ Feelings of disgust and ‘reverse psychology’ when watching television shows featuring morbidly obese adults, such as ‘*My 600 lb Life*’ were described as influencing themselves to eat more healthfully. However, several understood that they were influenced by social media, ‘…if I can afford it, I will just buy it’ and ‘if I see something I like, I will probably buy it.’ Social media ‘can definitely have a positive influence’ when healthful foods are displayed on social media platforms such as *Instagram*:

> ‘Right, say for example they took a picture of a salad and they were like eating healthy, then you would probably be like, “oh, I want to do that.”’
>
> ‘Yeah, you see all these people on *Instagram* and *Snapchat* and stuff, uploading smoothie bowls and things to their story. And you are just like, “oh, I really want one of them.” So it can kind of like tempt you… Into making them yourself, which can make you healthier.’
>
> ‘The adverts are always for healthy foods. People are always posting like their meals…’

In contrast, the negative influence of fast food advertising such as *McDonald’s* was commented upon, as it made individuals feel more inclined to eat unhealthful foods:

> ‘If you see an advert for a packet of sweets, then you are going to gravitate to that, and then chips.’
>
> ‘Because on *Instagram*, loads of people take pictures of their food. And if I am just browsing, it would just come onto this gorgeous piece of food. Although it is unhealthy, my mouth is watering like “ahhh.” Like I wish that I could literally just scoop it out and eat whatever was on there.’

There is a risk that seeing unhealthful foods repeatedly can be detrimental to healthful eating behaviours. Previous research reviewing 14-year-old adolescents’ *Instagram* accounts found that 85% shared food images and 67.7% shared images depicting foods that were energy dense but low in nutrients (Holmberg *et al.*, 2016).

Nevertheless, adolescents appeared informed with regard to the adverse effects of social media use as, 'You can see a positive side, but then you can see a very bad, negative' side to social media too and that they needed to be 'careful:'

> 'I try and stay off social media, to, er, to stop influencing me doing something that I might not actually want to do.'
>
> 'Maybe social media can cause people NOT to eat enough, because it's showing people like the perfect bodies.'
>
> 'In the winter it is alright to be like… it is alright to eat in the winter, like Christmas dinner and stuff… And then you will get fat. But then in the summer you need to get that summer bod.'

Additionally, scepticism of marketing strategies were apparent:

> 'You get some things like this person's story about how they started eating this salad and this is how they look like now after a week.'

Lastly, one Year 7 male adolescent was keen to mention how a book had positively influenced himself:

> 'This isn't social media, but it is an influence and it was a good influence. But I read a book recently and in it, there was a boy and he was really, really fat and he got bullied for it. And… years later, as a sort of reunion thing I think, he is thin and he tells his story about how he became thin… Because he was like bullied by his coach in sports.'

5.4. Intrapersonal Factors that Drive Food Choice

This third theme presents findings related to the following five sub-themes: convenience, price consciousness, health consciousness, vegan and vegetarianism and taste preferences.

5.4.1. Convenience

Adolescents were observed running towards the school canteen and speed walking once inside, particularly the Year 7 pupils. School B provided only chairs and no tables for pupils at break time. Across all three schools there was lots of movement because pupils rarely sat down, and the male adolescents moved a lot. Adolescents were observed walking around the canteen whilst chewing their food: Waffles, crisps, shortbread, cake, toast, pasta, apples, sandwiches, chocolate milk, hot dogs, cookies, bananas, crisps and muffins. Many pupils left the canteen with food-to-go,

including chips on a polystyrene tray, brownies, pasta pots, muffins and cookies. The apparent rush was reiterated during the focus groups:

> ‘You have got to be quick from your last lesson.’
>
> ‘Whoever is closest, because like a lot of people run down from, like if they are closest to the canteen, and get in the queue first and then they are fine.’
>
> ‘[Others] literally run to get their food and so then they have a longer time to eat and then go outside for a bit longer and talk to friends.’

One female participant complained that ‘usually people tend to push in with their friends.’ This was in spite of the lunchtime observations revealing staff shouting, ‘Guys, behave in the queue or get out!’ as pupils jostled amongst themselves. Catering staff told adolescents off for lingering in the area between selecting their food and the payment tills, ‘Guys, congestion charge!’ because the staff were keen to keep the queues moving. At break time, several adolescents began eating their food whilst waiting to pay. School A was the only school with a vending machine and this regularly attracted crowds of approximately twenty adolescents. Participants confessed that long queues might discourage them from purchasing food:

> ‘It depends how many people.’
>
> ‘On Tuesday they have like special chicken in wraps. So … the lines are huge and you can’t get in.’
>
> ‘You spend your whole lunchtime queuing, so like, it’s pointless.’
>
> ‘If the queues are really long, then I will just give up.’
>
> ‘Because by the time you get there, the food will all be gone.’
>
> ‘If I fancy something to eat, and the queue is really long then I won’t go. But if I was really hungry, and that would affect my learning so then I have to eat something.’

The importance of convenience and reluctance for queueing in the school canteen has been found in other focus group studies involving adolescent participants (Neumark-Sztainer *et al.*, 1999; McKinley *et al.*, 2005). To avoid long queues, some went to the library or stayed outside before queuing:

> ‘Yeah, and also because if we are last in, I would usually spend most of my time on the field before queuing up… Because it dies down and then it stops all the queueing, like boredom of queuing, instead of just standing there.’
>
> ‘I sort of do that, but instead of queuing, I go to the library.’

All the same, adolescents accepted that arriving later meant that desirable options might have run out:

> ‘Or sometimes you wait until there is no one in the queue, but then there is nothing there.’
>
> ‘Sometimes when you get in late you don’t really get the stuff you want because all the stuff has been taken by Year 7s who eat absolutely everything… No, but the current Year 7s they always have chicken burger and they always have all the good meals.’

The researcher observed staff pressurising adolescents to ‘hurry up’ and finish quickly:

> ‘You need to be super quick, the bell has just gone.’
>
> ‘You have got three minutes left. And to tidy away.’
>
> ‘Come on guys, hurry up. You haven’t got long.’
>
> ‘Right guys, the bell is going in about three minutes. A little less chat and a little more eating.’

One school lunchtime was only 25 minutes long and all the schools had brief lunchtime breaks, to the dismay of some adolescents:

> ‘You literally have a few minutes to eat it.’
>
> ‘We only have, like, get food, eat it, and go away.’
>
> ‘You have to go outside. Yeah, because if you have loads leftover, and they like ring the bell then you have to like throw it all away.’
>
> ‘Yeah, the lunchtimes are too short… They should be like one hour twenty minutes… I would rather school be like fifteen minutes longer to have a longer lunch.’
>
> ‘Well, yeah, we wish it was longer because then we could have more time to eat it.’

Shortened lunchtimes are becoming increasingly common at schools as they lessen the opportunity for poor behaviour. The average length of a KS3 lunch break is 44 minutes currently (Baines and Blatchford, 2019). Ordinarily, weather influenced uptake of convenient foods, because ‘once you finish they push you to go outside’ and ‘stay outside.’ Some were keen to stay inside whatever the weather and one Year 8 female participant disclosed that, ‘We sit in the corner furthest away from the teachers so that we don’t get pushed outside.’ Yet, the majority said that warmer weather encouraged them to eat foods that were quick and easy with the intention of spending more time outside:

> ‘I think the weather influences what it is, because if it is really, really hot you are not going to want a hot meal.’
>
> ‘If it is raining, then you would rather have a warm meal, then have less time outside. But when it is nice and warm like this, you would rather be in and have like a quick meal like a panini or a pizza and quick go out. And then you have only wasted… like fifteen minutes of time.’
>
> ‘In the winter I will definitely have the hot meals because it’s just good to have some hot food. But in summer it can get so boiling that it is just unthinkable to eat hot food, you have just got to have something cool.’

At School A, Physical Exercise (PE) lessons meant that Year 7 pupils had a shorter lunchtime on Thursdays. Besides this, other extra-curricular activities influenced the adolescents’ decision to purchase a more convenient option:

> ‘In Year 7 you can’t have a full grown meal.’
>
> ‘If you do choose to have meal then you have to like rush it down and then… you get indigestion and things.’
>
> ‘Yeah, because I sometimes have coding club and so I wouldn’t really, er, like sometimes, once in a while I might take a slice of pizza but usually I just go to the cold section and get a baguette… It is like quicker.’
>
> ‘I like to try to, if I know I am in third, like, um, I like having a bit of time to spend on the field and that. I will buy a sandwich at lunch, no break, and I would eat it up by there.’

The researcher asked, ‘So are the convenient options healthy?’ and many initially responded with the answer ‘No.’ After this, some were keen to list which options would be considered healthful and convenient. These were predominantly cold foods, such as sandwiches, the salad bar and baguettes. Most considered the hot food-to-go options unhealthful, bar the jacket potatoes:

> ‘But usually the fast food in there, most of it is quite like unhealthy. It is all like fat in there and that.’

Surprisingly, apples were viewed as too inconvenient because:

> ‘You just don’t have the time to pick up and eat it!’

As aforementioned, many pupils shunned the hot main meals and opted for other convenient options such as slices of pizza (see Section 5.2.3.). Whether convenient food-to-go options such as burgers were chosen over a hot main meal because ‘they are quicker’ or due to taste preferences was unclear:

> ‘It causes controversy a bit like, because it is a bit like 50:50 ... Because some people are like, “Ah, I choose this because it tastes sweet and I want to be quick.”’

> Participant 1: ‘I see people come in here at lunch and they have got like two doughnuts, a cookie and a drink. And basically that is their lunch.’
>
> Researcher: ‘Do you think that they are buying that because it is quick, or do you think that is because it is tasty?’
>
> Participant 1: ‘I think it is because it is quick.’
>
> Participant 2: ‘I think it is both.’
>
> Participant 3: ‘Because they want to be able to go, like out, but they also want to be able to have a nice lunch as well.’

However, one adolescent said that ‘they should up the prices of them [unhealthful foods]’ as this may dissuade price conscious pupils from the unhealthful convenient options. The results related to the ‘price consciousness’ sub-theme are presented next.

5.4.2. Price Consciousness

Comprehending this particular sub-theme was impossible from the school canteen observations, but the divisiveness of the Phase One focus group participants indicated that further exploration of price consciousness was necessary. Several adolescents referred to food in the school canteen as ‘expensive,’ stating that their money ‘goes quite fast,’ which makes them ‘worried.’ One Year 7 female participant explained that the electronic biometric payment system ‘just looks like a number, so it doesn’t feel real’ compared to paying with cash. Some claimed that foods could be purchased more cheaply elsewhere:

> ‘Like sometimes, compared to some friends outside of school they say, like, what theirs is and I’m like, “Ooh, mine is £1.00 more for the same thing.”’
>
> ‘You can buy it cheaper outside, like in the supermarket, or *Co-op*.’
>
> ‘Some things are really expensive at this school, so you just avoid buying them altogether but then you have got cheaper convenient stuff...’

To avoid the costly lunchtime items, it transpired that some purchased more at break time. In particular, the cheapness of toast meant that pupils could ‘get slices and slices:’

> ‘Some people buy more at break time… And then get a smaller lunch, because it all adds up.’
>
> ‘Or if you are not buying something main at lunch and you are just buying a waffle…’

Several participants revealed that they were price conscious because they feared upsetting their parents, and budgeted their limited allowance accordingly because, 'You don't want to waste it.' Making a packed lunch for themselves when they were running low on money was a commonly cited solution:

> 'Your parents get mad at you if you spend too much money.'
>
> 'I am quite conscious that it is not my money that I am spending… and I kind of don't want to spend loads because it is not mine.'
>
> 'You want to save it, because you get like £10.00, like a week, say if you have got that money for a week then you don't want to spend it then, I guess.'
>
> 'Yeah. I starting off having like, er, a pudding every day and then I realised that like, my money levels were just going down and down…'
>
> 'My Mum gives me so much and then if I spend it then that is my fault. And then she doesn't top it up until every two weeks.'
>
> 'If I am getting too low and I was only topped up last week, then I am panicking like ((gasp)), "Mum's going to realise that I have spent too much!" So I usually just like, make myself like a packed lunch or something, but usually I have a school dinner.'

When the researcher asked: 'What do you think would make it easier for young people to eat more vegetables and healthy foods?' The participants expressed that fruit should be cheaper:

> 'And make it cheaper. Like don't do it really expensive because nobody would buy a piece of fruit if… If it is the same price as a brownie.'
>
> 'If they were cheaper and the stupid stuff was more expensive.'

There is little published data on price consciousness amongst adolescents (see Section 4.5.5.).

5.4.3. Health Consciousness

When asked if they ate healthfully, answers were diverse but mostly positive. One male participant responded by saying 'It's debatable' and another declared, 'I think I eat healthy, like 60:40,' referring to eating healthfully sixty percent of the time and eating unhealthful foods the other forty percent of the time. A couple recognised room for improvement in their dietary behaviour:

> 'Yeah, like I do need to change. Like, a lot. But I do eat a lot of vegetables anyway. Like I do just eat a carrot out of the fridge ... like a whole carrot,

> I can just gnaw on that, yeah, but I do need to change my eating habits, yeah. ((Laughter)).'

Adolescents were aware of what constituted a healthful diet and lifestyle and that it could make your body 'healthier.' For instance, 'Nutrition,' 'A balanced diet.' 'Less fat and bad sugars and more good sugars in like fruit and vegetables,' 'Energy,' 'Doing physical activity,' 'Dairy,' 'Iron,' 'Not having fizzy drinks every day,' 'Focus on protein and carbohydrates,' 'Fibre' and 'Don't buy a *Yazoo* or a *Radnor Fizz* every single day.' Adolescents asserted that eating healthfully was conducive to avoiding obesity and Type II Diabetes, that a healthy lifestyle 'affects your wellbeing,' potentially makes individuals 'happy' and improves mental health. Likewise, McHugh's study suggested that adolescents believed that a healthful diet had the potential to contribute positively to both physical and mental health (McHugh *et al.*, 2019).

Many stated that they 'sometimes' ate their *5-A-Day* and several implied that they ate three or four portions regularly but preferred fruit over vegetables. All were aware of the governmental *5-A-Day* campaign, however only a few proclaimed that they consumed five or more portions of fruit and vegetables daily. This was as expected, as research conducted by the NHS in 2017 found that *5-A-Day* consumption in the UK was well below the recommendations, with only 18% of individuals aged 5- to 15-years-old consuming their *5-A-Day* (National Health Service, 2017a).

Remarkably, many adolescents held negative opinions towards fast food and had a derogatory attitude towards those who consumed takeaways such as *McDonald's* on a regular basis:

> 'The only time my Mum has ever got me a *McDonald's* was when I came out of surgery. She refuses to. Ever. Same with my Dad.'
>
> 'I have had a *McDonald's* like three times in my whole life.'
>
> '[we would] … get like Indian takeaway or something. We wouldn't ever get fast food, it's just not something we would think about doing.'
>
> '… We might order a Chinese, just as a special treat. But we rarely, rarely have it.'

Scepticism of health claims were distinctly displayed by several participants, namely stating that *Innocent* smoothies 'are not too innocent' as they contained 'loads of sugars.' In one of the focus groups, a female Year 7 participant disclosed that she once bought 'five *Juice Bursts* in a day' and this confession was met by negative

comments from the others. They claimed the drinks were ‘Full of acidic sugars,’ ‘They have got the bad sugars,’ ‘They have 2.8 cubes of sugar per one’ and that that ‘they don’t properly fulfil the *5-A-Day*, like it says on the wrapper.’ However, the participants agreed that companies had to appeal to consumers because otherwise *Coca-Cola* would be ‘green’ and that artificial sugars were often required:

> ‘But if it is no sugars and just natural sugars and fruits, then yeah, that would probably be one of your *5-A-Day*. But… most people wouldn’t like it, would they?’

Moreover, adolescents in the current study highlighted weight loss, keeping fit and guilt, with one explicitly stating that they ‘feel bad as I eat it’ as reasons why they ate healthfully. An unanticipated finding was that several adolescents restricted what they consumed. Both male and female participants mentioned restraint and guilt over what they ate:

> ‘I have never had one of the school puddings.’
>
> ‘Because I tell my parents like what I have and then, um, I stick to three puddings a week. So like, Monday, Wednesday and Friday. So like, I keep healthy the other two days. So my Mum, um, kind of knows what I am having.’
>
> ‘I changed my eating habits, so I am more healthy now.’
>
> ‘… If I have like a doughnut, then I have to have like a salad as well.’
>
> ‘I try to limit myself. Because I used to have a pudding every day. But then I sort of realised that it was a lot of sugar.’
>
> ‘Because I have only had pizza once in the whole year, so then it is not my first option. Um, but if I had it, like a couple more times then I might want it more and more and I haven’t had a panini this year, so that has kind of stopped me from actually kind of wanting one.’
>
> ‘So if I like go and get a panini, I am like, “do I really need this?” and put it down probably.’
>
> ‘Maybe make a meal plan or restrict yourself, like try and convince myself that it is not actually that bad. That there are things that are worse than it, but in reality I feel really bad after I have eaten it and then I wish that I hadn’t.’
>
> ‘I only drink water and milk.’
>
> ‘I only drink water. Lemonade if it is a special occasion.’

Participants indicated a high level of self-control and the belief that healthful eating was for the long-term This was unexpected because a study in Ireland involving 12 adolescent focus groups suggested that adolescents viewed eating healthfully as

an unpleasant short-term activity done to avoid obesity or increase attractiveness (Steven*son et al.*, 2007). Participants in the current study were seemingly convinced that lifestyle choices were linked to obesity. On the contrary, another focus group study found that children and adolescents may not cognitively link their lifestyle choices with their personal development of obesity, relying more on 'external causes, such as slow metabolism or genetics' (Sylvetsky *et al.*, 2013: p. 5).

5.4.4. Vegan and Vegetarianism

Discussion occasionally digressed onto veganism and vegetarianism. One female participant said that her parents would not allow her to become vegetarian at present, because 'you need a lot of protein while you are still growing,' but that she may become a vegetarian later in her life. The motivation to choose vegetarian or vegan diets may be influenced by various factors. A questionnaire study with 397 14- to 17-year-olds found that the younger adolescents were more motivated by religion, animal rights and health whereas older adolescents were motivated by food environmental issues (Share and Stewart-Knox, 2012).

In the current study, participants congruently claimed that veganism was 'hard' and many suggested that 'I could never be vegan' as they 'wouldn't be able to cope' because 'you don't get the protein you need from meat.' However, Cheese, *Quorn* and vegan chicken were referred to as alternative protein sources. One male participant said that he liked the taste of bacon despite the fact he 'hated the thing of slaughterism' and another Year 8 male participant said that individuals needed protein 'because otherwise you are going to be skinny.'

5.4.5. Taste Preferences

Adolescent focus groups began by participants stating their favourite vegetable (see Appendix B.17. and Table 5.3.):

Favourite Vegetables	Number of Times Mentioned
Carrots	9
Cucumber	8
Broccoli	7
Corn on the Cob / Sweetcorn	4
Beetroot	2

Mushrooms	2
Sprouts	2
Spinach	2
Cauliflower	1
Peppers	1
Sweet Potato	1
Peas	1
Rocket	1
Swede	1

Table 5.3.: Favourite vegetables of participants taking part in the focus groups

Explanations as to why participants favoured these vegetables included the following: 'They taste nice and are also good for you at the same time,' 'They are tasty,' 'I like it because it has got a lot of flavour,' 'I don't know, I just find them really nice to eat. And they go well with a lot of things,' 'They can be refreshing,' 'Because you can cut them in so many different ways,' 'They are lush,' 'It's juicy,' 'I like vegetables that don't taste of anything' and 'Refreshing, watering and nice.' 'Well mushrooms go nicely with a lot of foods,' 'They are nice in a salad' (beetroot), 'I like the sweetness of it [swede], it is nice,' 'You can eat carrots raw or cooked. They can pretty much go with any meal,' 'I think spinach goes well in burgers,' 'Ah, it's [rocket] so good in a bagel. With cheese spread.' The ability to identify and articulate favourite vegetables may be advantageous. This is because previous research indicates that taste preferences and frequent consumption of certain foods during adolescence strongly influences individual's dietary behaviour as young adults (Larson *et al.*, 2012; Wadhera *et al.*, 2015).

Next, disliked vegetables are listed (Table 5.4.):

Disliked Vegetables	Number of Times Mentioned
Peas	6
Sprouts	4
Cauliflower	4
Tomatoes	2
Sweetcorn	2
Carrots	2
Beetroot	2
Broccoli	1
Parsnips	1
Cabbage	1

Asparagus	1
Onions	1
Courgette	1
Aubergine / Eggplant – 'the purple one'	1
Salad	1

Table 5.4.: Disliked vegetables of participants taking part in the focus groups

Reasoning behind disliking these vegetables included the following: 'I just don't like the texture of them,' 'I like most vegetables in gravy, but without gravy they are not as nice,' 'They are dry,' 'Some of them can have a bitter taste,' 'Some of them are harder to consume than others. So like, you have to force them down,' 'I don't like the texture and it's just plain' and 'Slimy.' 'I have a hatred of a passion of onions,' 'A sprout feels like you are eating the God of vegetables,' 'I find peas frustrating, because you can never get them on your fork… like they always just fall off,' 'I don't like the salady stuff because I don't like dressing on it, so to me salad is very plain,' 'Tomatoes give like, a really weird taste in the mouth. And like ulcers and stuff,' 'I don't like Brussel sprouts because my Nan choked on one last year ((Laughter))' and, 'Peas are too small.' These reasons were in concordance with a focus group study involving 106 11- to 12-year-old participants in the UK, whereby it was indicated that healthful foods are rarely positively associated with taste (McKinley *et al.*, 2005).

However, trying new foods and repeated taste testing were identified as fundamental to developing healthful taste preferences. One male participant referred to a time that he accidentally ate gherkins because 'I didn't realise that they were on my burger and I just ate them.' He now likes gherkins, stating that 'They taste like a sodium pickle, if that makes sense?' Coercion was disapproved of:

> 'I don't think we should be forced to eat them. Because from like a young age, we are always just like, you have got to eat your vegetables… So that is putting us in a mind-set that vegetables are bad, that they are bad for us…'

Vegetables would be suitable for snacking 'if they had more taste' and one said 'If I was really hungry, then maybe, but not by choice.' Another proclaimed that they would only eat vegetables as a snack if they were 'stranded on a desert island.' A female participant boldly declared that 'You can't really have vegetables as snacks.' A couple of participants mentioned that cucumber and carrot sticks could be eaten

as a snack. However, this was responded to by a Year 8 female participant exclaiming in laughter, 'Who has carrot sticks?' Humorously, a Year 7 male participant reminisced over eating a raw courgette out of boredom:

> 'But sometimes… I get so bored to the point of food, is my only means of actual fun. So I can just go into the fridge and eat whatever my hand can find, it can sometimes be something I don't like. But I am so bored that I might as well just try it. So it could be like a courgette and I'm like, "Uh, in the bin." But, it, it works. But sometimes it ends up me not feeling the best afterwards. Huh.'

The consensus was that fruit was preferential, particularly for snacking because 'Fruit is way more sweeter, so I think it's easier to eat.' Previous research has established that fruit is more likely to be chosen as a snack by female rather than male adolescents aged 11- to 16-years-old (Mielby, Edelenbos and Thybo, 2012). No such differences were noticed in the current study.

Participants admitted that unhealthful food tasted nicer and remarked that if an individual had 'the option to choose between a healthy meal or an unhealthy meal' then 'Most people would go for the unhealthy' meal. Even so, one Year 8 female participant commented that she 'would choose mango over a cupcake' because it 'tastes really good.' Overall, unhealthful options available in the school canteen may derail attempts to try to eat more healthfully:

> 'They look at the unhealthy meal and then they are like, "that looks nice, let me have that instead of what I was going to have which was healthy."'
>
> 'If I had to pick between like a chocolate or something like a vegetable then I would pick chocolate.'
>
> 'But most of the time, it is like, you look in the fridge and you see something nice, you will eat that instead of the fruit.'
>
> 'And once you have seen the pizza you are a bit like, "I don't really want something healthy anymore."'

Therefore, it seemed that the intrapersonal factor of taste preferences is connected to the extrapersonal factor of availability as well as convenience (see Section 5.4.1.). Although slices of pizza were one of the more popular options during the observational periods and by the data mining, the adolescents taking part in the focus groups were less eager (see Figure 4.7.). Negativity towards pizzas ensued, claiming they were 'greasy,' 'too much like bread,' often 'cold,' and that '… Sometimes you do get a bit of an odd one and it is a bit greasier than the rest. Umm,

but that is just life.' One Year 7 male adolescent explained that he had avoided pizza since he vomited following eating a slice.

5.5. Interventions

Lastly, the two sub-themes of NPD and marketing are presented.

5.5.1. New Product Development

The participants were keen to share their advice about how to increase vegetable consumption amongst individuals aged 11- to 13-years-old and discussions resulted in copious humour and amusement. Suggestions included making vegetables 'more appealing' and 'do[ing] something with the taste' as well as pairing alongside 'something more appetising:'

> 'Try and mix veggies into the things you know kids love because then you know that way it is kind of influencing to eat them.'
>
> 'Like there are certain foods in school which come with veg and they have the really good aspect in it. So you will get it and eat the veg, because you want the like, good part of it.'
>
> 'Because a lot of people like, you can try and like make healthier food like nicer as well because people know that like, their taste buds … they know that apples don't taste as nice as brownies. So they wouldn't bother getting it instead.'

The concept of liquidising vegetables and making 'smoothies and juices out of them' and 'if they mushed them into something like a smoothie' was referred to. Chopping up vegetables such as carrots 'really, really small and you wouldn't notice,' hiding vegetables in large pasta shapes and improving the smell of vegetables, so that they 'smell like a burger, or something like that' were suggested. NPD discussion occurred towards the end of focus groups and a couple of the ideas were influenced by it being Easter time:

- Covering vegetables in chocolate. 'Instead of saying like £2.99 for a cake, say £2.99 for a bag of vegetables. And maybe glaze it in, I don't know, chocolate or something.' Three appropriate vegetables were named: peas, broccoli and Brussel sprouts.
- 'They should make a ball out of like cucumber peel or like celery peel ... and fill it with chocolate.'

- ‘You could say, “Here we go, there’s some sausage in batter.” But give them a cucumber.’ The idea of battering cucumbers and carrots was discussed, incorporating a ‘sausage scent on it’ so that consumers would be more easily fooled.
- Participant 1: ‘You know how you have a chocolate egg, why don’t you just fill the chocolate egg with vegetables?’
  Participant 2: ‘… And then you would take a big chomp and then, like all the vegetables would come out of it.’
  Participant 1: ‘Yeah, but that is a good idea. Like an Easter egg and you smash it.’
  Researcher: ‘So you think that chocolate eggs filled with vegetables… Is the way to go?!’
  Participant 1: ‘I have an idea! Maybe, if they pretended a little pea was a *Smartie*… and put it in an egg ((Laughter)) and then you have a *Smarties* egg ((Laughter)). You know how they have those *Smarties* Easter eggs?’

5.5.2. Marketing

The implementation of marketing techniques to promote vegetable consumption amongst adolescents was perceived as beneficial. However, ‘You shouldn’t be pressured, but you should be informed.’ Ideas included emphasising the long-term health benefits of eating healthfully, or advertising the health risks of an unhealthful diet:

> ‘Maybe if you put out the statistics and say that like, vegetables are way healthier, it would sway us.’
>
> ‘Because if you told me that, eating a chocolate bar, you would have to eat a certain amount of fruit to level with it, then I would probably take a piece of fruit.’
>
> ‘No, but the thing is, you could tell them that um, if you eat unhealthy that your life expectancy will be like, low… You could die at sixty.’
>
> ‘You could do like, if you eat this many vegetables, like, look at how good this guy looks.’
>
> ‘If you want to be like him, you could eat this many vegetables.’

Adolescents thought that using ‘shock therapy’ tactics similarly photographs of bad dental hygiene at dentists and alarming cigarette packaging messages could be applied to the marketing of unhealthful foods:

> ‘At the dentist they are always like “Look, your teeth are going to fall out, brush your teeth,” things like that. Look, you are going to be really fat if you eat all this stuff.’

> ‘They should just show a really, really obese person and say “this is going to be you if you buy that every day, I’m watching you.”’

> ‘It always says cigarettes could harm lives. And they should put on the bacon rolls like ... if you eat a bacon roll, your life goes down by ten minutes.’

> ‘For your credit card you could like have an app that shows everything you buy and it is sort of like when you have these apps about screen time and it sort of guilt trips you into seeing how much unhealthy food you have.’

The marketing techniques mentioned above seem relatively ‘grown-up.’ However, market research has found that young audiences are ‘savvy’ and significantly influence their parents’ purchasing decisions. Therefore, this audience ‘needs more adult/healthy messages’ (Strachan and Pavie-Latour, 2017: p. 7).

5.6. Conclusion

This second results chapter presented qualitative findings from the school canteen observations and the five focus groups with adolescents aged 11- to 13-years-old. Overall, observing pupils in the school canteen prior to facilitating the focus groups proved insightful, as observations influenced the focus group prompt sheet and allowed the researcher to delve into more detail. External validity was high and cross-validity was evident because similar behaviours and routines were exhibited during the observational period across all three schools. For instance, few pupils at any of the schools were seen consuming fruit; the preference was for starchy carbohydrate-based snacks at break time. Similarly to Phase One, convenience was emphasised as a key factor influencing consumption routines and behaviours around food. A noteworthy connection between peer pressure and convenience became apparent because participants feared being left in the canteen whilst they were still eating their school dinner.

One of the more surprising observations was that many adolescents shunned a substantial main meal, opting for a cookie or a brownie at lunchtime. No one in the focus groups admitted to this behaviour, but the practice was discussed alongside the potential unhealthfulness of school food. Secondly, the price consciousness of some adolescent participants who felt guilty about spending their parent’s money was unforeseen. This was because relevant literature is lacking and the Phase One focus groups debated this sub-theme extensively without any consensus. Another

unexpected finding was the extent to which participants claimed their decision-making both at home and whilst at school was influenced by their parents. Almost all the adolescents strongly felt that their peer's actions would have absolutely no influence on their consumption behaviours. This opposed the focus on social norms and the dependence on peer influence during adolescence found in published articles.

Predictably, the taste preferences of adolescents had a large influence on what they ate, but all were able to name a favourite vegetable. Although most admitted to failing to consume their *5-A-Day* regularly, some adolescents appeared highly health consciousness and self-controlled, limiting their intake of school puddings, sugary drinks and *McDonald's.* This was unanticipated given the literature expressing that this age group are largely swayed by their taste preferences and peer pressure towards unhealthful food choices. Nonetheless, the appeal of brownies and cookies over fruit in the school canteen was cited as a barrier to making healthful choices, as explained by the catering staff previously. The inherent liking of cookies and muffins was subsequently used in the NPD process to design some stealth-based NPD snacking concepts that were explored during the third phase of the research. The next chapter presents results from the participatory design research and the sequential focus groups with parents.

CHAPTER SIX – NPD RESULTS

6.1. Introduction

The purpose of the third phase of the data collection was to investigate the fourth research question: 'Can a design innovation develop a healthy product that meets the attitudes and habits of Welsh adolescents?' This results chapter presents the findings from two research methods: (i) participatory design research; and, (ii) sequential focus groups with parents. The following design brief was created in collaboration with *Puffin Produce*:

> *To design and develop an ambient / chilled vegetable-based product (potatoes, cauliflower, savoy cabbage). The product must be suitable for snacking and food-to-go. Young adolescents are the target consumer and the target market includes parents, families and adolescents.*

Throughout Phase Three the researcher ideated, designed and developed vegetable-based NPD product concepts that met this design brief. Evaluative feedback was sought from both the target consumer (adolescents) as well as the purchasers (parents). First, findings from each of the four activities from the participatory design research are presented. Secondly, the themes and sub-themes that emerged from the thematic analysis of the parents' focus group thematic analysis are described and discussed.

6.2. Participatory Design Research

Participatory design research with adolescent participants was completed prior to the parents' focus groups. This was to ensure that the adolescents had narrowed down the NPD concepts presented to the parents.

6.2.1. Methodology

Pupils participated in four activities: (i) Mind mapping or listing the snacks that they currently ate; (ii) Listing the foods that they associated with cauliflower, potatoes and cabbage; (iii) Designing snack products; and, (iv) Evaluating six of the researcher's design concepts (see Section 3.3.5.). Each activity is summarised below, but more detail can be read in the Methodology Chapter (see Chapter Three).

Research Questions

1. What competitor snack products do adolescents eat?
2. What products do adolescents currently associate with cauliflower, potato and cabbage; and, how do they think these vegetables could be incorporated into snacking products?
3. How do participants evaluate the researcher's six vegetable-based NPD concepts?

6.2.2. Snacks Eaten

Each table accommodated three to five adolescents, thus groups for the first activity were often made up of two or three adolescents, totalling 13 groups across the two sessions. Either adolescents created a list or mind mapped the snacks that they ate. Some participants were thorough and listed the snacks that they perceived as

‘healthy’ and ‘unhealthy’ separately, or distinguishing the healthiness with different coloured highlighter pens. In total, 251 snack products were noted (see Appendix F.1.). Most frequently noted were chocolate (n=13), cheeses (n=12), crisps (n=10), carrots (n=9) and biscuits (n=8). As the research was conducted in October, foreseeably ‘ice cream’ and ‘ice lolly’ were only cited once each. Fast foods such as chips (n=3) and chicken nuggets (n=2) had a low occurrence, only making up 3.9% (n=10) of all snacks listed. What is more, only 11 drinks were recorded. The pie chart below shows the overall percentages of fruits and vegetables noted (Figure 6.1.):

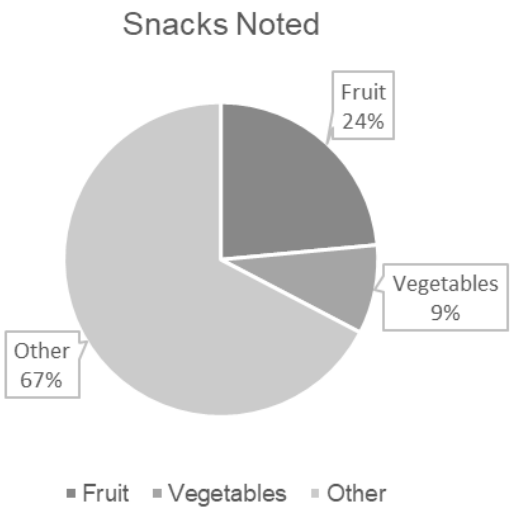


Figure 6.1.: Pie chart showing the percentage of fruit and vegetables noted

In sum, confectionery items, sweet baked goods and sweet snacks amounted to 43% (n=108) of all snacks. Broad generic products were recorded more than specific brands: *Cadbury* chocolate (n=1), *Mr Kipling* cake bar (n=1), *Oreos* (n=2), *Doritos* (n=2), *Snack-A-Jacks* (n=1), *Cheese String* (n=1), *Babybel* (n=2), *Nutella* (n=1), *Mars* chocolate bar (n=1), *Coca Cola* (n=1), and, *Yazoo* milkshakes (n=1). More commercial brands were anticipated because a previous study with 7- to 12-year-olds relatedly asked participants to list the snacks that they ate, and more branded products were listed (Letona *et al.*, 2014).

6.2.3. Associated Foods

Firstly, the teacher asked the adolescents to put their hand up if they liked eating the following vegetables: cauliflower, potato and cabbage (Table 6.1.):

	First Session	Second Session	Totals	Percentage
Cauliflower	9	9	18	44%
Potato	18	21	39	95%
Cabbage	8	9	17	41%

Table 6.1.: Number of participants that liked the vegetables

As expected, potatoes were most liked, with only two pupils disliking them. The adolescent participants favoured cauliflower and cabbage less. As a whole class, individuals had the opportunity to express what foods they associated with these three vegetables and the teacher made a list on the whiteboard (see Appendix F.2.). Across both sessions, most associations were for potatoes (n=18), in contrast to cauliflower (n=8) and cabbage (n=7). Whilst traditional products such as chips, potato waffles and roast dinners were named, other unusual products included kimchi, sauerkraut, potato doughnuts and cauliflower steak:

> ‘I had a cauliflower steak once and it was the most amazing thing ever. It actually tasted like meat, but it was completely vegan.’

6.2.4. Design Brief Responses

Participants were given the choice to work individually, in pairs or as a group of three to design and draw vegetable-based products containing at least one of the following vegetables: cauliflower, potato and cabbage. 29 worksheets totalling 95 design concepts were produced. Some responses to this exercise are in the Appendix (see Appendix F.3.). The table below presents a breakdown of the conceptual products (Table 6.2.):

Concepts	Males	% Male	Females	% Female	Total	Average Percentage
Total Number of Concepts	41	43%	54	57%	95	N/A
Sweet	7	17%	12	22%	19	20%
Savoury	34	83%	42	78%	76	80%
Includes cauliflower	22	54%	23	43%	45	47%
Includes potato	23	56%	29	54%	52	55%
Includes cabbage	11	27%	18	33%	29	31%

Table 6.2.: Occurrences within participants' responses to the design brief

Four times as many savoury concepts were ideated than sweet concepts, even though the teacher frequently reminded the pupils that vegetables could be incorporated into sweet products too. Evidently, a lack of imagination or interest in combining vegetables with sweet products and the possibility of preconceived savoury associations may have determined the low output of sweet concepts. All of the design concepts did contain at least one of the aforementioned vegetables. However, cabbage was unpopular amongst male participants (n=11) whereas potato (n=23) and cauliflower (n=22) were incorporated twice as often into their designs. More females partook in the study, explaining why they produced more designs than the males. Some of the more innovative designs are listed below:

Twelve 'sweet' design concepts

- 'Potato lollipop:' Potato inside, with a chocolate and candy coating. 'This lollipop is made of candies with a good baked potato. This will make kids think that this is a sweet lollipop but when they reach the inside, the sweet potato will fill their mouth.'
- A cone made with cabbage and filled with a potato chip and chocolate-flavoured milkshake. Cheese balls on top to decorate.
- Cupcake: Marinated cabbage slices cupcake case; cauliflower steak as the base and mashed potato as the cream. Topped with strawberry sauce and sprinkles.
- Pastry made with mashed potato. Strawberries and blueberries on top.

- Cauliflower ‘breakfast go ball’ containing: cauliflower, cocoa, hemp seeds and chia seeds.
- ‘Cabbleberry smoothie:’ smoothie made with blueberries, cabbage, apple juice and strawberries.
- Potato ice cream.
- Sweet potato brownies containing *Bourbon* whiskey, with a *Biscoff* crumb.
- Potato chocolate: ‘Potato chocolate is really good for you. Cook the potato and you get the chocolate but you melt it and then you get a stick to put the potato on it and then dip the potato in the chocolate.’
- ‘Healthy doughnut:’ potato and cauliflower base, solidified milk and cabbage, broccoli and blueberries.
- Potato waffle with ‘chocolate dippin’ sauce.’ Recyclable box with a hole for the sauce.
- Cauliflower ice cream in a cone with a potato wedge flake and carrot topping.

Twelve ‘savoury’ design concepts

- Cabbage sticks, cucumber sticks and carrot sticks with hummus.
- Deep fried cauliflower cheese balls: Injected cheese into deep-fried cauliflower balls.
- Breadsticks made with potato bits, served with a cabbage and garlic side dip.
- ‘Prank crisps:’ look like crisps, but are deep-fried slices of cabbage. ‘It’s a deep fried cabbage slices in a crisp packet that you offer to your friend thinking it’s a crisp and they bite into it, and it’s disgusting.’
- Mixed vegetable tart: A cauliflower tart decorated with a carrot coloured naturally (orange from carrot colouring and a green colour from cabbage). The product is wrapped in potato starch instead of plastic.
- ‘Mount Evermash:’ Mashed potato mountain with gravy coming out the peak. Cauliflower clouds, sausage trunks, broccoli treetops and peas.
- Potato-based pretzels with seasoning. Served with a sour cream and chive dip.
- Potato biscuits: ‘They are like crisps but they’re a lot thicker and they are more like crackers. They have savoury flavours like cauliflower and cabbage.’
- Potato popcorn: ‘They look like small pieces of popcorn but it’s actually mashed potato inside nutshells which have been baked with spices for flavour.’
- Cauliflower cheese in a potato bowl: ‘The outside of a potato [potato skin/’jacket’] with cauliflower cheese or any meal inside.’
- ‘The Big Dipper with The Big Dipper:’ Deep fried potatoes to dip into five different sauces: ketchup, curry sauce, brown sauce, prawn cocktail and ‘really hot’ sauce.
- Potatoes cut into the shape of hearts, with a ketchup dip.

Ten design elements were identified, five sketched elements and five written elements (Table 6.3.):

Design Elements	Overall n (%)	Males n (%)	Females n (%)
Sketched			
Product image	95 (100%)	41 (100%)	54 (100%)
Packaging image	28 (29.5%)	7 (17.1%)	21 (38.9%)
Ingredient image(s)	56 (58.9%)	25 (61%)	31 (57.4%)
Price	8 (8.4%)	0 (0%)	8 (14.8%)
Character	4 (4.2%)	4 (9.8%)	0 (0%)
Written			
Creative product name	20 (21.1%)	11 (27%)	8 (14.8%)
Descriptive text	34 (35.8%)	15 (36.7%)	19 (35.2%)
Detailed ingredient labelling	57 (60.0%)	24 (58.5%)	33 (61.1%)
Health claim	3 (3.6%)	2 (4.9%)	1 (1.9%)
Packaging descriptions	10 (10.5%)	2 (4.9%)	8 (14.8%)

Table 6.3.: Product concept design elements

Differences between the genders were apparent in that none of the males wrote a price and none of the females included a product character. Further, three times as many females (n=21, 38.9%) than males (n=7, 17.1%) included package imagery. Some of the product names were entertainingly creative: ‘Speedy Spud,’ ‘The All in One Roast Dinner,’ ‘Prank Crisps,’ ‘Cabbleberry Smoothie’ and ‘Prawnflower Curry.’ Several participants wrote about the environmental credentials of their product. For example, recyclable packaging, recycled plastic and wrapping the product in potato starch instead of plastic.

6.2.5. Evaluation of NPD Concepts

Snacking concepts were designed following Phases One and Two of the research and information from the literature and contextual sources were used. For example, concepts 1 and 3 incorporate dips as prior research shows that dips may encourage vegetable consumption (Anzman-Frasca *et al.*, 2012; Nørgaard, Sørensen and Grunert, 2014). Further, data collected in Phase One revealed that cookies and cake-type products were very popular, as reflected in concepts 2 and 4. Concepts 5 and 6 hide vegetables in a familiar snacking format for adolescents (Jønsson *et al.*, 2019). These six NPD concepts were evaluated (see Table 6.4.):

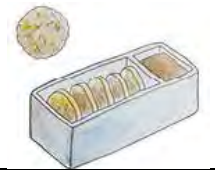
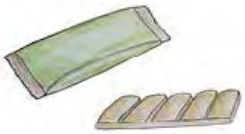
Concept	Image	Description
1		Spicy cauliflower pieces with sweet chilli dipping sauce.
2		Chocolate chip cookies with squashed crisps for added crunch.
3		Mini potato hash browns with chocolate dipping sauce.
4		Chocolate chip muffins made with hidden mashed potato.
5		Cereal bar with blended cauliflower, potatoes, seeds and spices.
6		Mashed potato chocolate truffles coated in cocoa powder.

Table 6.4.: The six NPD concepts evaluated by the adolescents

Star ratings were given to each design, five stars being the most positive and one star being the lowest rating (Table 6.5.):

	Male Participants' Rating						Female Participants' Rating					
	1	2	3	4	5	Mode Rating	1	2	3	4	5	Mode Rating
Concept 1	2	3	4	5	3	4	2	3	8	6	5	3
Concept 2	10	2	3	1	1	1	6	7	4	4	4	2
Concept 3	4	5	4	2	2	2	14	6	2	2	0	1
Concept 4	8	1	1	2	5	1	9	3	7	4	1	1
Concept 5	9	2	2	2	2	1	10	6	5	1	2	1
Concept 6	9	1	3	3	1	1	11	4	1	3	5	1

Table 6.5.: Star ratings given to each of the six design concepts

The cauliflower pieces with sweet chilli dipping sauce received the highest ratings by both male and female adolescents. Those that liked the concept said, ‘It is very

interesting and could be very tasty;' 'I love sweet chilli and cauliflower and cauliflower is sweet so the combo may be good.' Those that disliked the concept usually claimed to 'hate' spicy food, and that 'This is only suitable for people who like spice.' Suggested improvements included:

> 'It depends on the quantity for me because the cauliflower would get a bit boring.'
>
> 'Making it a little less oily and adventuring with other spices.'
>
> 'Using a range of sauces to have with the cauliflower, you could also add more spicy vegetables with the cauliflower.'
>
> 'Offering non-spicy options with a wider variety of sauce.'

Offering a choice of sauces was highly advocated, maybe this is something to consider if further developed. The acceptance of this snacking concept supports previous research indicating that individuals aged 9- to 12-years-old prefer cut vegetables and 52.6% are more interested in eating vegetables if they are served with a dip (Olsen *et al.*, 2012 (b)).

Secondly, the high sales of cookies in the school canteen resulted in the development of a cookie snacking concept (see Section 4.2.5.). Exclamations across the classroom suggested disgust: 'I'm sorry… WHY would anybody put crushed crisps?' and 'You don't put crisps in a chocolate chip cookie.' Star ratings were diverse, with over half of the male adolescent participants assigning it a one star rating. However, misunderstanding ensued, as one participant wrote that cheese and onion crisps would not taste nice. Consequently, if the study was repeated then the descriptive text would clearly state 'ready salted crisps' for clarity. Other negative responses included: 'disgusting,' 'Doesn't sound nice,' 'it sounds bad and probably is,' 'they don't match flavours,' 'It would taste weird with crisps for crunch with cookies' and, '…the texture would be buried.' On the contrary, others said that 'It's creative and could taste nice,' 'It's a good mix of sweet and savoury flavours,' and that 'It adds more flavour to cookies and that is appealing to youngsters.' Many recommended that the crisps were removed, gotten rid of, taken out, or not put into the recipe, even, 'Put the crisps in a separate box.'

Regarding the hash browns and chocolate sauce, 58% of the female participants gave this a one-star rating. Again, a lack of product description resulted in one participant misperceiving the incorporation of onions, 'The onion and chocolate will clash. It's just a weird idea.' There was a widespread opinion that chocolate and

potatoes ‘don’t go together’ and numerous adolescents seemed outraged by the NPD concept. Many suggested switching the chocolate sauce to something savoury such as sweet chilli, barbeque sauce or ketchup. Alternatively, swapping the potato hash browns for potato waffles, sweet waffles, breadsticks, potato cookies, crisps or chips.

The fourth snacking concept was chocolate chip muffins made with mashed potatoes. Those that gave positive feedback comprehended the mashed potato as being ‘hidden:’

> ‘It hides vegetables in common snacks and I don’t think it would be so bad.’
>
> ‘It’s chocolate chip muffins and mashed potato, you wouldn’t taste it.’
>
> ‘The mash would add an extra cream and blend well with the chocolate.’
>
> ‘You wouldn’t be able to taste the potato very well as the muffin is already light and fluffy.’

In opposition, many were sceptical, ‘It sounds disgusting and a weird mix of ingredients.’ Written comments included ‘sounds gross,’ ‘looks weird,’ it was ‘ruined,’ and that it ‘would be savoury.’ The majority of suggestions involved totally removing the mashed potato from the muffin. Nevertheless, a couple advised that cabbage, kale or broccoli might be better hidden. As 95% of the participants said that they liked potatoes during the second activity and liking chocolate was assumed, the disapproval of this particular design concept was unanticipated. Pope and Wolf’s (2012) study with individuals aged 8- to 14-years-old found that vegetable familiarity was important. Participants were given identical pairs of three snack foods that included vegetables. One of each pair included the vegetable in the label (zucchini chocolate chip bread, broccoli gingerbread spice cake, chickpea chocolate chip cookies). Taste preferences did not differ for zucchini or broccoli flavoured products, but did for chickpea cookies. However, the participants were less familiar with chickpeas as only 19% had eaten them within the last year and as a result, labelling featuring ‘chickpeas’ significantly impacted their chocolate chip cookie taste preferences. In the study, the preferences for courgette chocolate chip bread were similar regardless of whether ‘courgette’ was on the labelling because courgette was a familiar vegetable (Pope & Wolf, 2012). Hence, in the current study, adversity towards the muffins was unexpected because potatoes are a familiar vegetable. Perhaps if the adolescents had tasted the muffin then they may have liked it more.

Presumably, avoiding unfamiliar vegetables would be best practice in the NPD phase of the study.

Next, a flavoured savoury cereal bar was included to investigate the attitudes of adolescents because most of the product category is sweet. Verbal remarks were negative: 'The cereal bar sounds disgusting,' 'Cauliflower, that's... no,' and, 'It will taste disgusting… It will taste disgusting.' Only 17% (n=7) gave the concept either a four or five star rating. Positive comments included that it was 'healthy' and that 'I think it would taste nice and it is something new.' One participant wrote that 'I think I would eat this product if the calorie level was a lot lower than a regular cereal bar.' As predicted, responses were primarily negative:

> 'Cereal and potatoes and cauliflower does not have the same taste. It will maybe taste disgusting.'
>
> 'There's too many flavours for one bar and it would be overflowing with ingredients.'
>
> 'I like cereal bars and the vegetables but it wouldn't taste good together.'
>
> 'It wouldn't be nice for a cereal bar because if you had that for your breakfast it would taste horrible.'

Suggestions made involved removing 'everything,' or removing the cauliflower, perhaps indicative of it being one of the less liked vegetables during the second activity (see Section 6.2.3.). Furthermore, adding other ingredients such as cinnamon, grated coconut, nuts, seeds and chives were noted. A recent study with 256 7- to 10-years-olds tested six freeze-dried vegetable bars that were combined with date paste, flavours included: beetroot/carrot; spinach/Jerusalem artichoke; pumpkin/sweet potato; and, neutral (no vegetables in the bar). The study found that the liking for vegetables used to enrich the bars did not increase in comparison to the baseline (Jønsson *et al.*, 2019). This is noteworthy, as it suggests that developing a stealth cauliflower-based cereal bar would not increase an individual's liking for the vegetable otherwise.

Lastly, potato truffles were the sixth concept on the worksheet. Nearly all were incredulous, exclaiming to their peers:

> 'I'm sorry, but those chocolate truffles would be disgusting unless you took away the potatoes.'
>
> 'I don't get it… chocolate and potato together.'

> ‘Chocolate and mashed potato shouldn’t even be in the same sentence together.’

48.8% (n=20) gave this concept a one-star rating. However, some reckoned that it would be ‘creamy,’ ‘a cool concept’ and that it ‘sounds amazing:’

> ‘It is a nice mix of healthy and unhealthy. It can also be good to trick children into eating healthy.’
>
> ‘It uses two completely opposite flavours in harmony and creates a wonderful desert.’

Despite this, participants considered it ‘gross,’ ‘Not a good combo’ and expected to ‘taste a bit weird.’ Some proposed entirely removing the mashed potato so that the truffles were ‘normal.’ Although, doing so would not fulfil the design brief requirement of vegetable inclusion.

6.3. Parents Focus Group Research

These focus groups followed the participatory design research and further NPD.

6.3.1. Methodology

Two sets of sequential focus groups took place with parent participants. The focus groups sought to answer the following research questions.

Research Questions

1. What competitor snacking products are purchased regularly?
2. What do parents take into consideration when purchasing snacking products for their adolescents?
3. Determine the perceived acceptability of the concepts and the suitability for further development to market?

The four concepts presented in the first focus groups (Moroccan Couscous, Asian Salad, Cauliflower Nibblers and Baby Bites) were savoury because the participatory design research indicated that adolescents did not like sweet products containing vegetables (see Appendix E.7.). Feedback from these concepts was used to develop the designs further, particularly with regard to making the snacks more

convenient and less ‘grown-up.’ The final focus groups were presented with more complete designs and physical prototypes (Cauliflower Popcorn, # Browns, Tattus Bites and Potato Pops) (see Appendix E.9.). The eight NPD concepts are displayed in Table 6.6.:

Image	Description
	Moroccan Couscous: Cauliflower couscous with courgettes, peppers, dried apricots, chopped fresh parsley, toasted sliced almonds and balsamic vinegar.
	Asian Salad: Welsh cabbage and carrots with romaine lettuce, red pepper, toasted almonds and comes with an Asian dressing.
	Cauliflower Nibblers: Raw Welsh cauliflower pieces with a chilled cheesey dip.
	Baby Bites: Paprika spiced Welsh baby potatoes in a handy tube.
	Cauliflower Popcorn: Chargrilled ‘popcorn’ style cauliflower pieces that can be eaten cold or heated up in the microwave. Comes with a dipping sauce. (£0.98).
	# Browns: Breakfast on the go with two ‘brain boosting’ potato and carrot hash browns. Added pea protein and B12 to help you through the school day. (£1.19).
	Tattus Bites: Lightly salted mini Welsh potatoes in a 100% recyclable plastic container. Suitable for microwave use or can be eaten on the go. (£2.99 for a pack of four).
	Potato Pops: Subtly spiced small baked baby potatoes. The cardboard tube can be microwaved and the snack can be eaten one-handed. (£0.98).

Table 6.6.: Eight NPD concepts presented during the parents’ focus groups

6.3.2. Thematic Analysis

Deductive analysis of the verbatim transcripts generated six themes: (i) Current Eating Behaviours; (ii) Parental Concerns; (iii) Adolescent Concerns; (iv) Welshness; (v) Packaging Elements; and, (vi) Environment and Sustainability (Braun and Clarke, 2006). Each theme included at least two sub-themes (Table 6.7., Figures 6.2., 6.3. and 6.4.):

Theme	Sub-themes
Current Eating Behaviours	Routines What they eat
Parental Concerns	Energy Provision Health Consciousness Health and Safety
Adolescent Concerns	Palatability Variety Seeking Convenience Independence Identity Construction
Welshness	Identity Farmers' Cooperative
Packaging Elements	Packaging vs. taste Novelty
Environment and Sustainability	Packaging Locality

Table 6.7.: Thematic Analysis of key themes and sub-themes

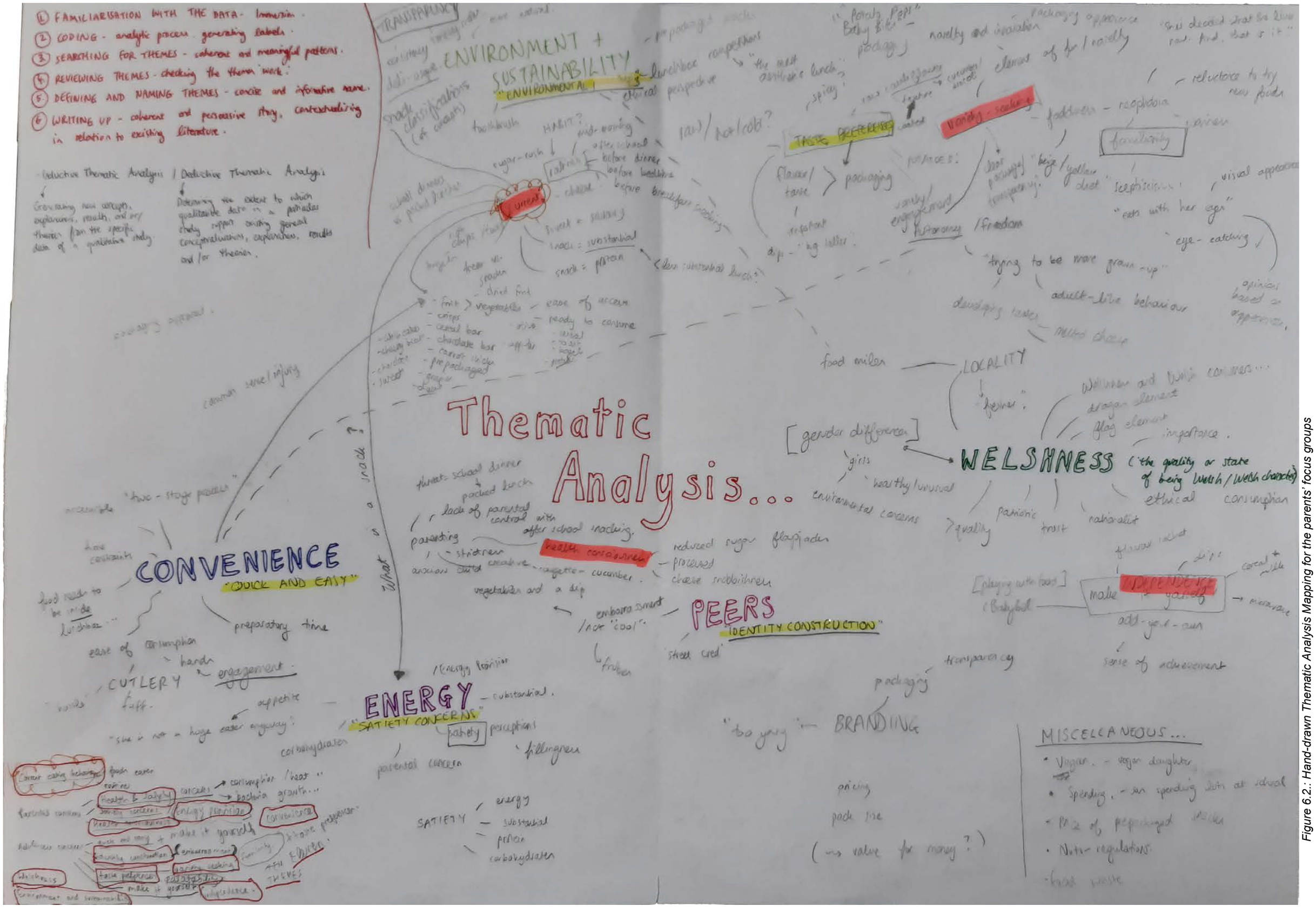


Figure 6.2.: Hand-drawn Thematic Analysis Mapping for the parents' focus groups

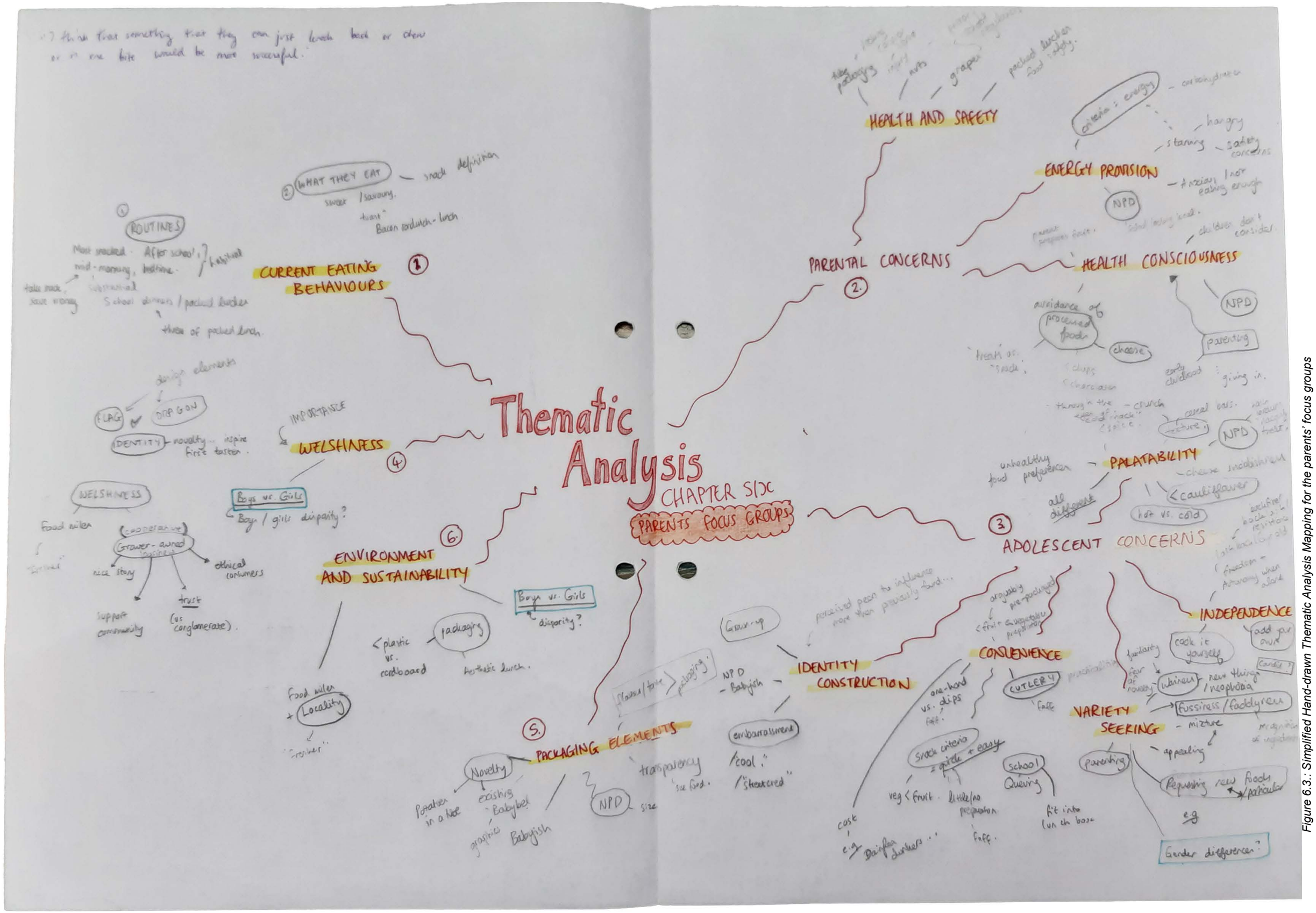


Figure 6.3.: Simplified Hand-drawn Thematic Analysis Mapping for the parents' focus groups

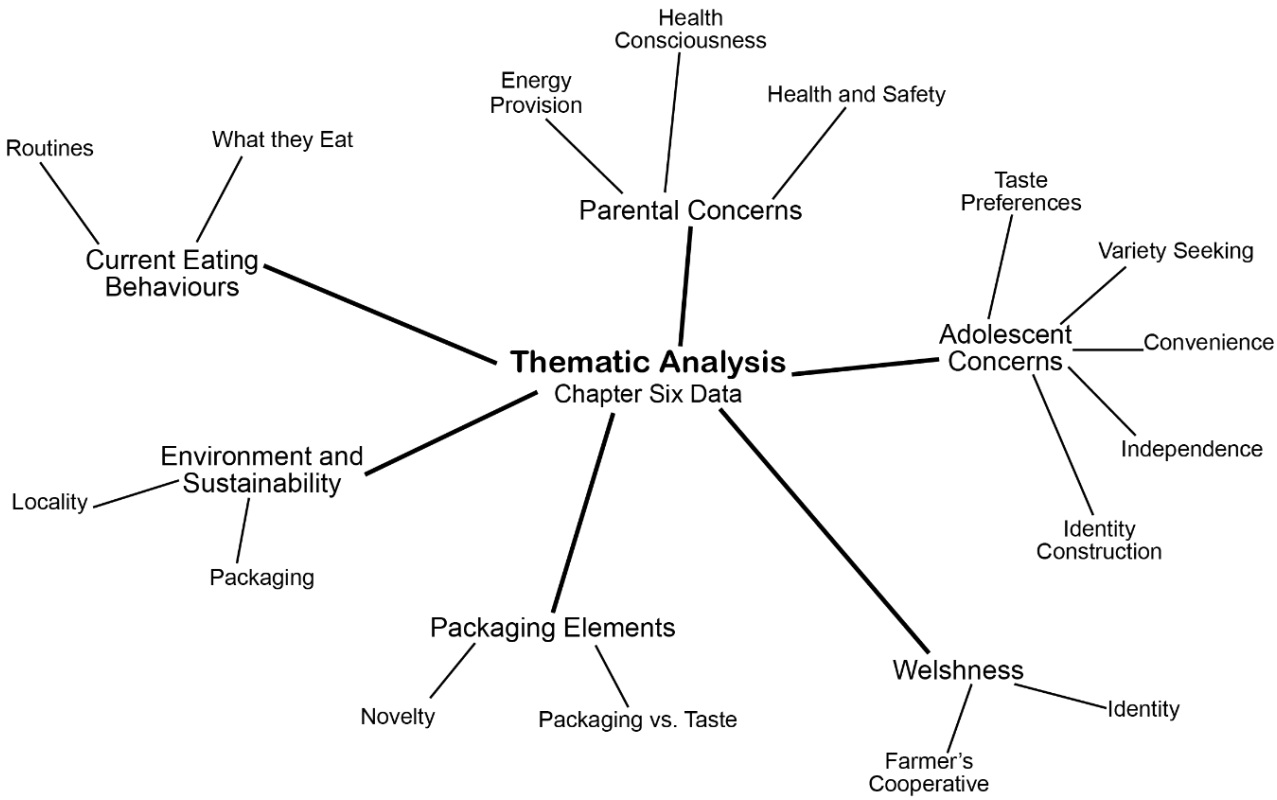


Figure 6.4.: Figure created using Adobe Illustrator, showing the six themes and sub-themes

6.3.3. Current Eating Behaviours

At the outset, participants described their adolescents' current eating behaviours, compromising routines and what they eat.

Routines

All but one of the parents said that their adolescent consumed snacks, as expected. The *EAT-2010* study found that adolescents consume four snacks a day on average and two of these are energy-dense (Larson *et al.*, 2016). As there is no universal definition of the term 'snack,' parents were asked to define the term (Hess, Jonnalagadda & Slavin, 2016). Parents defined a 'snack' as 'something that you eat between meals,' 'something to tide you over' and a 'gap filler.' Three main eating snacking occasions were drawn attention to: mid-morning, after school and before bedtime. Discussion revealed that snacking products featured in packed lunches and occasionally at breakfast time. A couple of parents believed that adolescents had been 'trained' to expect a mid-morning snack from their primary school timetables and were now accustomed to 'putting something into their stomachs' at

this time. However, purchasing a mid-morning snack from the school canteen was prohibitively expensive for a few and the majority of parents sent their adolescent into school with a snack regardless of whether they planned on having a school dinner or not:

> ‘Yeah, school snacks are quite a feature on the snacks landscape, I would say. You have your morning *Tupperware* and your lunch *Tupperware*. And they are your two distinct *Tupperware*.’

Most implied that their adolescent consumed a snack ‘immediately’ after school, when they were ‘starving’ and ‘hangry,’ which resulted in a ‘desperation for snacks at 3:30pm.’ This snacking occasion may be in the car, when the parent picks the adolescent up from school or an activity. However, snacking was usually at home in the absence of parental supervision due to working hours, meaning that parents could not ‘physically control what they are eating.’

What They Eat

A variety of both sweet and savoury snacks were listed: popcorn, crisps, *Snack-A-Jacks*, breadsticks, toast, bagels, crumpets, cereal, pretzels, breadsticks, crackers, sweets, fruit, fruit salad, dried fruit (mango and apricots), strawberries, grapes, apples, carrots, cherry tomatoes, cheese, ‘lumps of cheese,’ *Babybel* cheese, *Dairylea* cheese, yogurts, flavoured milkshakes, milk, ice lollies, nuts, biscuits, Welsh cakes, cereal bars, breakfast bars and flapjacks. Fruit was preferred over vegetables for snacking. Intriguingly, a number of parents explained that their adolescent would not eat fruit at school and that the fruit ‘will come back home,’ although they would eat fruit at home if the parent prepared it. One such example was a ‘travelling apple’ being referred to as an ‘absolute last resort’ snack, remaining uneaten in the school bag for days. This finding was contrary to previous research which indicated that individuals are more likely to consume fruit at school rather than at home (Mak *et al.*, 2012).

Several parents stated that their adolescent consumed insufficient food at lunchtime and this influenced what they provided as an after school snack:

> ‘I give them something usually quite carb-intensive because I find that they don’t always eat very well during the school day...’

Numerous reasons were provided for insufficient lunchtime intake. In one circumstance, the adolescent son regularly consumed a bacon sandwich mid-

morning, so ate a ‘less substantial’ lunch as he had ‘filled up at break time.’ In another instance, sporting activities left little time for lunch, inevitably resulting in the daughter eating most of her lunch after school. A couple of parents disclosed that their adolescents were hesitant to purchase food from the school canteen due to the long queues and a busy school canteen atmosphere causing some anxiety.

6.3.4. Parental Concerns

Three key sub-themes within the theme of parental concern were highlighted: energy provision, health consciousness and, health and safety.

Energy Provision

When parents were questioned about the criteria for purchasing snacks for their adolescents, many specified ‘energy’ and the requirement for a ‘fair bit of energy in it.’ This parental concern may be associated with the previous sub-theme of ‘What they Eat,’ whereby parents were concerned that the food consumed during the school day was insufficient. Consequently, parents provided energy-dense foods that were satiating and convenient, disclosing that ‘we do always look for something with a fair bit of calories in it,’ ‘from a calorie point of view, there is enough in there to sort of keep them going’ and ‘I do look for something with a fair bit of carbs.’ As aforementioned, anxiety and finding the school canteen too ‘overwhelming’ to eat at lunchtimes resulted in one mother providing snacks such as crisps because her son refuses traditional sandwiches or tortilla wraps:

> ‘[I have to] be quite creative and come up with healthy snacks so at least there is something good going into his little belly at some point during the day.’

Regarding the NPD concepts presented during the focus groups, parents were concerned that the ‘Asian Salad’ was lacking in calories. Further, the ‘Moroccan Couscous’ was considered ‘more meal-y’ and it ‘wouldn’t be a snack.’ Others envisioned that the ‘Asian Salad,’ ‘Moroccan Couscous’ and ‘Tattus Bites’ looked ‘too much like a dinner item’ with the inclusion of another component.

Health Consciousness

Parents appeared fairly health conscious and were keen to distinguish between ‘snacks’ and ‘treats’ when shown existing snack products. Snacks were judged as being ‘better for you and more substantial’ than the ‘treats.’ Chocolate bars were

considered ‘treat’ foods and only for occasional consumption as they provided a ‘sugar-rush.’ For example, one mother commented that eating chocolate or sweets in the evenings as part of a family movie night meant that ‘the sugar is not sitting on their teeth all day.’ Foods with a ‘lot of sugar’ were avoided and parents were keen to provide savoury snacking items. Moreover, one mother claimed to have taught her adolescents that a snack is ‘more of a protein’ rather than a packet of crisps. Allegedly, if adolescents declined an offering of fruit after asking for an unhealthful snack, then they were not hungry and did not ‘need’ a snack.

An avoidance of overly processed foods was evident, cited as ‘not ideal for the teeth.’ One father said that he preferred providing apples in contrast to ‘packaged things that have been washed in chlorine.’ Cheese was extensively debated, with an eschewal of ‘pretty processed’ *Dairylea* cheese products that were considered ‘weird plastic runny cheese,’ ‘full of all-sorts of things’ and contained ‘so many additives in there.’ Whilst several declared they would not buy *Dairylea* ‘at all,’ *Babybel* cheese was considered all right by some.

Parents acknowledged that adolescents rarely base decision-making around food on ‘the health benefits’ and that taste preferences were of greater importance. One father described how he had threatened his son with packed lunches if he regularly chose unhealthful school dinners. The NPD concepts were deliberated from a health conscious perspective, and one parent confirmed that ‘they look like reasonably healthy options.’ However, the ‘Cauliflower Nibblers’ chilled cheesy dip was disliked with regard to its similarity to *Dairlylea* cheese. This NPD concept was negatively perceived as being visually ‘a bit beige, as cauliflower is.’ One mother said that if she put any of the NPD concepts into her son’s ‘snack pack or lunch box, then he would be like, “Oh, she has done weird things again… send it home.”’ As *Puffin Produce*’s main product lines are potatoes, several of the NPD concepts featured potatoes. However, one father said that potatoes would not be his ‘go to veg’ for a snack as they are a ‘staple part of most meals.’ So,

> ‘…if potato becomes an in-between meal thing as well then I think that is a lot of carbs, a hell of a lot.’

Besides this, he declared the dips ‘unhealthy,’ but preferential to ‘a jumbo bar of chocolate.’

Health and Safety

Recollections of primary school regulations and a 'habit built from primary school' was continuing to omit nuts and nut-containing snack products for their adolescents' secondary school snacking. Likewise, some primary schools confiscate whole grapes, making them 'the bane of my life' as one mother put it because she loathed cutting grapes in half. Another food safety concern was the reluctance to put 'cold snacks' such as yogurts from the refrigerator into packed lunches because they 'grow bugs in the day.' Similarly, a large-scale study with primary school-aged parent-child dyads revealed that one of the barriers to providing a packed lunch was food safety concerns and a lack of refrigeration (Hawthorne *et al.*, 2018).

Furthermore, the novel consumption method of eating potatoes from a tube ('Baby Bites' and 'Potato Pops') were deliberated from a health and safety point of view. Remarks included the risk of adolescents overheating the product in the microwave. One mother identified that her son lacked 'common sense' and she would not allow him to eat the product unsupervised, declaring it as a choking hazard because it 'is a round ball shape, and it is boiling hot.'

6.3.5. Adolescent Concerns

Parents perceived adolescents to be concerned about their taste preferences, variety seeking, convenience, independence and identity construction with regard to their snack consumption.

Taste Preferences

This sub-theme compromises taste preferences in addition to the parent's perceptions of their adolescents' receptiveness towards consuming the NPD concepts hot or cold. Participants pointed out adolescents' unhealthful 'favourites' such as cookies, chocolates, crisps and cereal bars. Cereal bar discussions affirmed that some 'healthy' bars were 'inedible' and that their adolescents were 'quite picky' and 'discerning' about the textural qualities. However, parents admitted that individual taste differences were hard to navigate, particularly amongst those with more than one child in the family. It was stated that 'they have got very, very different tastes:'

> 'They all like different things, even though they have all had the same input from us, they have all got their own take on what they actually like and what they will eat.'

A few parents alluded to how their parenting during young childhood may have influenced their adolescents' current taste preferences. Parents understood that emergent eating habits were derived from 'what you do from quite a young age.' This included perseverance, not catering to fussy whims and:

> '…exposing them to lots of things, healthy snacks, at a young age, probably keeping your options open means that they are more likely to try anything.'

Interestingly, one mother said that she never gave one of her daughters any sugar and now she craves it. In contrast, the youngest daughter had 'sweets and chocolate when younger and she will kind of take it or leave it.' One mother revealed that her son had a 'really sweet tooth' and would 'raid the fridge and take the whole tub of grapes and demolish those.' Another mother anecdotally explained that her daughter used to eat more healthfully when younger but this has now backfired and 'it's more of a battle' because 'she would just eat sweets and junk food.' This finding is in support of a systematic review of the literature in which studies consistently associated restrictive child feeding practices with an increased snack intake (Blaine *et al.*, 2017). Relatedly, a questionnaire survey study found that restrictive child-feeding techniques were associated with the child developing obesogenic eating behaviours such as a tendency to overeat (Rodgers *et al.*, 2013).

Another element of 'identity construction' was the notion that their adolescents were growing up and developing more adult-like tastes. This included becoming 'more adventurous since she went up to senior school,' consuming increasingly spicy foods and eating vegetables that were 'previously rejected.' Parent participants attempted to view the NPD concepts from their adolescent's perspective and provided feedback accordingly. The inclusion of spices was divisive because some adolescents proved averse to spiciness. One participant suggested that fresh cut chives would make the potatoes more aesthetically appealing as they were 'a bit beige' looking. The concepts with the most negative palatability feedback were the cauliflower-based ones ('Cauliflower Nibblers' and 'Cauliflower Popcorn'). It was commented that a few adolescents did inherently like cauliflower 'in some way, shape or form, but it has always got something else with it' or, include an 'element of crunch or texture.' Nonetheless, the majority of parents were unenthusiastic about the cauliflower-based NPD concepts, declaring that their adolescent 'wouldn't touch that.' The raw cauliflower concept ('Cauliflower Nibblers') was reckoned, 'very hard.'

Suggested improvements included bread crumbing, creating a fritter, cauliflower bhajis or Arancini [Italian rice balls].

In contrast, the potato-based NPD concepts were considered palatable, 'Potatoes are a bit more appealing to kids, aren't they?' Further, the 'Tattus Bites' concept of baby potatoes was attractive either hot or cold and one mother disclosed that she had observed her son 'going into the fridge and picking one out by hand and eating it as he is walking around.' Another parent supposed that, 'thinking through the eyes of my kids, a bit of crunch on a cold snack is good.' However, several parents were dubious that their adolescent would eat the product cold. The second set of focus groups reviewed the '# Brown' concept, regarding it as 'something different' and 'a bit naughty and a bit of a treat, maybe,' with reference to *McDonald's* hash browns. This concept included 'pea protein' as a functional ingredient. The *British Nutritional Foundation* says that functional foods are foods enhanced with an ingredient that makes them additionally beneficial. This may involve adding a functional ingredient or fortification (British Nutritional Foundation, no date a). Nevertheless, in the current study, parents commented that they 'might possibly quite like the idea' of stealth carrots, added B12 and pea protein from a health perspective, but some adolescents may find these objectionable. Parents suggested only referring to functional ingredients 'on the small print on the back.' Notably, a couple of parents expressed that their adolescent would disregard all of the NPD concepts, and that they would not 'eat any of that.'

Variety Seeking

Variety within the product could make adolescents 'more likely to engage with it.' Adolescents 'like it best if it's a few different things' or 'lots of little bits' and that some parents 'tend to give a selection of things.' The suggestions for improving the cauliflower-based concepts involved incorporating a mixture of more appealing vegetables such as cucumber, tomatoes, carrot or broccoli, similar to a 'veggie version' of a fruit salad or medley. One mother said that she prepared a similar assortment of vegetables for her adolescents, 'almost like it is a little bowl of treats.' Other research with 242 adolescents and 119 adults has found that individuals visually prefer complex mixtures of fruit and vegetables (Mielby *et al.*, 2012). This was exemplified by another study finding that a mixture of vegetables was more

appealing, with most participants saying that they would prefer to have at least three vegetables served together (Olsen *et al.*, 2012 (b)).

Variety seeking extended to packed lunch and snack products, which were often fads that came and went. For example, chicken goujons were eaten for a couple of weeks, then 'I want something else now,' followed by tortilla wraps. A few weeks later the adolescent would say, 'No, no wraps' for the next two months. Equally, it could be extrapolated that a vegetable-based NPD concept may not feature in adolescents' diets long-term.

The visual appearance of foods may put some adolescents off:

> 'She very much eats with her eyes, and if she doesn't like the look of something… she wouldn't even try it.'

An aversion to 'bits of green,' liking foods separate and scepticism towards trying new foods was inferred. During the first focus group sessions, a perceived wariness towards couscous as 'a fear of the unknown' could put some adolescents off trying the 'Moroccan Couscous' because 'fear would be a big factor.' In comparison, the potato-based NPD concepts are easily recognisable, more familiar and have 'the trust factor.' A few parents indicated that their adolescents had neophobic tendencies and a fear of trying novel food products. This could have arisen from early childhood and a lack of exposure to a variety of foods, which has been shown to prevent food acceptance. Previous research has discovered that food preferences stay similar from the ages of 2- to 3-years-old until young adulthood (Nicklaus *et al.*, 2005).

Correspondingly, a few hinted at their adolescents' faddy behaviour, and that not eating their specifically requested lunch was 'a regular occurrence' if 'they didn't fancy it.' One mother described her daughter going 'on and on' about trying rice cakes for the first time. In the end, the daughter did not like the rice cakes. Parents acknowledged that they 'should encourage them' to try new foods and flavours. One mother spoke about the NPD concepts, saying that introducing slowly would be best practice:

> 'I think that if they were things that we… slowly introduced at home… and they had eaten them and enjoyed them, then we might be able to get them to engage with them. Certainly the couscous. And, possibly the salad and the 'Baby Bites.''

Neophobic responses to unfamiliar foods can lead to monotonous family diets unless parents intervene (Tuorila, 2015). Reassuringly, participants in the current study seemed willing to encourage their adolescents to try a variety of foods

Convenience

This sub-theme was considered crucial for adolescents and long queues in the school canteen and extra-curricular activities meant that parents sought convenient snacks. Then again, parents recognised that they needed to pay a premium for convenient pre-packaged snacks, as 'they are all quite expensive.' The quote below summarises this sub-theme:

> 'And they want it to be quick and easy. They want something that they can just fly in and eat something and then fly out and play sport or whatever.'

Parents described convenience from an adolescents' perspective, explaining that they want 'something quick,' 'something that could be produced within the next few minutes' without any 'faffing around.' Furthermore, if adolescents had 'total freedom,' they would in all probability 'grab a snack,' choosing 'nothing that requires preparation.' Nevertheless, opting for fruit was unlikely 'because that usually requires a bit of preparation.' Fruit was preferential to vegetables due to 'ease of access' in a fruit bowl and 'it is pre-packaged, arguably, and ready to consume.' Whereas vegetables were usually kept in the fridge and 'would probably need peeling… or chopping.'

Concerning the NPD concepts, the 'two-stage process' of dipping was perceived as too much hassle in contrast to 'something that they can just knock back or chew or in one bite.' Hence, the 'Tattus Bites' concept was positively welcomed by parents because microwaving the product was more convenient than boiling potatoes for twenty minutes. Likewise, the feedback on the '# Browns' concept was positively acknowledged from a convenience point of view as 'they can pick up and go' when in a 'rush' similarly to a breakfast bar. Maybe these products have potential because convenient formats of vegetables offer a valid alternative to counteracting the negative trend of decreasing fruit and vegetable sales (Baselice *et al.*, 2017).

The practicalities of including cutlery with the NPD concepts was debated, with one mother saying that for herself she 'would expect a fork for nearly everything that I

eat.' However, taking and using cutlery at school was reckoned, 'too much of a faff' and 'too much of a hassle.' When cutlery is involved, products often come home because they require 'engaging with in a different way.' Overall, the 'hand-based' method of eating appealed:

> 'They haven't got to worry about a knife and fork… They haven't got to worry about opening it up in a certain way. They can put their hands in and dip it in on their way, so in terms of concept, for my kids, that would probably work the best.'
>
> 'I think though that there is an element of kind of, being seen to be kind of acting cool in a school environment… and getting a snack that involves a piece of cutlery is just not cool.'

This finding is in support of the literature, namely an adolescents focus group study that found individuals would feel 'stupid' taking a spoon out of their bag and that eating with cutlery was an 'embarrassment' (Stead *et al.*, 2011).

Independence

Parents explained that when left to their own devices, adolescents were unlikely to 'go to *McDonald's* and choose a fruit bag,' but will eat fruit that the parent prepares within the home. One mother explained that she allows her 12-year-old daughter to choose what was in her packed lunch, under supervision. Thoughts of 'add your own' and 'cook it yourself' were evidently popular in the focus group sessions. Specifically, products such as corner yogurts with a separate granola or fruit pot to tip in and pouring milk into cereal can instil feelings of self-efficacy, because 'he feels he has made that:'

> 'They like to get the impression that they are cooking and making something… Because it is their first, at this age anyway, it is the first time that they have a little bit more responsibility that they can do that.'
>
> 'My children would eat carrot sticks; I probably could just about give them to them for school lunches still… But they probably wouldn't use it with a dip, because in school it probably wouldn't be the cool thing to do.'

Overall, dips and optional flavour sachets were popular and accepted amongst this age group, referred to as a 'big seller' and 'she always loved things with a dip.' In the same way, parents anticipated that the microwaveable NPD concepts 'would be quite popular.' One mother said that using the microwave was 'the limit' of what her son was allowed to do.

Conversely, the novelty and independence aspects of ‘add your own’ and ‘cook it yourself’ were considered more appealing for younger children rather than adolescents for some:

> ‘I think that by the age range that we are talking about today, they couldn’t give a monkeys… if they wanted to make their own food, they would go and make their own food. I think that this is more about consumption. Particularly if it is a snack, it is speed. You know, how many seconds will it take you, because you might die on *Fortnite* [computer shooting game] if you are gone for too long. [Snacks need to be] one-handed, whilst still activating your [controller] with the other, [that] is far more the focus than sitting and mixing your yogurt together…’

Identity Construction

Although participants in Phases One and Two suggested that peers were minimally influential, parents in the Phase Three focus groups judged peer pressure as being prevalent. Adults repeatedly referred to maintaining ‘street cred,’ avoiding embarrassment and constructing a ‘cool’ identity. The influence of peer pressure during adolescence has been widely reported in the literature, for example a laboratory study with 12- to 14-year-olds showed snack selection differed when a peer was present (Salvy *et al.*, 2012). Parents in the current study expressed that eating snack products marketed for primary school-aged children ‘…would be embarrassing now’ and that ‘he might hide around the corner to eat it:’

> ‘I think it depends where they are going to be using it. If it is something that is going to go into a lunchbox… Then it has to have an element of street cred because they are sitting with their friends… and they don’t want to look geeky by having something that is nerdy, or worse, something that is *Lidl* own brand… Trust me; I have failed there on occasion!’

The role of food in identity construction was unmistakeable in Stead *et al.*’s (2011) English study with adolescents aged 13- to 15-years-old. Participants in this study explained that taking mainstream premium branded food products into school was beneficial for their self-image as it helped to avoid unwanted attention and the disapproval of peers. The researchers found a fundamental anxiety over taking supermarket own brands. Adolescents worried that doing so would threaten their self-image, making them ‘uncool’ and a ‘nerd.’ Individuals made symbolic and emotional associations with certain food brands, believing that one’s social position at school would be detrimentally affected if they consumed socially unacceptable generic or inferior food brands (Stead *et al.*, 2011). Moreover, parents reckoned that

a ‘see-through tub’ of cold cauliflower could instigate negative commentary and questioning from peers.

The NPD concepts presented in the first focus groups were viewed as ‘quite young’ and too babyish, potentially resulting in ‘some level of teasing’ which would put adolescents off taking the product into the school environment. The ‘Baby Bites’ brand name in particular lacked ‘maturity’ as although it referred to baby potatoes, an adolescent may ‘interpret that as being a baby snack.’ Consequently, the four vegetable-based NPD snacking concepts shown in the second set of focus groups were more age-appropriate.

6.3.6. Welshness

Discussion concerning the theme of Welshness was crucial because *Puffin Produce* is a Welsh company supplying fresh Welsh produce across Wales. This topic was broached during the second set of focus groups.

Identity

In the second focus groups, one concept (‘Tattus Bites’) embraced the following Welsh branding design elements: a photo taken in the Brecon Beacons, the Welsh flag, the Welsh flag as letter filling and clearly stated the Welshness in the product description. The Welsh flag was divisive as on one hand, participants commented ‘it catches my eye,’ ‘I love the Welsh flag,’ ‘I don’t think there are enough Welsh flags on things’ and that it was ‘signifying the Welshness.’ On the other hand, some participants complained the branding was ‘tired,’ but modernisation for the target market could be good, as, ‘… the Welsh flag is chucked on everything and it just gets very, eurgh, boring, doesn’t it?’ Positive remarks included, ‘I would choose Wales all the time’ and that ‘I would pay more.’ Additionally, participants acknowledged that the Welsh identity ‘locality and the tribal sort of “we are Welsh” wouldn’t mean anything to an English market.’ *Food and Drink Wales* research has found that 78% of Welsh shoppers ‘would always buy Welsh if price was right’ as they perceived Welsh products to taste good and be of good quality (see Section 2.13.2.) (Food and Drink Wales, 2017: p. 3).

An unanticipated finding emerged in that parents thought Welsh branding might appeal more to male adolescents. Supposedly, male adolescents would be keen on

the Welsh branding because they support Welsh rugby and football teams. Of note, one father supposed that the Welsh identity on a novel snacking product could be enough to 'inspire' his son to taste it. But, the product would need to taste good 'in itself to encourage repeat consumption.' Contrariwise, another parent claimed that the Welsh branding would not 'bother' their daughter and that 'She would be looking past what's on it and [into] what is in it.'

Farmer's Cooperative

Puffin Produce is a grower owned business and participants held positive interpretations about this, saying that 'it's a nice story,' and that they were keen to 'support the community' from an 'ethical' perspective. Evidently, a farmer's cooperative was considered trustworthy:

> 'I think for me it is not just supporting the local community, it's not just that. It is quite frankly that I trust the farmer that has grown it more… I would trust a local farmer's cooperative more than I would trust a conglomerate.'

With regard to portraying the Welshness and farmer's cooperative, these two studies demonstrate how packaging design can help. One focus group research concerning potato packaging in Sweden has indicated that exposing the grower's name and the origin of the local produce is advantageous from the consumer's perspective (Fernqvist, Spendrup and Ekelund, 2015). Secondly, a focus group study into milk packaging demonstrated that having images of the countryside helped to reinforce the naturalness and provenance of the product (Hollywood *et al.*, 2013). Findings from the literature should be considered when designing packaging portraying the product origin and Welshness.

6.3.7. Packaging Elements

This theme compromises two sub-themes: packaging vs. taste and novelty.

Packaging vs. Taste

Parents perceived product packaging as negligibly influencing their adolescents, declaring that 'they don't really think much about packaging.' Rather, taste preferences were thought to play a more crucial role in what their adolescents chose to eat. Yet, the playful element of *Babybel* cheese wax was an example of appealing

packaging as, ‘It is like a present, isn’t it?’ The ‘# Brown’ packaging had ‘an unusual shape’ that was considered ‘more attractive for them.’

Novelty

The novel NPD concepts of eating potatoes from a tube (‘Baby Bites’ and ‘Potato Pops’) were considered ‘eye-catching,’ and:

> ‘The flavour and the idea that you could open it and consume it in quite a novel way, I think that it would be seen as quite cool.’
>
> ‘I think that with the ‘Potato Pops,’ I think that the actual method of eating with the tube going into your mouth would be enough of an incentive for my son to really kind of like that, it is quite unusual, quite different.’
>
> ‘I think that for 11- to 13-year-olds, they probably would be quite swayed by that sort of thing.’

One of the father’s remarked that he wanted ‘five, because there are five days in a week’ rather than the four-pack stated on the ‘Tattus Bites’ concept sheet. In response, other parents described how their adolescent would become ‘pretty bored’ of the same snack, suggesting that ‘maybe a single pack would be better than a four-pack.’

6.3.8. Environment and Sustainability

Packaging

Several parents talked about their adolescents’ environmental concern, particularly the environmental impact of packaging as ‘they do a lot of projects about recycling’ which has made them ‘a lot more aware.’ Recyclability, reusability and sustainability were described as being ‘appealing to kids at the moment.’ This finding is in concordance with a study associating environmental knowledge with pro-environmental behaviours amongst adolescents aged 14- to 18-years-old (Meinhold and Malkus, 2005). Participants emphasised a disparity between male and female adolescents’ environmental concerns. One parent stated that ‘My girls definitely actively avoid buying stuff in plastic’ whilst another said that their adolescents ‘don’t like lots of plastic around.’ In contrast, those with sons disclosed that they did not care about the environmental impact of their consumption choices. This apparent concern for the environment was surprising as a questionnaire study with 397

adolescents in Ireland found that environmental concerns did not affect food choice (Share and Stewart-Knox, 2012).

Participants commented that some of the NPD concepts appeared to look ‘a bit plastic-y in the packaging.’ A ‘recyclable cardboard container’ packaging would be judged as ‘preferable to more plastic,’ particularly for adolescents who currently used compartmentalised lunchboxes to avoid unnecessary plastic packaging. However, the opaque NPD concept packaging caused suspicion because participants preferred to ‘actually see what is in there’ so that they could ‘know its freshness.’ Some suggested that the inclusion of a ‘little window’ would improve their confidence in purchasing the product. Similar findings relating to a transparent window regardless of the negative connotations around plastic packaging were found in a focus group study studying consumer views on potato packaging (Fernqvist, Olsson and Spendrup, 2016).

Locality

The environmental and sustainability aspect of purchasing products that had been produced locally relates back to the theme of ‘Welshness’ (see Section 6.3.6.). The preference for buying ‘something that is made locally and produced locally’ also related to ‘wanting to minimise the greenhouse gases and the extra transport.’ A couple alluded to female adolescents being more ‘tuned into the food miles’ and the locality than male adolescents. The notion behind purchasing products produced in Wales appealed to the parents, particularly from an environmental perspective, taking into account ‘the whole issue of food miles.’ Others perceived that if the product was grown locally ‘that it lasts longer,’ was ‘nicer,’ ‘fresher’ and would be more ‘nutritious or wholesome.’ The keenness to minimise food miles was unexpected, as previous research has indicated that the concept of food miles has negligible influence on UK consumer decision-making (Kemp *et al.*, 2010).

6.4. Conclusion

Although Phases One and Two were carried out concurrently, Phase Three was conducted afterwards. Findings from previous phases influenced the NPD process and what can be concluded is that a few sub-themes were consistent: current eating behaviours, health consciousness and convenience. The participatory design

research demonstrated that adolescents are not keen on stealth vegetable-based concepts. Perhaps the inclusion of taste testing would have helped them to understand that in all actuality, the taste profiles of vegetables could be well hidden amongst the other ingredients. However, this would have been ethically difficult to execute and was outside of the project scope. Vegetable inclusion was narrowed down; the consensus being that the palatability of cauliflower proved divisive and that potatoes were possibly more suited for further development.

Some interesting gender differences transpired regarding Welsh nationalism and environmental attitudes. Further research into gender disparities may be unnecessary because a product that appeals to females from an environmental perspective is unlikely to put males off. Fortunately, Welshness and purchasing products produced by a farmer's cooperative were attractive attributes for the parents in the second set of focus groups. This is something that *Puffin Produce* currently promotes on its product packaging and through all its marketing communications. The two NPD concepts that received the most positive feedback and apparent willingness to buy were the 'Potato Pops' and the '# Browns.' The innovative packaging concepts and the recyclability aspect proved popular alongside the taste descriptions. The supplementation of protein powder and vitamins shown to enhance cognitive performance were enthusiastically appreciated. The next chapter discusses each of the three phases of research, comparing and contrasting the findings from different participant groups in relation to the literature and research context.

CHAPTER SEVEN – DISCUSSION

7.1. Introduction

This chapter discusses the extent to which the PhD study met its overall aim, which was to examine ways ‘to improve the eating habits of Wales’ younger generation through making vegetables ‘desirable.’’ First, each of the four research questions are discussed in turn, deliberating on the findings with regard to the theoretical frameworks and literature (see Figures 7.1. and 7.2.):

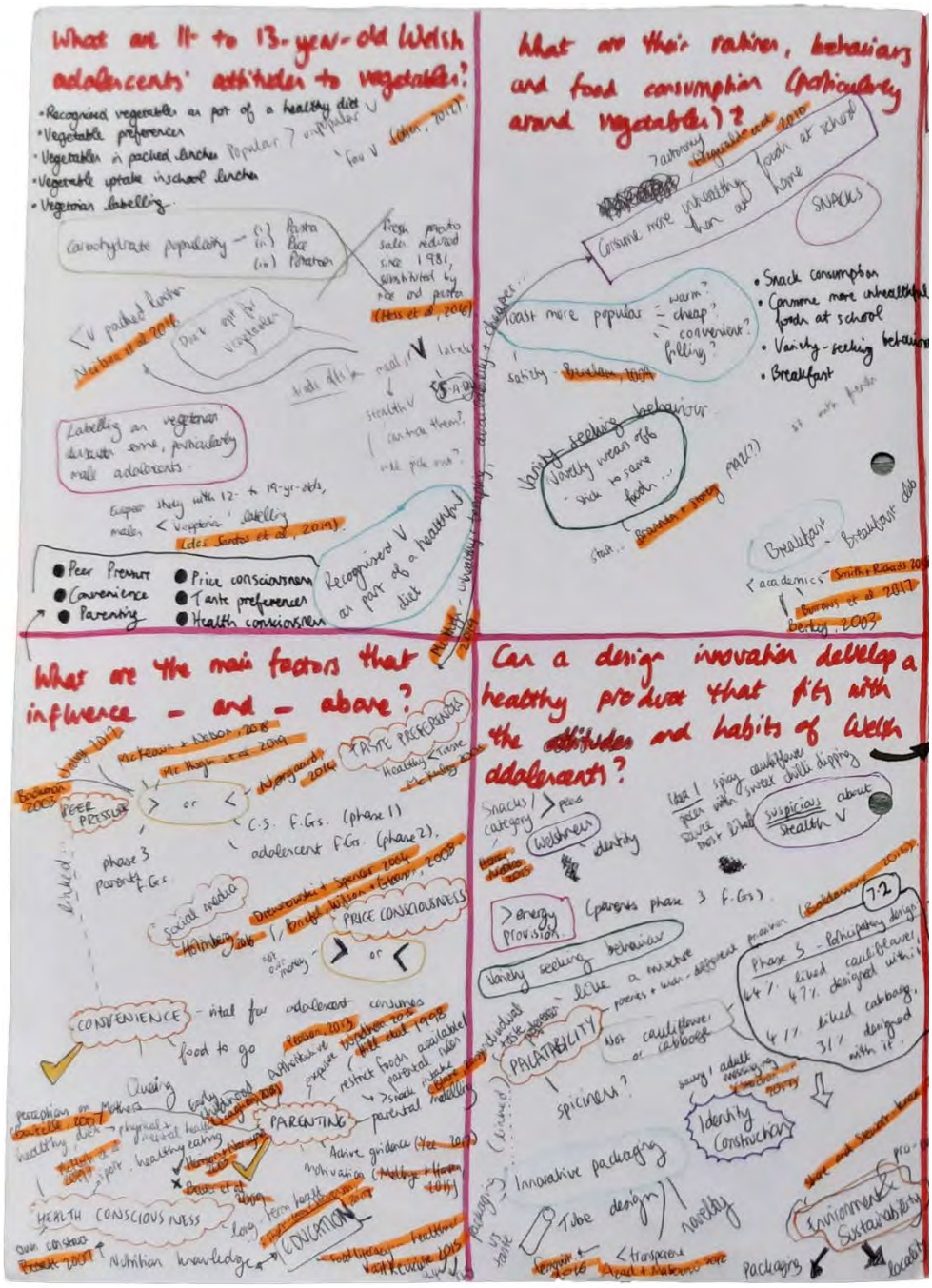


Figure 7.1.: Hand-drawn workings for the Discussion Chapter

Figure 7.2.: Hand-drawn mapping of the PhD results related to the research questions

Following this, specific recommendations for *Puffin Produce* are outlined (see Section 7.6.). To end, limitations of the current study are listed and how these affect the external validity of the study findings.

7.2. What are 11- to 13-year-old Welsh adolescents' attitudes to vegetables?

Vegetable Preferences

The current study found that carrots were the most popular vegetable amongst participants. This was in concordance with Dinnella *et al.*'s questionnaire study involving adolescent participants from Denmark, France, Italy and the UK. The study found that the familiarity and sensory properties of carrots (sweeter taste, delicate flavours and being brightly coloured) made it the most preferred vegetable amongst adolescents (Dinnella *et al.* 2016). Adolescents' favourite and disliked vegetables in the current study were in line with the literature, although a couple expressed fondness towards less common vegetables such as beetroot, an attraction that may be related to the middle-class demographic sampled.

Some discrepancy was evident in the current study because catering staff stated that peas were a favourite vegetable. Whereas when adolescents were asked which vegetables they disliked, peas were most frequently cited and only one pupil identified peas as their favourite vegetable. The questionnaire study referred to above also found that peas were disliked amongst adolescents in the UK (Dinnella *et al.*, 2016). The current study found no evidence for female adolescents preferring vegetables to males. However, Bere, Brug and Klepp's (2008) questionnaire survey with adolescents from 20 Norwegian schools showed that females ate on average, 14.5 fruit and vegetable portions a week in comparison to males who ate 11.9. The main determining factor for these differences was taste preferences, but their research was unable to clarify why females preferred the taste of fruit and vegetables over males (Bere, Brug & Klepp, 2008).

Relevantly for *Puffin Produce*, cabbage was disliked throughout the study. Whilst cauliflower was marginally favoured over cabbage, there was a low acceptability of

eating cauliflower as a snack product. In particular, the Phase Three focus groups exhibited much scepticism pertaining to snacking on cauliflower. Of interest, one study involved 345 9- to 11-year-old participants repeatedly taste-testing vegetables (cauliflower, sugar snap peas and celery) consecutively for six days across two exposure periods. Findings showed that cauliflower was neutrally liked at onset, but the liking of the vegetables decreased due to boredom during and shortly after the study (Olsen *et al.*, 2012 (a)). Conceivably, future NPD should avoid bitterly tasting foods, such as cauliflower, and focus on the sensory aspects of preferred vegetables to help increase the consumption of vegetables amongst Welsh adolescents (Dinnell*a et al.*, 2016; Appleton *et al.*, 2019).

Vegetarian and Vegetable Labelling

The catering manager at School A elucidated that vegetarian labelling or promoting the inclusion of vegetable ingredients in dishes could deter pupils. Recent published evidence and existing products on the market validate this finding, suggesting that some meat-eaters will be put-off by vegan labelling, because they hold negative associations with veganism, its connotations and its stigmas with a cult. For example, *Beyond Meat* vegan burgers omit emphasising veganism on their packaging with the aim of appealing to omnivores (Sabur, 2018; Markowski & Roxburgh, 2019). Nevertheless, these findings were contrary to expectations because catering staff spoke of an increasing number of pupils requesting vegetarian and vegan options. Presumably, if the plant-based dietary trend continues to grow, then foods labelled ‘vegan’ may be perceived positively and increasingly chosen by adolescents.

Secondly, the catering manager interviews revealed that labelling the stealth vegetables in baked products such as carrot cake or courgette cake deterred adolescent consumers. Similarly, parents evaluating the NPD concepts said that their adolescents would be deterred by labelling promoting functional ingredients such as pea protein. Therefore, the current study indicates that vegetable-based NPD packaging should avoid overtly marketing the vegetable content and any functional ingredients. However, indulgent labelling on food items and dishes can improve vegetable consumption. A naturalistic intervention study in a university cafeteria labelled vegetarian dishes cooked in the same way using either ‘basic,’ ‘healthy positive,’ ‘healthy restrictive’ or ‘indulgent descriptive labelling.’ The study

discovered that vegetables labelled with the indulgent descriptions considerably increased the mass of vegetables consumed and the quantity of individuals selecting these vegetables (Turnwald, Boles & Crum, 2017). Appreciably, labelling is a very low-cost intervention that can have a significant impact on vegetable consumption.

7.3. What are their routines, behaviours and food consumption (particularly around vegetables)?

Focus group discussions revealed that most adolescents fail to consume sufficient fruit and vegetables. This finding is reinforced by an abundance of existing literature and governmental reports (Welsh Government, 2016; National Health Service, 2017a) (see Section 2.5.1.). Although adolescent participants listed fruits and vegetables as snacks during the participatory design research, parents of adolescents later disclosed that their adolescents were more accustomed to eating fruits and vegetables at home rather than at school. This finding was in support of the literature; Winpenny *et al.*'s (2017) longitudinal dietary record study investigating adolescents' dietary habits from 10- to 14-years-old old showed that fruit and vegetable consumption was higher outside school, although fruit consumption decreased over this time period by 27% and vegetable consumption decreased by 21% compared to baseline at 10-years-old. Parents in the current study suggested that their adolescents were reluctant to eat fruits and vegetables at school because doing so would be perceived as inconvenient and 'uncool.' This is contrary to food diary data collected for the 2008–2010 UK NDNS, which revealed that individuals aged 1.5- to 10-years-old are more likely to consume fruit outside the home and in the school environment (Mak *et al.*, 2012).

Despite no unanimous definition of the term 'snack,' parents in the Phase Three focus groups described it as foods eaten outside of the three main meals, which was in accordance to the literature (Bellisle, 2014; Hess, Jonnalagadda & Slavin, 2016). Snacking was ubiquitous across all three phases of the research study. Asking parents to define 'snack' was important because a systematic review of food parenting and child snacking discovered that many studies only define 'snack' following data collection, which could lead to potential bias (Blaine *et al.*, 2017).

Overall, the school food complied with the regulations laid out in the *Welsh 2013 Healthy Eating in Schools Nutritional Standards and Requirements,* i.e. an awareness of any allergies and the top twelve allergens; whereby nuts were discouraged from packed lunches (Welsh Local Government Association, 2013). Data mining revealed relatively low fruit sales and this was backed up during the school canteen observations. Adolescents described the barriers towards their purchase and consumption of fruit at school. For instance, the fruit bowls were not always visible and whole fruit appeared aesthetically unappealing. An intervention study at a secondary school found that positioning bowls of fruit near the checkouts increased consumption of fruit (Ensaff *et al.*, 2015b). Maybe the catering staff could ensure fruit is positioned visibly and that the fruit available is suitably appetising for pupils.

The school canteen observations revealed that in spite of verbal encouragement from the catering staff serving hot main meals, the majority of pupils declined a portion of vegetables. Evidently, staff were reluctant to force vegetables onto pupils' plates, knowing that they would be scraped into the bin and increase food wastage. Vegetable waste in secondary schools is considerable, accounting for 18.1% of the total food wasted in addition to wasting money purchasing the vegetables, paying staff to prepare them and then the eventual disposal costs (WRAP, 2010, 2011). Although schools may meet the *School Food Standards* and provide a portion of vegetables, pupil avoidance reduces the healthfulness of the meals (Dimbleby & Vincent, 2013). There is potential for partially rectifying pupils' low intake of vegetables during the school day by serving composite dishes containing vegetables rather than relying on the uptake of salad and vegetables as side portions (Stevens *et al.*, 2013). Equally, research has shown that individuals are more likely to consume vegetables if they are part of a main meal rather than served separately (Bevan *et al.*, 2015). On that account, composite dishes are something that school catering staff, parents and the food industry could consider. For example, including stealth vegetables in a meat-based curry.

Despite the vast majority of pupils in the observational periods selecting a school dinner, many of the adolescents in the focus groups regularly had a packed lunch. Adolescents perceived taking a packed lunch into school as beneficial, because it allowed parental supervision and could potentially be healthier. However, covert observations of packed lunch contents during the Phase Two canteen observations

revealed a low occurrence of vegetables, with fruit being more common. The research to date appears focused more so on primary school-aged pupils rather than adolescents in their secondary education. One such example is a cross-sectional survey of packed lunches across 89 British primary schools, which exposed that many are laden with unhealthful foods and only 1% meet the nutritional standards applied to cooked school meals. Only 19% of these packed lunches contained vegetables and 53% contained fruit (Evans, Greenwood & Thomas, 2010). Similarly, a recent American study with pupils aged 9- to 12-years-old revealed that pupils taking a packed lunch were 81% less likely to consume fruit than those having a school dinner (Tay*lor et al.*, 2019). Maybe more pupils could be encouraged to eat a school dinner, or vegetable consumption promoted as part of a packed lunch through developing a vegetable-based NPD snacking concept.

7.4. What are the main factors that influence (7.2.) and (7.3.) above?

Across the three phases of data collection, seven main factors were found to influence 11- to 13-year-old Welsh adolescents' attitudes to vegetables and their routines, behaviours and food consumption. The following figure shows these factors and the interconnections between them. Convenience, taste preferences

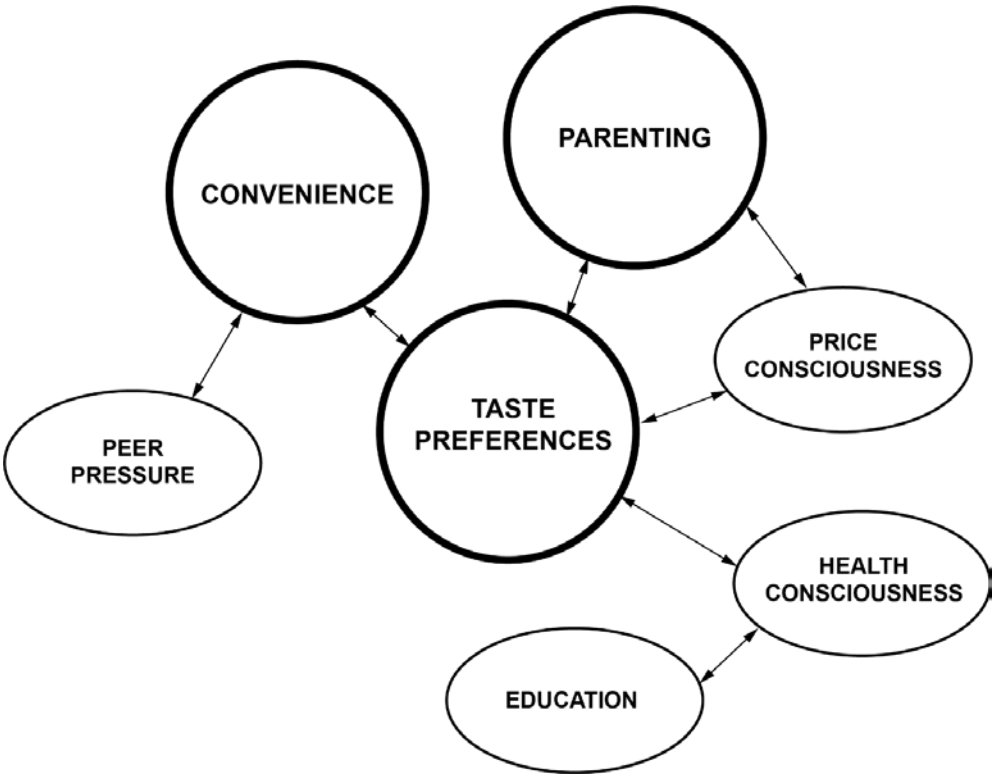


Figure 7.3.: Diagram of the relationships between the main seven factors influencing adolescents' attitudes, routines, behaviours and food consumption (particularly vegetables)

and parenting are diagrammatically shown in larger circles as they are most significant (Figures 7.3. and 7.4.):

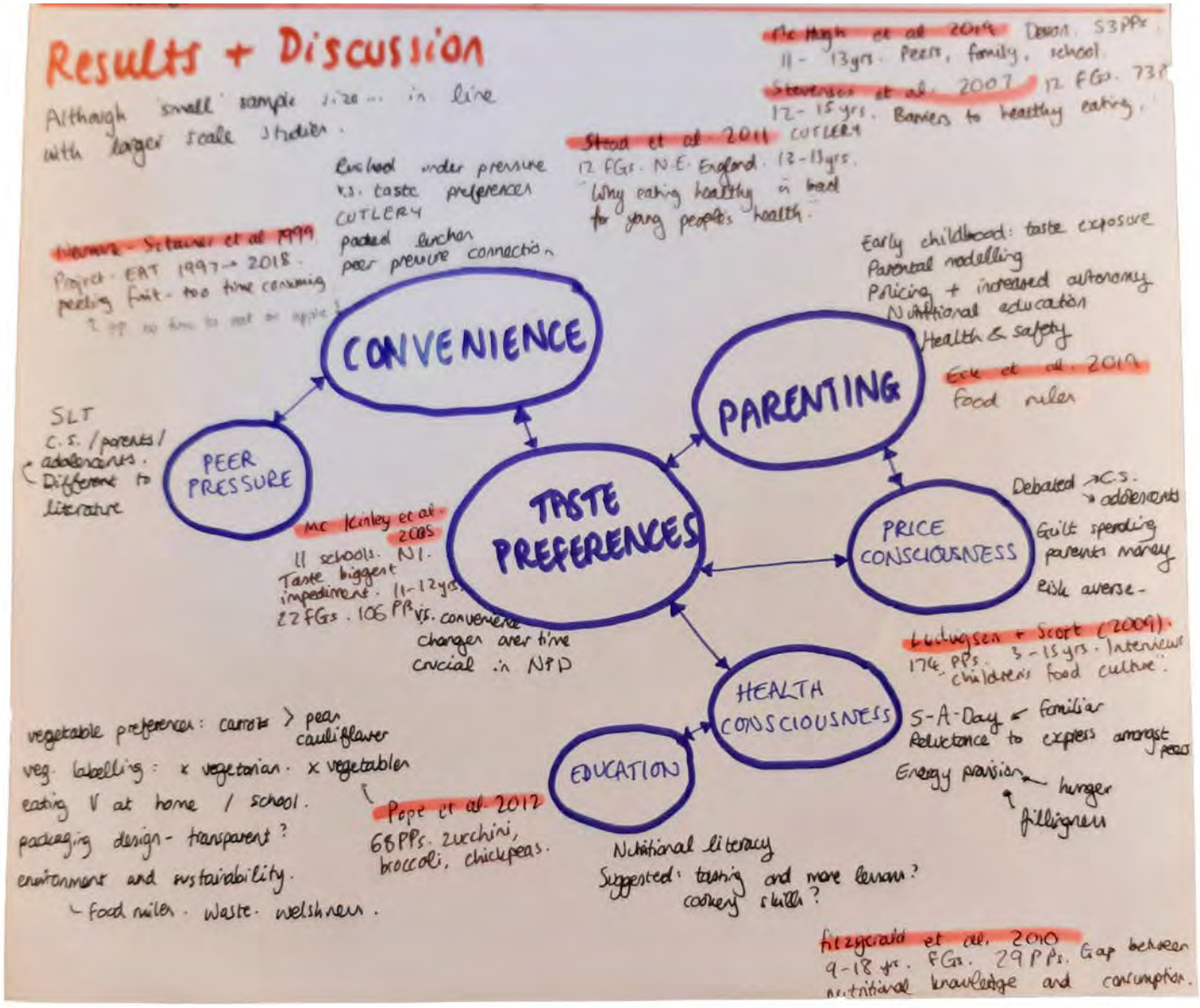


Figure 7.4.: Hand-drawn Thematic Analysis Mapping to show the main points and related pieces of research

Factor	Relationships	Evidence	Importance
Convenience	Peer Pressure, because adolescents opted for convenient foods so that peers consuming fast foods did not leave them behind.	- Adolescents wanted to eat the same foods as their peer group so that they would all finish eating at the same time. This was discussed in the focus groups and whole tables of pupils eating exactly the same foods were observed in the school canteen.	Is of a high level of importance because all participant stakeholder groups mentioned its importance. Adolescents felt rushed and pressurised when choosing foods in the school canteen. Foods needed to be quick to consume.
	Taste Preferences, because most of the convenient options at school also tasted preferable. Thus, whether a food is chosen because it is tasty or because it is convenient to consume is unclear.	- Convenience is a barrier to eating healthfully if the available convenient options are unhealthful. But, unhealthful options such as pizza often taste preferable. - Packed lunches were considered more convenient than queueing for school food. Adolescents said that the benefit of taking a packed lunch was that they could include tasty foods.	
Taste Preferences	Convenience, because the available convenient foods tended to taste better to adolescents.	- Many adolescents were observed selecting a pizza or brownie for lunch rather than a traditional sit down meal. - Convenient packed lunches are made to suit the individuals taste preferences and often contain unhealthful products.	Is of a high level of importance because regardless of how novel the packaging or product concept may be,

	Parenting, because preferences for certain foods often results from early childhood exposure.	- All the focus groups mentioned early childhood exposure to a wide variety of foods as crucial for developing taste preferences.	adolescents will not consume and make repeat purchases unless the product is palatable.
	Price Consciousness, because adolescents considered purchasing unknown foods risky.	- Adolescents were described as reluctant to try new foods. In the school canteen, this was evident because individuals did not want to risk spending money on new food or drinks that they may not like.	
	Health Consciousness, because adolescents perceive unhealthful foods as tasting more desirable than healthful foods.	- Adolescents provided anecdotes in the focus groups that evidenced their reluctance to consume vegetables or healthful foods despite acknowledging that these foods were healthier.	
Parenting	Taste Preferences, because taste preferences are developed in the familial home and through early childhood experiences.	- Early childhood exposure to a wide range of foods, parental modelling and active encouragement were all mentioned as beneficial techniques used to encourage vegetable consumption and healthful eating behaviours. - Overly strict parenting restricting unhealthful foods can lead to rebellion and a preference for the restricted foods.	Is of a high level of importance because it was emphasised by all participant stakeholder groups as a significant factor influencing adolescents' dietary

	Price Consciousness, because the amount of money allocated to adolescents or whether they have unlimited funds influences their purchasing decisions in the school canteen.	- Some adolescent participants described how they felt guilty about spending their parents' money in the school canteen.	habits. Parents control what adolescents eat at the microsystem level of the adolescents' immediate environment.
Price Consciousness	Parenting, because price consciousness may stem from parental influence.	- Debates in the catering staff and adolescent focus groups revealed that some individuals were price conscious and would purchase cheaper foods accordingly. In contrast, the focus groups with parents conclusively stated that adolescents were not price conscious at all.	Is important because existing literature negates this theme, it requires further exploration as it was a definite factor in decision making for many adolescents.
	Taste Preferences, because adolescents were risk averse and reluctant to spend money on new foods that they may not like.	- Catering staff explained how adolescents were risk averse and tended to purchase the same foods repeatedly. It was difficult to introduce new foods on the menu.	

Health Consciousness	Taste Preferences, because adolescents believed that healthful foods did not taste as nice as unhealthful foods and were less satisfying.	- Snacks needed to provide enough energy to satisfy hunger. Therefore, opting for numerous slices of white bread toast at break time rather than a piece of fruit was common. - Adolescents repeatedly remarked on their preference for unhealthful foods because they taste nicer.	Is important because despite adolescents being conscious of what a healthful diet entails, other factors overrode this. Taste preferences prevented healthful eating.
	Education, because nutritional literacy results in health consciousness regarding healthful foods and healthy lifestyles.	- The adolescent participants were familiar with the *5-A-Day* campaign but thought it was prohibitively difficult to achieve.	
Education	Health Consciousness, because an awareness of what is healthful and what is unhealthful drives food consumption choices.	- Adolescents had a degree of nutritional literacy, but all participant stakeholder groups suggested that more food technology lessons would be beneficial. In particular, tasting sessions and cookery skill development. - The Phase Three focus groups with parents highlighted that female adolescents in particular were conscious about the environment and sustainability issues. For example, reducing food miles and plastic waste.	Is important because education is a top-down interventional approach that has been shown to positively affect dietary behaviour.
Peer Pressure	Convenience, because adolescents opted for convenient options so that they were not left behind by their peer group.	- Adolescents ate similarly to their peer group so that they would finish eating at the same time. - The parents taking part in the Phase Three focus groups described how their adolescents would not	Is important because although the adolescents themselves did not

		take cutlery into school and would avoid childish packaged snacks to avoid embarrassment.	believe Peer Pressure was an important influencing factor, parents and catering staff along with the previous literature stated that it is significant.

Table 7.1.: Table clarifying the seven main themes identified and the relationships between them

7.4.1. Convenience

As shown by the large circle in Figure 7.3., convenience is one of the most influential factors for adolescents. The focus groups with adolescents indicated that they feel rushed and under pressure when choosing foods, and that this has an effect on what they purchase because they want to have enough time to eat it. These findings are consistent with previous research supporting the notion of convenience significantly influencing adolescents of a similar age (McKinley *et al.*, 2005). School C's 25 minute lunchtime may be to the detriment of healthful dietary behaviours, as published evidence shows that time limitations at school are an established barrier for eating healthfully (Jenkins & Horner, 2005). Having a short lunchtime break results in pupils having less time to choose what to eat from the ever-increasing food choice available in the school canteen. This lack of time for decision-making and feeling rushed may result in adolescents continuing to purchase familiar options. However, research evidences that making fruit and vegetable sides a default option in the canteen could help. This is because convenience constitutes a barrier to healthful eating if convenient options are unhealthful (Dimbleby and Vincent, 2013; Sharma *et al.*, 2017). Nonetheless, whilst pizza is convenient, taste preferences may additionally influence pizza consumption. Adolescent participants were unable to provide any further clarification as to which factors determine their decision-making because many of the convenient options available in the school canteen were unhealthful.

A connection was identified between the Phase One quantitative canteen sales data showing that food-to-go puddings had higher sales than those requiring cutlery, and the parents in Phase Three describing their adolescents' reluctance to eat with 'uncool' cutlery in the school canteen. Prior research has also revealed that adolescents consider cutlery not socially acceptable (Stead *et al.*, 2011). Moreover, all participant groups reckoned that inconvenient long queues were off-putting for adolescents, as found in previous research (Brembeck *et al.*, 2013). Thus, packed lunches were deemed an appropriate solution to avoid the inconvenience of queueing. These results build on Fossgard *et al.*'s (2019) research involving 25 focus groups of 11-year-old adolescents. This research exposed that packed lunches were often chosen on the basis that they are more convenient than queuing in the school canteen.

An unforeseen connection was identified between convenience and peer pressure. During the focus groups with adolescent participants in Phase Two, adolescents spoke of wanting to eat the same foods as their peer group so that they could finish at the same time and avoid being left behind. Prior interview research with pupils has discovered that several had switched from school dinners to packed lunches to avoid segregation from their friendship group (Ludvigsen and Scott, 2009). Yet, no published research could be found both linking opting for convenient food and a fear of being left behind by peers. Therefore, the current study provides new insight into the relationship between peers and convenience. Perhaps this warrants further study, possibly on a larger scale.

7.4.2. Peer Pressure

The influence of peer pressure on adolescents' eating habits was inconclusive, particularly between each of the three stakeholder participant groups. Whilst parents strongly suspected that peers swayed their adolescents' food choice, the catering staff reasoned that the desire to copy peers was minimal and decreased over the course of KS3. Adolescents expressed that their peer group did not care and would never comment on what they eat. On the other hand, parents in the Phase Three focus groups judged adolescents' consciousness regarding their self-identity and desiring to appear 'cool' as being a highly significant contributing factor for decision-making concerning food. Parents' anecdotal evidence of adolescents feeling too embarrassed to take supermarket own brand crisps or snacks targeting younger children into school is in support of the literature. The current study builds on existing evidence of consuming own brand foods provoking feelings of anxiety because adolescents feel 'uncool' (Roper & La Niece, 2009; Stea*d et al.*, 2011). Moreover, research with 10- to 16-year-olds investigating the acceptability of eight novel healthful snacks found that individuals preferred snacks that were perceived as acceptable amongst their peer group. Even so, their buying intentions were determined more by their own personal importance of the snacks attributes (Nørgaard, Sørensen & Brunsø, 2014). By extension, launching novel products in the school environment may be initially advantageous as it could be easier to encourage purchases in the perceivably safe school environment when peer influence could potentially be used to a positive effect.

In sum, the findings in the current study were contrary to most published research claiming that social norms have a significant influence. SLT has been posited as a key determinant for the development of dietary habits because social norms concerning eating are perceived personally relevant, reinforcing social comparison thoughts and subsequent engagement behaviour (Higgs & Thomas, 2016). However, research has shown using the TPB that norms only influenced intention, and more so amongst younger children (Hang, Davies & Schüring, 2020). Intra-familial factors and food intake have been found to decrease with age (Fitzgerald *et al.*, 2010).

Thus, the adolescents' opinions are contrary to the extensive body of literature stipulating that peer pressure is substantial amongst adolescents (Bruening *et al.*, 2012; Salvy *et al.*, 2012; Pedersen, Grønhøj & Thøgersen, 2015). Adolescents may have either exhibited a lack of awareness or been reluctant to describe the influence of peers. Perhaps adolescents' lack of comments regarding peer pressure was due to the focus group method utilised in the current study. They could have been reluctant to disclose that their routines and dietary behaviours were influenced by others (Coolican, 2009). Conversely, other studies have found branded clothing to be a more frequently used indicator of one's identity rather than branded food. For example, Chaplin and John's (2005) experimental study demonstrates that foods were selected to match taste preference regardless of branding and that foods were not utilised to express self-identity amongst peers.

7.4.3. Taste Preferences

Figure 7.3. shows that taste preferences are connected to health consciousness, price consciousness, parenting and convenience. However, as aforementioned, the link between taste preferences and convenience is complicated and whether adolescents will opt for a brownie or slice of pizza for lunch purely from a convenience perspective or due to taste preferences needs further clarification. Focus group discussions with all participant groups suggested that individual taste preferences influence what adolescents eat and are liable to change and develop over time, yet would prevail above other influencing factors. This was in concordance with prior research involving adolescent participants that has established taste as a substantial factor influencing decision-making around food

(Blanchette & Brug, 2005; Brug *et al.*, 2008; Ludvigsen & Scott, 2009). Additionally, a study with elementary school-aged pupils found that taste preferences and product category have a greater influence on snack consumption than particular brands and branding, even in social contexts amongst peers (Hemar-Nicolas *et al.*, 2015). This implies that appealing to the tastes of adolescents is crucial in the NPD process.

During Phase Three, some parents described how they provided their adolescents with a mixture of vegetables for variety seeking, in contrast to the NPD concepts shown consisting of one sole vegetable. Studies have also found that adolescents preferred eating mixtures of at least three different vegetables. Likewise, when neutrally liked cauliflower was served alongside a liked vegetable, this increased consumption of the cauliflower in comparison to when it was served unaccompanied (Olsen *et al.*, 2012(a); Olsen *et al.*, 2012(b)). Moreover, parents declared that although novel packaging may initiate a first try of a new product, the taste and palatability must appeal in order for repeat consumption to occur.

7.4.4. Parenting

Throughout the study, taste exposure during early childhood was considered crucial. This awareness was in agreement with existing research publications explaining the importance of early childhood and how feeding strategies determine an individual's food choices (Anzman, Rollins & Birch, 2010; Blissett, 2011; Rodgers *et al.*, 2013). A recent review of the literature established that whilst visual exposure (e.g. storybooks) and experiential learning through sensory activities (e.g. cooking, gardening and nutritional education) were partially successful in early childhood, taste exposure interventions were 'robust and durable' (Nekitsing, Hetherington & Blundell-Birtill, 2018: p. 64).

Parenting during early adolescence remains fundamental. The *Pro Children* project (Brug *et al.*, 2008) recruited over 1300 11-year-olds from 20 schools from nine European countries. The questionnaire survey revealed that: those that had access to vegetables they liked at home were more likely to report daily vegetable consumption; females perceived at home accessibility as higher than males (possibly due to a different upbringing of daughters); parental modelling was important; and, active encouragement was associated with daily intakes of fruit and

vegetables. Similarly, Eck *et al.* (2019) recommended several SLT constructs to explain how parents could improve their child's dietary habits: parental modelling of healthful eating behaviours; building a child's self-efficacy in asking for healthful foods when away from home; providing age-appropriate nutritional education; and, offering their child guidance and reminders about healthful eating away from home.

Conversely, all stakeholder participant groups were able to provide anecdotal evidence concerning how excessively strict authoritarian parenting and condoning 'junk food' could lead to rebellion and a backlash. In particular, the catering staff alleged that adolescents would opt for unhealthful foods at school if they knew that their parents would enforce a balanced meal at dinnertime. Adult participants admitted that policing adolescents' food could be problematic due to the increased autonomy. This view was supported by an observational supermarket study with 47 parent and adolescent dyads, whereby 'Parents used strategies of coaxing, coaching and coercing, while teens responded by complaining, ignoring and refusing their parents' advice' (Bassett, Chapman & Beagan, 2008: p. 325). It became apparent that parents and adolescents might have opposing views concerning the importance of food healthfulness and diet. Some parents restricted their adolescent's access to foods. This included eschewing *Dairylea* cheese and encouraging protein-based snacks rather than unhealthful food consumption. Consideration of the parental viewpoint and their attitudes is crucial as they often make the final purchasing decisions.

On the other hand, adolescents claimed to eat what their parents would want them to eat. This aligned to previous research which demonstrated that adolescents living in households with at least one health-oriented rule regarding what they could eat, usually chose healthier snacks when making independent food decisions in their parents' absence (Wang & Fielding-Singh, 2018; Gunther *et al.*, 2019). However, as focus group participation was optional in the current study, it is possible that adolescents who were more conscientious took part and this could be extrapolated into them being more likely to listen to their parents than the general adolescent population.

Health and Safety

The 'Potato Pops' and 'Baby Bites' concepts were judged unsafe due to the novel tube packaging idea. A number of parents brought attention to this aspect, declaring

that that they would not allow their adolescent to prepare or eat the potatoes without adult supervision in case they choked or burnt themselves. This concurred with recent evidence concerning adolescents aged 10- to 13-years-old which discovered that some parents restricted food preparation activities such as using the oven, microwave or cutting with a knife unsupervised (Gunther *et al.*, 2019). Secondly, parents stated a reluctance to provide chilled foods in their adolescents' packed lunches due to safety concerns. Recent research with parents of primary school-aged children has these concerns prevalent as well (Hawthorne *et al.*, 2018).

7.4.5. Price Consciousness

This theme of price consciousness was highly debated, resulting in an approximate halfway split of opinion amongst adolescents and catering staff participants. Several adolescents explained how they feel guilty and worried about spending their parents' money in the school canteen. Curiously, the literature concerning adolescents decision-making around food mostly negates the topic of price consciousness. Yet, a survey concerning Irish adolescents' food choice discovered that price and convenience factors converged and were strongly associated with one another to motivate food choice (Share & Stewart-Knox, 2012). In contrast, parents' unanimously judged their adolescents' to be not at all price conscious with regard to out-of-home food purchases and provided anecdotal evidence of their adolescents' reluctance to taking a packed lunch as although it would save money, doing so would be less socially acceptable.

As previously mentioned, adolescents articulated that fruit should be cheaper and unhealthful foods should be more costly in the school canteen. However, the catering staff were sceptical of making healthful foods cheaper whilst maintaining the prices of other foods; they believed that adolescents' would simply buy more cookies and brownies. Previous intervention studies have found that decreasing the price of healthful foods are effective. For instance, lowered prices were more effective than health marketing messages for increasing consumption of the targeted healthful foods in a restaurant intervention study (Horgen & Brownell, 2002). Relevantly, an intervention study with two secondary schools demonstrated that reducing the price of fresh fruit, carrots and salad by 50% increased sales of fruit by 400%, carrots by 200% and did not affect salad sales (French *et al.*, 1997).

7.4.6. Health Consciousness

Focus group discussions indicated that adolescents were familiar with the governmental *5-A-Day* campaign and the benefits of consuming a healthful diet inclusive of vegetables. Despite this awareness, the majority willingly shared that they were unsuccessful in consuming five portions of fruit or vegetables daily and reckoned consuming five portions daily was prohibitively difficult. In summary, adolescents appeared ambivalent towards the *5-A-Day* campaign. They understood it as something to aim for, but alluded to it being unattainable for themselves. However, the catering staff believed that pupils taking part in competitive sporting activities were more health-conscious and had a better nutrient intake (Harrison and Narayan, 2003; Croll *et al.*, 2006). It is important to recognise that some adolescents may have felt a reluctance towards expressing health consciousness during the focus groups as they were fearful that this would have been unacceptable socially (Coolican, 2009).

Energy Provision

All participants identified how feelings of hunger influenced adolescents desiring something filling. This builds on existing evidence because other studies with adolescents have found that 'fillingness' is a necessary consideration when making decisions around food (McKinley *et al.*, 2005; Contento *et al.*, 2006). Consequently, hunger may be a significant factor influencing the consumption of starchy carbohydrate-based products at morning break time because they are filling. What is more, the parents in the Phase Three focus groups were adamant that snacks purchased or prepared for their adolescents were ideally energy-dense and carb-intensive because adolescents often ate poorly during the school day. This is in stark contrast to the controversial NHS campaign, launched in 2018, proclaiming, 'If you're buying packaged snacks for your kids, remember to look for 100 calorie snacks, two a day max!' (Public Health England, 2018). Moreover, intrinsic factors and feelings may dictate adolescent food choices; Neumark-Sztainer *et al.* (1999) found that reasons included 'I was hungry,' or, 'I was craving it.' Therefore, high school pupils would pursue foods that they craved or considered filling. Energy provision and fillingness is important in adolescents' snack products and parents in

the current study explained that the cauliflower NPD concepts may lack the required calories. Further product development should take these findings into account.

7.4.7. Education

As aforementioned, despite adolescents having nutritional literacy, taste preferences usually prevail when deciding what to eat. Education was much discussed amongst the catering staff, on the understanding that a lack of education was detrimental and blamed it as the reason why carrot cake was poorly received. Taster days and more Food Technology lessons were suggested. However, 15 focus groups with Australian adolescents aged 12- to 17-years-old found that whilst adolescents had nutritional knowledge, they lacked cookery skills. Therefore, education focusing on developing cookery skills could prove effective for improving adolescents' dietary habits (Ronto *et al.*, 2016). In general, adolescents displayed a health consciousness seemingly derived from their education. Several adolescents included health claims in their NPD concepts during the participatory design research, indicative of their nutritional knowledge. However, like adults, food literacy is insufficient and prioritisation of other factors are often deemed more worthy (Nga *et al.*, 2019).

7.5. Can a design innovation develop a healthy product that fits with the attitudes and habits of Welsh adolescents?

Phase Three of the data collection sought to answer the above research question. Although this question focuses on adolescents' attitudes, it became apparent that consideration of parental attitudes was vital, as they will be the main purchasers of any vegetable-based snacking products. Innovative designs should take into consideration the answers to the first three research questions (see Sections 7.2., 7.3. and 7.4.).

Moreover, the packaging design of food products is crucial, as argued by Rundh (2009). Factors to consider during the design process include: 'materials used, shape and size of the package, colour, texture and graphics' (Rundh, 2009: p. 999). Visual packaging design and branding must communicate effectively in the competitive supermarket environment as it plays a major role in the low involvement, rushed decision-making. Innovative packaging is vital because it affects the perceived value and price differentiation in addition to supporting the promotion and communication of products in the highly competitive supermarket environment (Silayoi & Speece, 2004; Rundh, 2005). The diagram below shows how packaging design can trigger purchasing decisions (Figure 7.5.):

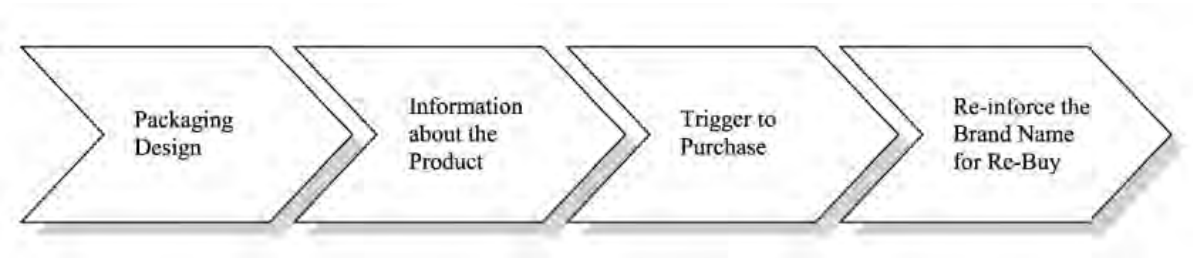


Figure 7.5.: Rundh (2009). 'Packaging design and trigger to purchase.' Figure 2.

The above diagram shows the importance of packaging design for initiating consumer awareness. Hence, packaging is a vital consideration when designing the new product. Within the retail environment, packaging must be suited to function logistically and used strategically in marketing. Graphics, colour, shape, size and product information are necessary considerations. In particular, vegetable packaging is usually transparent in the supermarkets, so opaque packaging may arise suspicion amongst consumers. However, a negative salience effect concerning transparency has been found to reduce vegetable consumption. When carrots were provided in a transparent package compared to an opaque one, participants ate 18g less carrots (Deng & Srinivasan, 2013).

The study provided an unforeseen insight into the perceived importance of environment and sustainability issues for adolescents. Some concepts drawn during the participatory design research highlighted environmental credentials and parents described how their adolescents were aware of food miles and locality as well as being knowledgeable about issues such as recycling from their school education. Research shows that some adolescents are keen to buy locally grown foods to reduce the environmental impact of their diet (Bissonnette & Contento, 2001). Parents in the current study assumed females were more aware and concerned for

environmental and sustainability issues in comparison to males. Recent evidence from a longitudinal survey studying individuals' value of sustainable food practices from adolescence to adulthood supports the finding that females value sustainable practices more than males (Larson, Laska & Neumark-Sztainer, 2019). Conversely, a study found that food miles were commonly cited when discussing where food came from, and that male adolescents were more likely to mention environmental factors influencing what they ate than females (Ronto *et al.*, 2016). Environment and sustainability is an area of increasing public concern and 27% of Britons now cite the environment in their top three issues facing the country (Smith, 2019). The appeal of lunch boxes divided into sections to minimise packaging was discussed and the appeal of minimising plastic and food wastage should be considered in any further product development. Food waste is a major problem; in 2015, food wastage totalled EUR 143 billion. Europeans throw away 30kg plastic packaging a year per person (Schweitzer *et al.*, 2018).

7.6. Recommendations for Puffin Produce

Puffin Produce's expected outcome of the PhD project was the development of an innovative vegetable-based NPD snacking product that will be targeted towards the younger generation in Wales, or possibly 'cross the border' into the English market. The researcher recommends that *Puffin Produce* further develop the '# Brown' NPD snacking concept. A recent report from *Mintel* called, *Global Food and Drink Trends 2030* suggests that the plant-based dietary trend will continue to grow as consumers become increasingly environmentally aware. In addition, consumers will seek foods that 'improve their brain health, states of mind and moods' (Mintel, 2019: p. 18). Thus, inclusion of functional ingredients in the '# Brown' concept to increase brain health and avoiding using any ingredients derived from animals so that the product can claim the 'vegan' credential on its packaging and in marketing activities is encouraged. Additionally, *Mintel* reports that consumers are increasingly seeking 'fresh' snacks, those with clean labels, no additives or preservatives and often found in the refrigerated section (Lockwood, 2018). The '# Brown' concept meets these trends as it is fresh, contains functional ingredients and has the potential to be plant-based.

Potatoes

The research indicates that potatoes should be the main vegetable ingredient in any further NPD. Potatoes were well-liked by participants in contrast to cabbage and cauliflower whilst helping to meet the energy requirements of the target market. The literature demonstrates that incorporating a less-familiar vegetable into novel snacking products is likely to decrease taste perceptions (Pope & Wolf, 2012). Therefore, as potatoes are a familiar vegetable, it is hoped that taste perceptions are not negatively affected by its inclusion in a snacking product. It would be feasible to use the potatoes unsuitable for business-to-business supermarket sales. This would enable *Puffin Produce* to generate greater value from their waste potatoes, which are otherwise sold for animal feed or ploughed back into the fields. Using waste vegetables from processing fits into the policy of sustainable business development (Ciurzyńska *et al.*, 2019).

Eating Occasions

Puffin Produce have recently built a factory suitable for chilled product manufacturing yet parents in the current study and previous research say that they would be reluctant to provide a chilled product in a packed lunch (Hawthorne *et al.*, 2018). Notably, the AHDB states that potatoes are rarely considered as a breakfast product, apart from hash-browns (Agriculture and Horticulture Development Board, 2015). Despite this, the '# Brown' concept has potential as an after school snack, breakfast food-to-go product or being sold in the school canteen. Approaching school caterers with a chilled product that could be sold at break time could potentially be more straightforward than launching the NPD directly into the retail environment.

Creation of a 'desirable' Brand

Whilst adolescents were adamant that peers and personal identity construction had no influence over themselves, the literature and Phase Three parental focus groups suggest otherwise (Ludvigsen & Scott, 2009; Leton*a et al.*, 2014; Holmberg*. et al.*, 2016). Commercially branded products ought to strategically use visual elements such as graphics, sizing, colour and product information on the packaging. Product branding and positioning is communicated through the branding and aids consumers in their decision-making (Silayoi & Speece, 2004; Ahmed, Ahmed & Salman, 2005). Currently, *Puffin Produce* target middle-aged and older adults, but

exposing younger individuals to brands has been shown to increase recognition in adulthood (Ellis, Holmes & Wright, 2010).

Welshness

The Welshness of any further *Puffin Produce* NPD is encouraged. Although adolescents were not questioned regarding national branding, parents were certainly keen on supporting Welsh businesses. Research shows that including a countryside photo as well as featuring the grower's name and origin increase customer acceptance and individuals will pay more for products of known origin (Hollywood *et al.*, 2013; Fernqvist, Spendrup & Ekelund, 2015). Other research found that participants value food more and exhibit a greater willingness to pay if the area of origin is smaller (Stefani, Romano & Cavicchi, 2006). Conceivably, labelling the NPD concepts as specifically grown in the county of Pembrokeshire may evoke increased idealistic perceptions rather than generically stating 'grown and packed in Wales.'

Further NPD

The researcher strongly recommends that *Puffin Produce* take into account the attitudes of adolescents and their parents when conducting any further product development. Research with parent and adolescent dyads will be of help because whilst parents seek energy provision, safety and healthfulness, they will not buy snack products unless they meet the adolescents' requirements of palatability, convenience and are suitably desirable.

7.7. Limitations of the Study

A few notable limitations associated with this research study affected the external validity and the generalisability of the findings to a wider population.

7.7.1. Funding Bias

Collaboration with a company partner meant that the study was required to support the interests of *Puffin Produce*. Participant sampling, the vegetables researched (cauliflower, potatoes and cabbage predominantly) and the NPD design brief were

constrained and biased towards fitting the perspective and interests of the company partner.

7.7.2. Methodology

Qualitative research may be considered limitative because interviewer and observer effects may result in participants altering their behaviour with the intention of acting in a more socially desirable way (Blumberg, Cooper & Schindler, 2011). In addition, researcher subjectivity can make it difficult to separate the researcher's assumptions, social background, interests, beliefs and values from the data collection process. Along these lines, reflexivity and self-awareness before, during and after the data collection was important (Ahern, 1999; Finlay, 2002). Triangulating research methods in the study helped to negate the above limitations and enabled cross-validation (Creswell *et al.*, 2006). The current study was cross-sectional, so caution should be taken in drawing any conclusions about the relationships between factors.

Specifically, reliance on schools and their staff proved difficult and the lack of enthusiasm and engagement from most school staff delayed data collection significantly. Then again, teachers can often feel like they have excessive duties and taking on an extra project for no tangible benefit was a 'big ask' (Passmore & Harris, 2005; Sturgis, Smith & Hughes, 2006). A further issue is the detail accessible from the school canteen sales data differed from school to school. None of the schools could offer a detailed breakdown of specifically which vegetables were chosen by pupils, as meals were recorded as 'Main Meal' or 'Hearty Meal.' One of the schools was only able to provide a months' worth of data and this meant that the other two schools needed to provide the same for comparative purposes.

7.7.3. Participant Samples

The relatively small sample size limits the generalisability and applicability of the study findings. However, whilst three schools may be considered a small sample, findings were similar across the schools and appeared to support larger-scale studies in the literature. Fairly small sample sizes lack generalisability to large populations and mean that conclusions about cause and effect cannot be made

(Patton, 2015; Denscombe, 2017). The use of opportunity and convenience sampling provided ease of participant recruitment, but meant that the sample is somewhat biased (Blumberg, Cooper & Schindler, 2011). Moreover, *Puffin Produce* requested a middle-class constitution of participants, as this was in accordance with their current target market demographic. Therefore, findings from the middle-class adolescent participants cannot be extrapolated to the entire adolescent population. Consequently, the extent to which the study findings are applicable to adolescents living in more socially disadvantaged areas is unknown.

7.7.4. Scope

Lastly, the methodological choices were constrained by the time available and the funding. Further research is recommended because this cross-sectional study only offered a ‘snapshot’ (see Section 8.3.). Even with the limitations of this explorative study mentioned above, many of the results are corroborated by previous similar studies.

CHAPTER EIGHT – CONCLUSION

8.1. Concluding the Thesis

The overall aim of the current study was:

> To develop a detailed insight into young adolescents' (aged 11- to 13-years-old) behaviour concerning vegetables through exploratory research. The project is an industry sponsored PhD, so the subsequent knowledge and understanding will be used to inform the vegetable marketing of *Puffin Produce*.

Searching the literature provided an abundance of research studies concerning adolescents' poor eating habits and the multitude of factors that influence their decision-making around food. Perhaps the rising levels of overweight and obesity worldwide have led to the influx of research in this highly topical area. There is a consensus amongst published studies and the current study that poor eating habits in addition to low fruit and vegetable consumption, is rife amongst adolescents. The current research study utilised a triangulated approach of quantitative and qualitative data collection to explore the various factors affecting adolescents' attitudes, routines, behaviours and food consumption whilst exploring the multitude of factors influencing these eating habits.

Discussions with participants encompassed influencing factors across all of Bronfenbrenner's EST levels. Thematic analysis deduced a variety of intrapersonal and extrapersonal factors perceived to influence an adolescents' decision-making around food. Participants across all three phases of the study acknowledged that dietary patterns change at the start of secondary school due to adolescents having greater autonomy and independence. The three themes of convenience, taste preferences and parenting appeared central to influencing adolescents' eating habits and vegetable consumption. The desire for convenience and the reluctance to queue in the school canteen or carry out extensive food preparation was considered vital for adolescent consumers. Moreover, the awareness of parenting having a long-term influence on eating habits was agreed upon particularly with regard to the effect of early childhood and continued dietary rule enforcement. In spite of the numerous factors, taste preferences tended to prevail as adolescents are reluctant to force themselves to eat disliked foods.

It is hoped that by making vegetables desirable, the health and eating habits of Wales' younger generation can be improved. Developing healthier eating habits that continue throughout an individual's life will have a long-lasting impact, which is in line with the *Wales Future Generations Act*. The Act has seven well-being goals and 'a healthier Wales' is the main goal targeted by this research project (Wales Future Generations Commissioner for Wales, no date). In conclusion, the researcher recommends that the '# Brown' concept undergoes further NPD with *Puffin Produce*, and taste testing with the target consumer of adolescents aged 11- to 13-years-old is incorporated in the product's development. This vegetable-based novel snacking product could be suitable for targeting the school catering market or the retail environment.

8.2. Contributions to Knowledge

8.2.1. Filling 'gaps' in the Literature

- The majority of research exploring the barriers to eating healthfully focus on adults or parental views of adolescents. Exploring what factors catering staff perceived to impact adolescents' food consumption and eating behaviours was a novel approach as this perspective is rarely taken (Moore *et al.*, 2010; Day *et al.*, 2013).
- Secondly, little research has explored the attitudes and behaviours of Welsh adolescents although they experience higher levels of overweight than English children (Bailey, 2016) (see Section 2.4.2.). Adolescents living in the geographical research area of South Wales have not been researched in recent years (Warren *et al.*, 2008).
- The current study provides a repeatable approach to an in-depth understanding of the eating habits of 11- to 13-year-olds as a result of participatory engagement. Participatory design research with adolescents and the design of food products has not been done before.

8.2.2. Knowledge into the Factors Influencing Eating Habits

The study provides evidence for knowledge into the factors influencing adolescents eating habits and the relationships between these factors (see Table 7.1.). The three main influencing factors are Convenience, Taste Preferences and Parenting. Four

other factors of importance: Price Consciousness, Health Consciousness, Education and Peer Pressure.

8.2.3. List of Recommendations

Whilst the prospect of improving eating habits of Welsh adolescents through developing a vegetable-based product is overly ambitious, the novel research findings may inform healthful eating branding and marketing communications targeting adolescents.

- The plant-based dietary trend is expected to continue to grow, so the development of products that can promote themselves as ‘plant-based’ or ‘vegan’ is encouraged (Kantar Worldpanel, 2016).
- Use of functional ingredients such as pea protein is another market trend (Mintel, 2019). A concept containing functional ingredients was shown to parents in the Phase Three focus groups and it was well received.
- Consumer avoidance of refrigerated snacks without additives and preservatives is probable (Lockwood, 2018).
- Potatoes have greater potential for further NPD in comparison to cauliflower and cabbage-based snacks.
- Sustainability is important for conscious consumers. Using waste potatoes from Puffin Produce’s processing would meet this demand (Ciurzyńska et al., 2019).
- Parents were cautious about providing their adolescents with chilled snacks, so launching refrigerated snacks into the school canteen is to be encouraged initially.
- Developing a snack that has numerous eating occasions (breakfast, break time or as an after school snack) may increase sales.
- Create a ‘desirable’ brand image and age-appropriate packaging that helps adolescents construct their self-identity.
- Parents are keen to support Welsh businesses. Product packaging and marketing should emphasise the Welshness of the snack product.
- Products should be priced so that they are affordable for adolescents that need to budget their school dinner money allowance.

- Within the school canteen, staff could verbally encourage pupils and healthful products could be promoted.
- Adolescents could be educated in the area of making autonomous food choices in their parents' absence.

8.2.4. NPD Concept for Further Development

The NPD process resulted in an innovative yet feasible vegetable-based product and packaging concept suitable for *Puffin Produce* to develop further. Novel findings provide invaluable insight concerning what adolescents and their parents desire and require from a novel vegetable-based snacking product. The study findings are expected to aid further NPD, with the longer-term goal of increasing *Puffin Produce*'s product offering while reducing waste. Additionally, there is potential to extend the trading area from Wales to England, further expanding the business.

8.3. Recommendations

8.3.1. Recommendations for Change

No Price Increases

Increasing the prices of certain food items in the school canteen with the aim of increasing adolescents' fruit and vegetable consumption is discouraged. Toast is a filling, warm and cost-effective food and should not be subject to price increase, if plausible. Whilst increasing the price of cookies and brownies alongside decreasing the price of fruit may seem wise because adolescents mentioned that they were tempted by unhealthful options in the canteen, complete removal of these products is not recommended. If the prices of unhealthful canteen options increased significantly then pupils could potentially revert to bringing in a packed lunch or their own snacks instead. Prior studies have found packed lunches to be less regulated and school meals are usually more nutritious (Stevens *et al.*, 2013; Taylor *et al.*, 2019). Thus, school meals are more likely to aid in the study aim of improving the eating habits of adolescents and pupils should be encouraged to consume the foods provided in the school canteen.

School Environment

Focus group research with 11- to 13-year-old adolescent participants has found that they feel the school environment could do more to help them make healthier food choices in terms of the food that is provided and their education (McHugh *et al.*, 2019). Therefore, a multi-faceted approach is recommended, including introducing more healthful and convenient foods that meet adolescents' taste preferences. Taking a 'small-steps approach' that is less focused on persuasive appeals and more focused on nudges such as smaller packet sizes, less quantity discounts and 'surreptitiously improving food composition' may be effective (Chandon, 2013: p. 23). Further, Wilson *et al.*'s (2016) systematic review of thirteen studies found that 'primary' (subconscious physical, verbal or sensational cues) and 'salience' nudges (personally relevant information) were effective at subconsciously nudging adult participants towards making healthful choices. Perhaps catering staff could encourage healthful choices through verbal interaction and there is further scope for research into nudging theory in the school canteen environment.

Governmental Interventions and Taxation

'Parenting' was a highly significant influencing factor for young adolescents' food habits, concurring with previous studies. Whilst current parenting interventions establishing healthful eating tend to target parents with younger children, it is recommended that national policy is adapted accordingly for older children and adolescents. Piaget's TCD would suggest that the 'formal operational' stage of 11-years-old and over would be an appropriate age for educating, informing and enabling adolescents, particularly focusing on the autonomous food choices that adolescents make when independent of parental influence (Hudders *et al.*, 2017). Important to consider is that 'the majority of food consumed in Wales is not produced in Wales, policies directed at the Welsh manufacturing sector will have limited impact on the overall health of the population' (Evans *et al.*, 2017: p. 45). Even though evidence supports the taxation of unhealthful food and drinks with the intention of improving the populations' diet and reduce disease risk, it is impossible to account for unforeseen product reformulations and how future NPD may change consumption and buying behaviours (Smith *et al.*, 2018).

8.3.2. Recommendations for Further Research

Taste Testing

The participatory design research uncovered that most individuals shunned the concept of stealth vegetables. Imaginably, the scepticism towards the stealth vegetable-based NPD concepts would reduce if taste testing was organised. A more comprehensive study could include Food Scientists developing tasters and taste testing various recipes in booths to establish palatability preferences. Taste testing with a 9-point rating scale to enable qualitative data collection is recommended (Stone, Bleibaum & Thomas, 2012).

Continued Use of Parent and Adolescent Participants

Future studies should take into account the perspectives of both the adolescent consumer and the parent purchaser. Both stakeholder groups are considered vital as they have their own perspectives and concerns regarding snack products. The current study and previous research has established that parents can have different food buying priorities despite not consuming the product themselves (Bech-Larsen & Jensen, 2011; Baldassarre, Campo & Falcone, 2016). A new study could examine a large, randomly selected sample of adolescent and parent dyads in order to increase the generalisability of the results.

Laboratory Studies

Use of the Perceptual Experience Laboratory (PEL) at the university is encouraged. Use of eye-tracking methods would enable quantitative insight into how participants react to different products when in an immersive environment. Laboratory studies minimising extraneous variables would provide comparable quantitative data.

Naturalistic Environment

Laboratory studies have shown that peers affect adolescents' food selection. However, research in naturalistic environments possibly at home, at school or in the supermarket environment are recommended to determine the products suitability before launching (Salvy *et al.*, 2012). The non-committal responses given during Phase Three of the current study are considered limiting. Therefore, comparing the

target market's choice between novel vegetable-based snacking concepts and current, commercially branded conventional snack products is advised.

8.4. Final Conclusion

To conclude, as qualitative data was collected from a relatively small participant sample size, proving direct causality was impossible. Nonetheless, these results may be reproducible in other secondary schools with similar socio-demographic profiles and the findings are congruent with previous studies. There is evidence that a multitude of factors influence adolescents' eating habits. However, conclusions can be drawn that convenience, taste preferences and parenting are significant factors that must be considered in any further NPD for the adolescent target market. Whilst this study is principally focused on how the findings can aid the NPD process at *Puffin Produce*, the implications of the findings may influence healthy eating policy interventions. Marketers and commercial businesses may find the results of use when developing age-appropriate vegetable-based snacking products for adolescents.

This research study provided insight into the eating habits of young Welsh adolescents as well as gaining feedback for vegetable-based NPD concepts that endeavoured to make vegetables desirable. Although this study has its limitations, it fulfils the aim of the study and the managing director at *Puffin Produce* was satisfied with the results achieved in the research study. He said that all the final concepts were 'feasible' for the company and described the '# Brown' idea as 'really clever' and, 'something that I had never really thought of:'

> 'It's interesting that we have ended up with potato products. You know, I thought that we would be down the line with some sort of spinach thing… But we pack about a thousand tonnes of potatoes a week and [lots][‡] have a lint in them or a bit of green or whatever. So that's [X] tonnes a week of stuff that ... The only home for those sort of products is a mash or a hash brown, if you are doing a French fry it needs to be a different sort of variety of potato. So something like the '# Brown' is instantly the most commercial on this table.'

[‡] Commercially sensitive details have been omitted.

The current study findings indicate that there is potential to develop a chilled vegetable-based product suitable for break time at school or for after-school snacking.

Bibliography

A'Echevarria, A. and Patience, I. (2008) *Teaching Thinking Pocketbook*. Alresford: Teachers' Pocketbooks.

Aarsand, P. and Forsberg, L. (2010) 'Producing children's corporeal privacy: ethnography video recording as material-discursive practice.', *Qualitative Research.*, 10(2), pp. 249–268. doi: 10.1177/1468794109356744.

Addessi, E., Galloway, A., Visalberghi, E. and Birch, L. (2005) 'Specific social influences on the acceptance of novel foods in 2-5-year-old children', *Appetite*, 45(3), pp. 264–271. doi: 10.1016/j.appet.2005.07.007.

Advertising Standards Authority (2016) *ASA Hot Topic: Children.*, *Advertising Standards Authority*. [Online]. Available at: https://www.asa.org.uk/?gclid=Cj0KEQiAvJS3BRDd44fjndyii6MBEiQAN4EkPS6na04Vh_kFbrrhTkNWS4Nqnxgz7N1RvVJZFZSNM-UaAkPa8P8HAQ. (Accessed: 11 March 2016).

Agriculture and Horticulture Development Board (2015) *Consumer Category Report: November 2015*. [Online]. Available at: https://potatoes.ahdb.org.uk/sites/default/files/publication_upload/AHDB%20POTATOES%20Consumer%20Category%20Report%20Nov%2015.pdf (Accessed: 4 Januaury 2019).

Agriculture and Horticulture Development Board (2019) *In-home Consumption*, *Agriculture and Horticulture Development Board (AHDB)*. [Online]. Available at: https://potatoes.ahdb.org.uk/market-information-0/consumers (Accessed: 17 February 2020).

Ahern, K. (1999) 'Ten tips for reflexive bracketing', *Qualitative Health Research*, 9(3), pp. 407–411. doi: 10.1177/104973239900900309.

Ahmed, A., Ahmed, N. and Salman, A. (2005) 'Critical issues in packaged food business', *British Food Journal*, 107(10), pp. 760–780. doi: 10.1108/00070700510623531.

Ajzen, I. (2002) 'Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior', *Journal of Applied Social Psychology*, 32(4), pp. 665–683. doi: 10.1111/j.1559-1816.2002.tb00236.x.

Albani, V., Butler, L., Traill, W. and Kennedy, O. (2017) 'Fruit and vegetable intake: Change with age across childhood and adolescence', *British Journal of Nutrition*, 117(5), pp. 759–765. doi: 10.1017/S0007114517000599.

Andre, C. *et al.* (2014) 'The potato in the human diet: A complex matrix with potential health benefits', *Potato Research*, 57(3–4), pp. 201–214. doi: 10.1007/s11540-015-9287-3.

Ang, I., Trent, R., Gray, H., Wolf, R., Koch, P. and Contento, I. (2016) 'Comparison of school lunch cut fruit and whole fruit consumption in a naturalistic elementary school cafeteria setting', *Journal of Nutrition Education and Behavior*. 48(7), p. 14. doi: 10.1016/j.jneb.2016.04.041.

Angrosino, M. (2007) *Doing Ethnographic and Observational Research*. England: SAGE Publications.

Anzman-Frasca, S., Savage, J., Marini, M., Fisher, J. and Birch, L. (2012) 'Repeated exposure and associative conditioning promote preschool children's liking of vegetables', *Appetite*. 58(2), pp. 543–553. doi: 10.1016/j.appet.2011.11.012.

Anzman, S., Rollins, B. and Birch, L. (2010) 'Parental influence on children's early eating environments and obesity risk: Implications for prevention', *International Journal of Obesity*. Nature Publishing Group, 34(7), pp. 1116–1124. doi: 10.1038/ijo.2010.43.

Appleby, P., Key, T., Thorogood, M., Burr, M. and Mann, J. (2002) 'Mortality in British vegetarians', *Public Health Nutrition*, 5(1), pp. 29–36. doi: 10.1079/phn2001248.

Appleby, P. and Key, T. (2016) 'The long-term health of vegetarians and vegans', *Proceedings of the Nutrition Society*, 75(3), pp. 287–293. doi: 10.1017/S0029665115004334.

Appleton, K. *et al.* (2019) 'Liking and consumption of vegetables with more appealing and less appealing sensory properties: Associations with attitudes, food neophobia and food choice motivations in European adolescents', *Food Quality and Preference*. 75, pp. 179–186. doi: 10.1016/j.foodqual.2019.02.007.

Arcan, C., Neumark-Sztainer, D., Hannan, P., Van Den Berg, P., Story, M. and Larson, N. (2007) 'Parental eating behaviours, home food environment and adolescent intakes of fruits, vegetables and dairy foods: Longitudinal findings from Project EAT', *Public Health Nutrition*, 10(11), pp. 1257–1265. doi: 10.1017/S1368980007687151.

Arcelus, J., Mitchell, A., Wales, J. and Nielsen, S. (2011) 'Mortality rates in patients with anorexia nervosa and other eating disorders. A meta-analysis of 36 studies.', *Archives of General Psychiatry*, 68(7), pp. 724–731. [Online]. Available at: https://www.ncbi.nlm.nih.gov/pubmed/21727255. (Accessed: 13 Feburary 2020).

Arnett, J. and Hughes, M. (2012) *Adolescence and Emerging Adulthood: A Cultural Approach.* Pearson Education, United Kingdom.

Atkin, C. K. (1978) 'Observation of parent-child interaction in supermarket decision-making', *Journal of Marketing*, 42(4), pp. 41–45. doi: 10.2307/1250084.

Bailey, C. (2007) *A Guide to Qualitative Field Research*. 2nd edn. London: SAGE Publications.

Bailey, L. (2016) *Child Measurement Programme for Wales 2014/2015.*, *Public Health Wales NHS Trust.* [Online]. Available at: http://www.wales.nhs.uk/sitesplus/documents/888/12318 PHWO Child Measurement Eng August.pdf. (Accessed: 3 May 2017).

Baines, E. and Blatchford, P. (2019) 'School break and lunch times and young people's social lives: a follow-up national study', (May), p. 115. Available at: http://ow.ly/qtkn30oHeEO. (Accessed: 12 January 2020).

Baldassarre, F., Campo, R. and Falcone, A. (2016) 'Food for kids: How children influence their parents purchasing decisions', *Journal of Food Products Marketing*. Routledge, 22(5), pp. 596–609. doi: 10.1080/10454446.2016.1141143.

Bandura, A. (1977) *Social Learning Theory*. London: Prentice Hall.

Bandura, A. (1986) *Social Foundations of Thought and Action: A Social Cognitive Theory.* Englewood Cliffs: Prentice-Hall.

Baranowski, T. *et al.* (2013) 'Dimensions of vegetable parenting practices among preschoolers', *Appetite*. 69, pp. 89–93. doi: 10.1016/j.appet.2013.05.015.

Barker, M. (2017) *Lidl pilots fun size veg range*, *Fresh Produce Journal*. [Online]. Available at: http://www.fruitnet.com/fpj/article/171519/lidl-pilots-fun-size-veg-range (Accessed: 14 January 2020).

Baselice, A., Colantuoni, F., Lass, D., Nardone, G. and Stasi, A. (2017) 'Trends in EU consumers' attitude towards fresh-cut fruit and vegetables', *Food Quality and Preference*. 59, pp. 87–96. doi: 10.1016/j.foodqual.2017.01.008.

Bassett, R., Chapman, G. and Beagan, B. (2008) 'Autonomy and control: The co-construction of adolescent food choice', *Appetite*, 50(2–3), pp. 325–332. doi:

10.1016/j.appet.2007.08.009.

Bauer, K, Larson, N., Nelson, M., Story, M. and Neumark-Sztainer, D. (2009) 'Socio-environmental, personal and behavioural predictors of fast-food intake among adolescents', *Public Health Nutrition*, 12(10), pp. 1767–1774. doi: 10.1017/S1368980008004394.

Bazeley, P. and Jackson, K. (2013) *Qualitative Data Analysis with NVivo*. London: SAGE Publications.

Beales, J. and Kulick, R. (2013) 'Does advertising on television cause childhood obesity ? A longitudinal analysis', *Journal of Public Policy & Marketing*, 32(2), pp. 185–194. doi: 10.1509/jppm.11.051.

Bech-Larsen, T. and Jensen, B. (2011) 'Food quality assessment in parent-child dyads - A hall-test of healthier in-between meals for adolescents', *Food Quality and Preference*. 22(7), pp. 614–619. doi: 10.1016/j.foodqual.2011.03.004.

Bech-Larsen, T., Jensen, B. and Pedersen, S. (2010) 'An exploration of adolescent snacking conventions and dilemmas', *Young Consumers*, 11(4), pp. 253–263. doi: 10.1108/17473611011093899.

Bech-Larsen, T. and Kazbare, L. (2014) 'Perceptions of healthy eating in transitional phases of life: Results of four focus groups with adolescents and older adults', *British Food Journal*, 116(4), pp. 570–584. doi: 10.1108/BFJ-05-2012-0117.

Beeken, R. and Wardle, J. (2013) 'Public beliefs about the causes of obesity and attitudes towards policy initiatives in Great Britain', *Public Health Nutrition*, 16(12), pp. 2132–2137. doi: 10.1017/S1368980013001821.

Bellisle, F. (2004) 'Effects of diet on behaviour and cognition in children', *British Journal of Nutrition*. 92(2), pp. 227–232. doi: 10.1079/bjn20041171.

Bellisle, F. (2014) 'Meals and snacking, diet quality and energy balance', *Physiology and Behavior*. 134(C), pp. 38–43. doi: 10.1016/j.physbeh.2014.03.010.

Benelam, B. (2009) 'Satiation, satiety and their effects on eating behaviour', *Nutrition Bulletin*, 34(2), pp. 126–173.

Benton, D. (2012) 'Vitamins and neural and cognitive developmental outcomes in children', *Proceedings of the Nutrition Society*, University College Cork, Republic of Ireland, 15–17 June 2011. 71(1), pp. 14–26. doi: 10.1017/S0029665111003247. (Accessed: 4 January 2019).

Bere, E., Van Lenthe, F., Klepp, K., Brug, J. (2008) 'Why do parents' education level and income affect the amount of fruits and vegetables adolescents eat?', *European Journal of Public Health*, 18(6), pp. 611–615. doi: 10.1093/eurpub/ckn081.

Bere, E., Brug, J. and Klepp, K. (2008) 'Why do boys eat less fruit and vegetables than girls?', *Public Health Nutrition*, 11(3), pp. 321–325. doi: 10.1017/S1368980007000729.

Berkey, C., Rockett, H., Gillman, M., Field, A. and Colditz, G. (2003) 'Longitudinal study of skipping breakfast and weight change in adolescents', *International Journal of Obesity*, 27, pp. 1258–1266. doi: 10.1038/sj.ijo.0802402.

Berkman, N., Brownley, K. and Peat, C. (2015) 'Management and Outcome of Binge-Eating Disorder', *Comparative Effectiveness Reviews*. No. 16. [Online]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK338301/table/introduction.t1/. (Accessed: 5 March 2020).

Berrie-Johnson, M. (2005) *The Allergy Aware Schools Catering Manual.* London: Berrydales Books.

Besson, T., Bouxom, H. and Jaubert, T. (2020) 'Halo It's Meat! the effect of the vegetarian label on calorie perception and food choices', *Ecology of Food and Nutrition*. 59(1), pp. 3–20. doi: 10.1080/03670244.2019.1652820.

Bevan, A., Hartwell, H., Hemingway, A. and Da Costa Proença, R. (2015) 'An exploration of the fruit and vegetable "foodscape" in a university setting for staff: A preliminary study', *British Food Journal*, 117(1), pp. 37–49. doi: 10.1108/BFJ-06-2013-0153.

Biometric Technology Today (2010) 'Education, Education, Education...', *Biometric Technology Today*, 3, pp. 10–11.

Birch, L. (1998) 'Development of food acceptance patterns in the first years of life', *Proceedings of the Nutrition Society*, 57, pp. 617–624. doi: 10.1079/pns19980090.

Birch, L. and Ventura, A. (2009) 'Preventing childhood obesity: What works?', *International Journal of Obesity*. Nature Publishing Group, 33(1), pp. 74–81. doi: 10.1038/ijo.2009.22.

Bissonnette, M. and Contento, I. (2001) 'Adolescents' perspectives and food choice behaviors in terms of the environmental impacts of food production practices: Application of a psychosocial model', *Journal of Nutrition Education and Behavior*, 33(2), pp. 72–82. doi: 10.1016/s1499-4046(06)60170-x.

Blaine, R., Kachurak, A., Davison, K., Klabunde, R. and Fisher, J. (2017) 'Food parenting and child snacking: a systematic review', *International Journal of Behavioral Nutrition and Physical Activity*, 14(146). doi: 10.1186/s12966-017-0593-9.

Blanchette, L. and Brug, J. (2005) 'Determinants of fruit and vegetable consumption among 6–12-year-old children and effective interventions to increase consumption - Blanchette - 2005 - Journal of Human Nutrition and Dietetics - Wiley Online Library', *Journal of Human Nutrition and Dietetics*, 18(6), pp. 431–443.

Blissett, J. (2011) 'Relationships between parenting style, feeding style and feeding practices and fruit and vegetable consumption in early childhood', *Appetite*. 57(3), pp. 826–831. doi: 10.1016/j.appet.2011.05.318.

Blissett, J. and Fogel, A. (2013) 'Intrinsic and extrinsic influences on children's acceptance of new foods', *Physiology and Behavior*. 121, pp. 89–95. doi: 10.1016/j.physbeh.2013.02.013.

Blumberg, B., Cooper, D. and Schindler, P. (2011) *Business Research Methods.* 4th edn. New York: McGraw-Hill Education.

Boeing, H. *et al.* (2012) 'Critical review: Vegetables and fruit in the prevention of chronic diseases', *European Journal of Nutrition*, 51(6), pp. 637–663. doi: 10.1007/s00394-012-0380-y.

Boivin, D. *et al.* (2009) 'Antiproliferative and antioxidant activities of common vegetables: A comparative study', *Food Chemistry*, 112(2), pp. 374–380. doi: 10.1016/j.foodchem.2008.05.084.

Bolton, G. (2005) *Reflective Practice: Writing and Professional Development.* 2nd edn. London: SAGE Publications.

Bosetti, C. *et al.* (2012) 'Cruciferous vegetables and cancer risk in a network of case-control studies', *Annals of Oncology*, 23(8), pp. 2198–2203. doi: 10.1093/annonc/mdr604.

Bourdieu, P. (1984) *Distinction. A Social Critique of the Judgement of Taste*. Cambridge, Massachusetts: Harvard University Press.

Boutelle, K., Birkeland, R., Hannan, P., Story, M. and Neumark-Sztainer, D. (2007) 'Fast food for family meals: Relationships with parent and adolescent food intake, home food

availability and weight status', *Public Health Nutrition*, 10(1), pp. 16–23. doi: 10.1017/S136898000721794X.

Boyland, E. and Halford, J. (2013) 'Television advertising and branding. Effects on eating behaviour and food preferences in children', *Appetite*. 62, pp. 236–241. doi: 10.1016/j.appet.2012.01.032.

Bradbury, B. and Andrews, R. (2010) 'State devolution and National identity: Continuity and change in the politics of Welshness and Britishness in Wales', 63(2), pp. 229–249. doi: 10.1093/pa/gsp029.

Braithwaite, I., Stewart, A., Hancox, R., Beasley, R., Murphy, R. and Mitchell, E. (2014) 'Fast-food consumption and body mass index in children and adolescents: An international cross-sectional study', *BMJ Open*, 4(12), pp. 1–9. doi: 10.1136/bmjopen-2014-005813.

Brannen, J. and Storey, P. (1998) 'School meals and the start of secondary school', *Health Education Research*, 13(1), pp. 73–86. doi: 10.1093/her/13.1.73.

Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(3), pp. 77–101. doi: 10.1017/CBO9781107415324.004.

Brembeck, H. *et al.* (2013) 'Exploring children's foodscapes', *Children's Geographies*, 11(1), pp. 74–88. doi: 10.1080/14733285.2013.743282.

Bridges, E. and Briesch, R. (2006) 'The "nag factor" and children's product categories', *International Journal of Advertising*, 25(2), pp. 157–187. doi: 10.1080/02650487.2006.11072961.

Briefel, R., Wilson, A. and Gleason, P. (2008) 'Consumption of low-nutrient, energy-dense foods and beverages at school, home, and other locations among school lunch participants and nonparticipants', *Journal of the American Dietetic Association*, 109(2), pp. S79–S90. doi: 10.1016/j.jada.2008.10.064.

British Nutritional Foundation (no date a) *Functional Foods*. [Online]. Available at: https://www.nutrition.org.uk/nutritionscience/foodfacts/functional-foods.html?__cf_chl_jschl_tk__=14353d27d9a024a081ad4f5c4d5fd3cecfcd87aa-1578394296-0-AZiNkS12_PZtEaFsJo5lUOjJGXKbDSdNYfAIQx9sKJtId4c6ZBs2eHpdOav4FtLKu1g6SiqJtAxf842fGh8sRC7hllr32IPdgiOzk6S (Accessed: 7 January 2020).

British Nutritional Foundation (no date b) *Nutrient Requirements*, *British Nutrition Foundation*.[Online]. Available at: https://www.nutrition.org.uk/nutritionscience/nutrients-food-and-ingredients/nutrient-requirements.html?start=1&__cf_chl_jschl_tk__=6692e7cf9c5046302e159e33ccabe7042c217a1a-1578988003-0-AdUY6Hjq_YeEP2E7GK5wr65l2kDiXKQKC4hinj94TX40x-XCxGWrxOJK52DoPI2WIHE1O (Accessed: 14 January 2020).

British Nutritional Foundation (no date c) *The Eatwell Guide - A Revised Healthy Eating Model*, *BNF*. [Online]. Available at: https://www.nutrition.org.uk/healthyliving/healthydiet/eatwell.html?__cf_chl_jschl_tk__=f78f0a2d06a4b9edaa257327a9f42858b834ea03-1578119065-0-AUuh3uC6J37dOIAPh6dSLHf3qqlGRm30AB4l3uZavyum9bDQVAiKJYtN6CZb8T5FL1G_re3-QN9FwQuRRrv0v2HZz1s5ry00KHZTt-NIMzzyMVp5Y (Accessed: 4 January 2019).

Brofenbrenner, U. (1979) *The Ecology of Human Development*. Cambridge: Harvard University Press.

Bronfenbrenner, U. (1994) 'Ecological Models of Human Development', in Gauvain, M. and Cole, M. (eds) *Readings on the development of children*. New York: Freeman, pp. 37–43. doi: 10.1007/978-0-387-79061-9_437.

Bruce, A. S. *et al.* (2014) 'Branding and a child's brain: An fMRI study of neural responses to logos', *Social Cognitive and Affective Neuroscience*, 9(1), pp. 118–122. doi: 10.1093/scan/nss109.

Bruening, M. *et al.* (2012) 'Relationship between adolescents' and their friends' eating behaviors: Breakfast, fruit, vegetable, whole-grain, and dairy intake', *Journal of the Academy of Nutrition and Dietetics*. 112(10), pp. 1608–1613. doi: 10.1016/j.jand.2012.07.008.

Brug, J. Tak, N., Te Velde, S., Bere, E. and De Bourdeaudhuij, I. (2008) 'Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: Results from observational studies', *British Journal of Nutrition*, 29(1), pp. 7–14. doi: 10.1017/S0007114508892458.

Bryman, A. (1992) 'Quantitative and qualitative research: further reflections on their integration', in Brannen, J. (ed.) *Mixing Methods: Quantitative and Qualitative Research*. Aldershot, England: Avebury Publishing Limited. pp. 57–80.

Bryman, A. (2016) *Social Research Methods.* 5th edn. Oxford, England: Oxford University Press.

Bucchianeri, M. M., Eisenberg, M. E. and Neumark-Sztainer, D. (2013) 'Weightism, racism, classism, and sexism: Shared forms of harassment in adolescents', *Journal of Adolescent Health*. 53(1), pp. 47–53. doi: 10.1016/j.jadohealth.2013.01.006.

Buckingham, D. (2009) 'The appliance of science: the role of evidence in the making of regulatory policy on children and food advertising in the UK', *International Journal of Cultural Policy*, 15(2), pp. 201–215. doi: 10.1080/10286630802651594.

Burgoine, T. Forouhi, N., Griffin, S., Brage, S., Wareham, N. and Monsivais, P. (2016) 'Does neighborhood fast-food outlet exposure amplify inequalities in diet and obesity? A cross-sectional study', *American Journal of Clinical Nutrition*, 103(6), pp. 1540–1547. doi: 10.3945/ajcn.115.128132.

Burrows, T., Goldman, S., Olson, R., Byrne, B. and Coventry, W. (2017) 'Associations between selected dietary behaviours and academic achievement: A study of Australian school aged children', *Appetite*. 116, pp. 372–380. doi: 10.1016/j.appet.2017.05.008.

Calvert, S. (2008) 'Children as consumers: Advertising and marketing', *Future of Children*, 18(1), pp. 205–234. doi: 10.1353/foc.0.0001.

Cambridge Dictionary (no date) *Pester Power*, *Cambridge Dictionary*. [Online]. Available at: https://dictionary.cambridge.org/dictionary/english/pester-power (Accessed: 5 March 2020).

Campbell, C. and Campbell, T. (2006) *The China Study. Startling Implications for Diet, Weight Loss and Long-term Health.* Dallas, USA: BenBella Books Ltd.

Cancer Research UK (2018) *Teens likely to crave junk food after watching TV ads*, *ScienceDaily*. [Online]. Available at: https://www.cancerresearchuk.org/about-us/cancer-news/press-release/2018-01-15-teens-likely-to-crave-junk-food-after-watching-tv-ads (Accessed: 14 January 2020).

Capaldi-Phillips, E. and Wadhera, D. (2014) 'Associative conditioning can increase liking for and consumption of brussels sprouts in children aged 3 to 5 years', *Journal of the Academy of Nutrition and Dietetics*. 114(8), pp. 1236–1241. doi: 10.1016/j.jand.2013.11.014.

Caprio, S. *et al.* (2008) 'Influence of race, ethnicity, and culture on childhood obesity: Implications for prevention and treatment: A consensus statement of Shaping America's Health and the Obesity Society', *Diabetes Care*, 31(11), pp. 2211–2221. doi:

10.2337/dc08-9024.

Carter, O., Patterson, L., Donovan, R., Ewing, M. and Roberts, C. (2011) 'Children's understanding of the selling versus persuasive intent of junk food advertising: Implications for regulation', *Social Science and Medicine*. 72(6), pp. 962–968. doi: 10.1016/j.socscimed.2011.01.018.

Cecchini, M., Sassi, F., Lauer, J., Lee, Y., Guajardo-Barron, V. and Chisholm, D. (2010) 'Tackling of unhealthy diets, physical inactivity, and obesity: Health effects and cost-effectiveness', *The Lancet*. 376(9754), pp. 1775–1784. doi: 10.1016/S0140-6736(10)61514-0.

Central Advisory Council for Education (1967) *The Plowden Report. Children and their Primary Schools.* London. [Online]. Available at: http://www.educationengland.org.uk/documents/plowden/plowden1967-1.html. (Acessed: 3 January 2020).

Chandler, D. (2007) *Semiotics: The Basics*. 3rd edn. London: Routledge.

Chandon, P. (2013) 'How package design and packaged-based marketing claims lead to overeating', *Applied Economic Perspectives and Policy*, 35(1), pp. 7–31. doi: 10.1093/aepp/pps028.

Change4Life (2017) *School Fruit and Vegetable Scheme*, *Change4Life*. [Online]. Available at: https://assets.nhs.uk/prod/documents/SFVS-factfile-2017.pdf. (Accessed: 5 May 2017).

Chaplin, L. and John, D. (2005) 'The development of self-brand connections in children and adolescents', *Journal of Consumer Research*, 32(1), pp. 119–129. doi: 10.1086/426622.

Childhood Obesity Foundation. (2015) *What are the Complications of Childhood Obesity?* [Online]. Available at: http://childhoodobesityfoundation.ca/what-is-childhood-obesity/complications-childhood-obesity/ (Accessed: 5 May 2017).

Christensen, P. (2004) 'Children's participation in ethnographic research: Issues of power and representation', *Children and Society*, 18(2), pp. 165–176. [Online]. Available at: http://www3.interscience.wiley.com.ezproxy.library.usyd.edu.au/cgi-bin/fulltext/107641600/PDFSTART. (Accessed: 22 March 2017).

Christensen, P. and Prout, A. (2002) 'Working with ethical symmetry in social research with children', *Childhood: A Global Journal of Child Research*, 9(4), pp. 477–497. doi: 10.1177/0907568202009004007.

Ciurzyńska, A. *et al.* (2019) 'Eating habits and sustainable food production in the development of innovative "healthy" snacks (running title: Innovative and "healthy" snacks)', *Sustainability*, 11(10), pp. 1–20. doi: 10.3390/su11102800.

Clarke, V. and Braun, V. (2013) 'Teaching Thematic Analysis: Over-coming challenges and developing strategies for effective learning.', *The Psychologist*, 26(2), pp. 120–123.

Connell, P., Brucks, M. and Nielsen, J. (2014) 'How childhood advertising exposure can create biased product evaluations that persist into adulthood', *Journal of Consumer Research*, 41(1), pp. 119–134. doi: 10.1086/675218.

Contento, I., Williams, S., Michela, J. and Franklin, A. (2006) 'Understanding the food choice process of adolescents in the context of family and friends', *Journal of Adolescent Health*, 38(5), pp. 575–582. doi: 10.1016/j.jadohealth.2005.05.025.

Cooke, K. (2019) *How popular is Dry January?*, *Kantar Worldpanel*. [Online].Available at: https://uk.kantar.com/consumer/leisure/2019/how-popular-is-dry-january/ (Accessed: 14 January 2020).

Cooke, L., Wardle, J., Gibson, E., Sapochnik, M., Sheiham, A. and Lawson, M.. (2004) 'Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children', *Public Health Nutrition*, 7(2), pp. 295–302. doi: 10.1079/phn2003527.

Coolican, H. (2009) *Research Methods and Statistics in Psychology.* 5th edn. United Kingdom: Taylor and Francis.

Corbetta, P. (2003) *Social Research: Theory Methods and Techniques.* London: SAGE Publications.

Corsini, N., Slater, A., Harrison, A., Cooke, L. and Cox, D. (2013) 'Rewards can be used effectively with repeated exposure to increase liking of vegetables in 4-6-year-old children', *Public Health Nutrition*, 16(5), pp. 942–951. doi: 10.1017/S1368980011002035.

Cowley, S. (2007) *Getting the Buggers to Think*. 2nd edn. London: Continuum.

Creswell, J., Shope, R., Clark, V. and Green, D. (2006) 'How interpretive qualitative research extends mixed methods research', *Mid-South Educational Research Association*, 13(1), pp. 1–11. doi: Article.

Cribb, J., Johnson, P. and Joyce, R. (2012) *Jubilees compared: incomes, spending and work in the late 1970s and early 2010s*.

Croll, J., Neumark-Sztainer, D., Story, M., Wall, M.,, Perry, C. and Harnack, L. (2006) 'Adolescents involved in weight-related and power team sports have better eating patterns and nutrient intakes than non-sport-involved adolescents', *Journal of the American Dietetic Association*, 106(5), pp. 709–717. doi: 10.1016/j.jada.2006.02.010.

Cross, G. (2002) 'Valves of eesire: A Historian's perspective on parents, children, and marketing', *Journal of Consumer Research*, 29(3), pp. 441–447. doi: 10.1086/344423.

Crotty, M. (2003) *The Foundations of Social Research*. [Online]. Available at: https://books.google.co.uk/books?hl=en&lr=&id=yV-JCwAAQBAJ&oi=fnd&pg=PR5&ots=PZYr5T3Ud6&sig=TmrQWv07sNM5EG5Q2dqET0C1PCw#v=onepage&q&f=false.

Crowther, D. and Lancaster, G. (2012) *Research Methods*. 2nd edn. United Kingdom: Taylor & Francis.

Cullen, F. (2010) '"Two's up and poncing fags:" Young women's smoking practices, reciprocity and friendship', *Gender and Education*, 22(5), pp. 491–504. doi: 10.1080/09540250903481595.

Cullen, K. *et al.* (2000) 'Socioenvironmental influences on children's fruit, juice and vegetable consumption as reported by parents: reliability and validity of measures', *Public Health Nutrition*, 3(3), pp. 345–356. doi: 10.1017/s1368980000000392.

Cullen, K., Watson, K. and Konarik, M. (2009) 'Differences in fruit and vegetable exposure and preferences among adolescents receiving free fruit and vegetable snacks at school', *Appetite*, 52(3), pp. 740–744. doi: 10.1016/j.appet.2009.04.001.

Dar-Nimrod, I., Hansen, I., Proulx, T., Lehman, D., Chapman, B. and Duberstein, P. (2012) 'Coolness: An Empirical Investigation', *Journal of Individual Differences*, 33(3), pp. 175–185. doi: 10.1027/1614-0001/a000088.

Dauchet, L., Amouyel, P. and Dallongeville, J. (2005) 'Fruit and vegetable consumption and risk of stroke: A meta-analysis of cohort studies', *Neurology*, 65(8), pp. 1193–1197. doi: 10.1212/01.wnl.0000180600.09719.53.

Davison, K. and Birch, L. (2001) 'Childhood overweight: A contextual model and recommendations for future research', *Obesity Reviews*, 2(3), pp. 159–171. doi: 10.1046/j.1467-789x.2001.00036.x.

Dawson, C. (2009) *Introduction to Research Methods: A Practical Guide for Anyone Undertaking a Research Project.* Oxford: How To Books.

Day, R., Sahota, P., Christian, M. and Cocks, K. (2013) 'A qualitative study exploring pupil and school staff perceptions of school meal provision in England', *British Journal of Nutrition*, 114(9), pp. 1504–1514. doi: 10.1017/S0007114515002834.

Decaluwé, V. and Braet, C. (2003) 'Prevalence of binge-eating disorder in obese children and adolescents seeking weight-loss treatment', *International Journal of Obesity*, 27(3), pp. 404–409. doi: 10.1038/sj.ijo.0802233.

DeCosta, P., Møller, P., Frøst, M. and Olsen, A. (2017) 'Changing children's eating behaviour - A review of experimental research', *Appetite*. 113, pp. 327–357. doi: 10.1016/j.appet.2017.03.004.

Definition of 'cool' (no date) *Collins Dictionary*. [Online]. Available at: https://www.collinsdictionary.com/dictionary/english/cool (Accessed: 5 September 2019).

Delwiche, J. (2012) 'You eat with your eyes first', *Physiology and Behavior*, 107(4), pp. 502–504. doi: 10.1016/j.physbeh.2012.07.007.

Deng, X. and Srinivasan, R. (2013) 'When do transparent packages increase (or decrease) food consumption?', *Journal of Marketing*, 77(4), pp. 104–117. doi: 10.1509/jm.11.0610.

Denscombe, M. (2017) *The Good Research Guide. For Small-Scale Social Research Projects.* 6th edn. London: Open University Press.

Department for Digital Cultural Media & Sport (2018) *Data Protection Act 2018 - Factsheet – General Data Processing (Sections 4 – 28)*. [Online]. Available at: https://www.gov.uk/government/collections/data-protection-act-2018. (Accessed: 10 September 2019).

Department for Education (2019) 'School food in England: Advice for governing boards'. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/788884/School-food-in-England-April2019-FINAL.pdf. (Accessed: 3 January 2020).

Department for Environment, Food & Rural Affairs (2017) *Horticulture Statistics 2016*. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/646536/hort-report-22sep17.pdf. (Accessed: 22 May 2017).

Department for Environment Food & Rural Affairs (2019) *National Statistics. Family Food 2017/18*. [Online]. Available at: https://www.gov.uk/government/publications/family-food-201718/family-food-201718. (Accessed: 5 January 2020).

Department for Environment Food & Rural Affairs (2018) *Department for Environment, Food and Rural Affairs Department of Agriculture, Environment and Rural Affairs (Northern Ireland) The Scottish Government, Rural and Environment Science and Analytical Services*. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/741062/AUK-2017-18sep18.pdf. (Accessed: 5 January 2020).

Department for Environment Food and Rural Affairs (2019) *Horticulture Statistics 2018*. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812420/hort-report-27jun19.pdf. (Accessed: 1 January 2020).

Department of Health (2009) *Be Active, Be Healthy: A Plan for Getting the Nation Moving*.

[Online]. Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_094358. (Accessed: 22 May 2017).

Department of Health (2015) *Calorie Reduction Pledge Development Tool - Using industry best practice examples. Public Health Responsibility Deal – Food Network*. [Online]. Available at: http://webarchive.nationalarchives.gov.uk/20180201180029/https://responsibilitydeal.dh.gov.uk/calorie-reduction-industry-best-practice-examples/. (Accessed: 20 September 2019).

Department of Health and Social Care (2018) *Childhood Obesity: A Plan for Action. Chapter Two.*, *HM Government.* London. doi: 10.1080/14672715.1971.10416245.

Dhar, T. and Baylis, K. (2011) 'Fast-Food Consumption and the Ban on advertising Targeting Children: The Quebec Experience', *Journal of Marketing Research*, 48(5), pp. 799–813. doi: 10.1509/jmkr.48.5.799.

Dimbleby, H. and Vincent, J. (2013) *The School Food Plan*. [Online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/251020/The_School_Food_Plan.pdf. (Accessed: 22 March 2017).

Dinnella, C. *et al.* (2016) 'Sensory determinants of stated liking for vegetable names and actual liking for canned vegetables: A cross-country study among European adolescents', *Appetite*, 107, pp. 339–347. doi: 10.1016/j.appet.2016.08.110.

Dittmar, H. (2007) 'The costs of consumer culture and the "Cage Within": The impact of the material "Good Life" and "Body Perfect" ideals on individuals' identity and well-being', *Psychological Inquiry*, 18(1), pp. 23–31. doi: 10.1080/10478400701389045.

Dovey, T., Staples, P., Gibson, E. and Halford, J. (2008) 'Food neophobia and "picky/fussy" eating in children: A review', *Appetite*, 50, pp. 181–193. doi: 10.1016/j.appet.2007.09.009.

Dowler, E. and O'Connor, D. (2012) 'Rights-based approaches to addressing food poverty and food insecurity in Ireland and UK', *Social Science and Medicine*. 74, pp. 44–51. doi: 10.1016/j.socscimed.2011.08.036.

Draxten, M. Fulkerson, S., Friend, S., Flattum, C. and Schow, R. (2014) 'Parental role modeling of fruits and vegetables at meals and snacks is associated with children's adequate consumption', *Appetite*. 78, pp. 1–7. doi: 10.1016/j.appet.2014.02.017.

Drewnowski, A. and Specter, S. (2004) 'Poverty and obesity: The role of energy density and energy costs', *The American Journal of Clinical Nutrition*, 79(1), pp. 6–16.

Duarte, C., Mohr, P., Wilson, C. and Wittert, G. (2010) 'Child mental health problems and obesity in early adulthood', *Journal of Pediatrics*. Mosby, Inc., 156(1), pp. 93–97. doi: 10.1016/j.jpeds.2009.06.066.

Duhaime's Law Dictionary (no date) *In Locos Parentis Definition*, *Duhaime's Law Dictionary*. [Online]. Available at: http://www.duhaime.org/LegalDictionary/I/InLocoParentis.aspx. (Accessed: 1 January 2020).

Dukeshire, S., MacPherson, M., Veitch, S. and Wang-Pruski, G. (2016) 'Slicing, dicing, spicing, and pricing: Factors influencing purchase and consumption of fresh potatoes', *Journal of Food Products Marketing*. Routledge, 22(2), pp. 240–257. doi: 10.1080/10454446.2014.1000438.

Dunham, L. and Kollar, L. (2006) 'Vegetarian eating for children and adolescents', *Journal of Pediatric Health Care*, 20(1), pp. 27–34. doi: 10.1016/j.pedhc.2005.08.012.

Dunlop, S., Freeman, B. and Jones, S. C. (2016) 'Marketing to youth in the digital age: The promotion of unhealthy products and health promoting behaviours on social media', *Media and Communication*, 4(3), pp. 35–49. doi: 10.17645/mac.v4i3.522.

Dunn, K., Mohr, P., Wilson, C. and Wittert, G. (2011) 'Determinants of fast-food consumption. An application of the Theory of Planned Behaviour', *Appetite*, 57(2), pp. 349–357. doi: 10.1016/j.appet.2011.06.004.

Eck, K. *et al.* (2019) 'Parents' and kids' eating away from home cognitions', *British Food Journal*, 121(5), pp. 1168–1182. doi: 10.1108/BFJ-07-2018-0431.

Eisenberg, M. E. and Neumark-Sztainer, D. (2010) 'Friends' dieting and disordered eating behaviors among adolescents five years later: Findings from Project EAT', *Journal of Adolescent Health*. 47(1), pp. 67–73. doi: 10.1016/j.jadohealth.2009.12.030.

Ejlerskov, K., Stead, M., Adamson, A., White, M. and Adams, J. (2018) 'The nature of UK supermarkets' policies on checkout food and associations with healthfulness and type of food displayed: Cross-sectional study', *International Journal of Behavioral Nutrition and Physical Activity*, 15(1), pp. 1–10. doi: 10.1186/s12966-018-0684-2.

Elgar, F., Roberts, C., Moore, L. and Tudor-Smith, C. (2004) 'Sedentary behaviour, physical activity and weight problems among adolescents in Wales', *Psychology and Health*, 19, pp. 48–49. doi: 10.1016/j.puhe.2004.10.011

Ellis, A. W., Holmes, S. J. and Wright, R. L. (2010) 'Age of acquisition and the recognition of brand names: On the importance of being early', *Journal of Consumer Psychology*, 20(1), pp. 43–52. doi: 10.1016/j.jcps.2009.08.001.

Encylopaedia Brittannica (no date) *Semiotics*, *Britannica*. [Online]. Available at: https://www.britannica.com/science/semiotics (Accessed: 11 January 2020).

Ensaff, H., Coan, S., Sahota, P., Braybrook, D. and Akter, H. (2015a) 'Adolescents' food choice and the place of plant-based foods', *Nutrients*, 7(6), pp. 4619–4637. doi: 10.3390/nu7064619.

Ensaff, H., Homer, M., Sahota, P., Braybrook, D. and Coan, S. (2015b) 'Food choice architecture: An intervention in a secondary school and its impact on students' plant-based food choices', *Nutrients*, 2(2), pp. 4426–4437. doi: 10.3390/nu7064426.

Evans, C., Greenwood, D. and Thomas, J. (2010) 'A cross-sectional survey of children's packed lunches in the UK: food and nutrient based results', *Journal of Epidemiology and Community Health*, 64(11), pp. 977–983. doi: 10.1136/jech.2008.085977.

Evans, E. *et al.* (2017) *Food for the Future. Food and Drink Wales.* [Online]. Available at: https://businesswales.gov.wales/foodanddrink/sites/fooddrink/files/ZERO2FIVE Food Industry Centre - Food for the Future Report.pdf.

Fairchild, R. and Collins, A. (2011) 'Serving up healthy and sustainable school meals? An analysis of school meal provision in Cardiff (UK)', *Journal of Environmental Policy and Planning*, 13(3), pp. 209–229. doi: 10.1080/1523908X.2011.578402.

Faith, M. Scanlon, K., Birch, L., Francis, L. and Sherry, B. (2004) 'Parent-child feeding strategies and their relationships to child eating and weight status', *Obesity Research*, 12(11), pp. 1711–1722. doi: 10.1038/oby.2004.212.

Feed me Better (no date) *How it happened*. [Online]. Available at: http://www.feedmebetter.com/why/howithappened.html (Accessed: 10 September 2019).

Ferguson, C., Muñoz, M., Garza, A. and Galindo, M. (2014) 'Concurrent and prospective analyses of peer, television and social media influences on body dissatisfaction, Eating Disorder symptoms and life satisfaction in adolescent girls', *Journal of Youth and Adolescence*, 43(1), pp. 1–14. doi: 10.1007/s10964-012-9898-9.

Fernqvist, F., Olsson, A. and Spendrup, S. (2016) 'What's in it for me ? Food packaging and consumer responses, a focus group study', *British Food Journal*, 117(3), pp. 1122–1135. doi: 10.1108/BFJ-08-2013-0224.

Fernqvist, F., Spendrup, S. and Ekelund, L. (2015) 'Changing consumer intake of potato, A focus group study', *British Food Journal*, 117(1), pp. 210–221. doi: 10.1108/BFJ-05-2013-0112.

Field, A., Gillman, M., Rosner, B., Rockett, H. and Colditz, G. (2003) 'Association between fruit and vegetable intake and change in body mass index among a large sample of children and adolescents in the United States', *International Journal of Obesity*, 27, pp. 821–826. doi: 10.1038/sj.ijo.0802297.

Finlay, L. (2002) 'Negotiating the swamp: The opportunity and challenge of reflexivity in research practice', *Qualitative Research*, 2(2), pp. 209–230. doi: 10.1177/146879410200200205.

Finlay, L. and Gough, B. (2003) *Reflexivity. A Practical Guide for Researchers in Health and Social Sciences.* Oxford: Blackwell Publishing.

Fisher, J., Mitchell, D., Smiciklas-Wright, H. and Birch, L. (2002) 'Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes', *Journal of the American Dietetic Association*, 102(1), pp. 58–64. doi: 10.1016/S0002-8223(02)90017-9.

Fitzgerald, A., Heary, C., Nixon, E. and Kelly, C. (2010) 'Factors influencing the food choices of Irish children and adolescentst: a qualitative investigation', *Health Promotion International*, 25(3), pp. 289–298. doi: 10.1093/heapro/daq021.

Flick, U. (2007) 'Quality in Qualitative Research', in *Designing Qualitative Research*. United Kingdom: SAGE Publications.

Flick, U. (2008) *Designing Qualitative Research* (*Qualitative Research Kit)*. United Kingdom: SAGE Publications.

Food and Agriculture Organization of the United Nations (1987) *Our Common Future*, *United Nations*. doi: 10.4324/9781912281220.

Food and Agriculture Organization of the United Nations (2006) *The Double Burden of Malnutrition: Case Studies from Six Developing Countries*. Food and Agricultural Organization.

Food and Drink Federation (no date) *Feeding Change*. London. [Online]. Available at: https://www.fdf.org.uk/corporate_pubs/feeding-change-report.pdf (Accessed: 20 September 2019).

Food and Drink Wales (2017) *Value of Welshness*. [Online]. Available at: https://businesswales.gov.wales/foodanddrink/sites/fooddrink/files/ZERO2FIVE Food Industry Centre - Food for the Future Report.pdf (Accessed: 11 January 2020).

Food For Life (no date) *Maintaining and Building on the School Food Standards.*, *Food For Life*. [Online]. Available at: https://www.foodforlife.org.uk/schools/benefits/school-food-standards (Accessed: 8 January 2020).

Food Standards Agency (2001) *The Balance of Good Health*. [Online]. Available at: http://www.food.gov.uk/sites/default/files/multimedia/pdfs/bghbooklet.pdf. (Accessed: 22 March 2017).

Food Standards Agency (2006) *Food Standards Agency: Putting the Consumer First. Annual Report 2005.06.* [Online]. Available at: http://tna.europarchive.org/20110912091909/http://www.food.gov.uk/multimedia/pdfs/annualreport0506.pdf. (Accessed: 23 March 2017).

Food Standards Agency (2007a) ‘Eatwell Plate’ [Online]. Available at: https://www.food.gov.uk/sites/default/files/media/document/eatwellpdf.PDF (Accessed: 8 June 2017).

Food Standards Agency (2007b) *FSA nutrient and food based guidelines for UK institutions.* [Online]. Available at: https://www.food.gov.uk/sites/default/files/multimedia/pdfs/nutrientinstitution.pdf (Accessed: 3 May 2017).

Food Standards Agency (2015) *Food allergen labelling and information requirements under the EU food information for consumers regulation no. 1169/2011: Technical Guide.* [Online]. Available at: https://www.food.gov.uk/sites/default/files/food-allergen-labelling-technical-guidance.pdf. (Accessed: 14 June 2017).

Ford, F., Mouratidou, T., Wademan, S. and Fraser, R. (2009) ‘Effect of the introduction of Healthy Start on dietary behaviour during and after pregnancy: Early results from the before and after Sheffield study’, *British Journal of Nutrition*, 101(12), pp. 1828–1836. doi: 10.1017/S0007114508135899.

Fossgard, E., Wergedahl, H., Bjørkkjær, T. and Holthe, A. (2019) ‘School lunch—Children’s space or teachers’ governmentality?: A study of 11-year olds’ experiences with and perceptions of packed lunches and lunch breaks in Norwegian primary schools’, *International Journal of Consumer Studies*, 43(2), pp. 218–226. doi: 10.1111/ijcs.12501.

French, S. *et al.* (1997) ‘Pricing strategy to promote fruit and vegetable purchase in high school cafeterias’, *Journal of the American Dietetic Association*, pp. 1008–1010. doi: 10.1016/S0002-8223(97)00242-3.

Fruit and Vegetable Alliance (2018) *Joint Response to ‘Health and Harmony: the Future for Food, Farming and the Environment in a Green Brexit’*. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/684003/future-farming-environment-consult-document.pdf (Accessed: 5 January 2020).

Garthwaite, K., Collins, P. and Bambra, C. (2015) ‘Social Science & Medicine Food for thought: An ethnographic study of negotiating ill health and food insecurity in a UK foodbank’, *Social Science & Medicine*. 132, pp. 38–44. doi: 10.1016/j.socscimed.2015.03.019.

Gibson, S. and Francis, L. (2015) ‘An analysis of potato consumption habits and diet quality among adults and children in the UK’, *Nutrition Bulletin*, 40(3), pp. 177–186. doi: 10.1111/nbu.12151.

Gifford-Smith, M., Dodge, K., Dishion, T. and McCord, J. (2005) ‘Peer influence in children and adolescents: Crossing the bridge from developmental to intervention science’, *Journal of Abnormal Child Psychology*, 33(3), pp. 255–265. doi: 10.1007/s10802-005-3563-7.

Gill, S. (2017) *Consumer insight: UK shopper behaviour and buying British.*, *Agriculture and Horticulture Development Board (AHDB)*. [Online]. Available at: http://www.ahdb.org.uk/consumerinsight/shopperbehaviour.aspx (Accessed: 22 March 2017).

Gladman, R. (2017) *Consumer insight: More growth for prepared potato products over Christmas 2016.*, *Agriculture and Horticulture Development Board (AHDB)*. [Online]. Available at: http://www.ahdb.org.uk/consumerinsight/potatogrowth.aspx. (Accessed: 22 March 2017).

Global Burden of Disesase Mortality and Causes of Death Collaborators (2016) *Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease*

Study 2015. doi: 10.17863/CAM.15722.

Gloor, P. and Cooper, S. (2007) *Coolhunting Chasing Down the Next Big Thing*. New York: AMACOM.

Goldsmith, R. (2007) 'Coolhunting: Chasing down the next big thing', *Journal of Consumer Marketing*, 45(7), pp. 444–445. doi: 10.5860/choice.45-1554.

Gorard, S. (2012) 'Who is eligible for free school meals ? Characterising free school meals as a measure of disadvantage in England', *British Educational Research Journal*, 38(6), pp. 1003–1017. doi: 10.1080/01411926.2011.608118.

Government (2015) 'Protected food name: Pembrokeshire Earlies specification'. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730667/pembrokeshire-earlies-spec.pdf (Accessed: 11 January 2020).

Gray, D. (2004) *Doing Research in the Real World*. London: SAGE Publications.

Greater London Authority (2018) *The Draft London Food Strategy: Healthy and Sustainable Food for London*. [Online]. Available at: www.london.gov.uk. (Accessed: 14 January 2019).

Grebitus, C., Printezis, I. and Printezis, A. (2017) 'Relationship between consumer behavior and success of urban agriculture', *Ecological Economics*. 136, pp. 189–200. doi: 10.1016/j.ecolecon.2017.02.010.

Greggs (2019) *Vegan Sausage Roll*, *Greggs*. [Online]. Available at: https://www.greggs.co.uk/bakes/vegan-sausage-roll (Accessed: 14 January 2020).

Gregori, D., Lorenzoni, G., Ballali, S., Vecchio, M., Verduci, E. and Berchialla. (2017) 'Is brand visibility on snacks packages affecting their consumption in children? Results from an experimental ad-libitum study', *Archivos Latinoamericanos de Nutrición*, 67.

Griffith, R., O'Connell, M. and Smith, K. (2013) *Food expenditure and nutritional quality over the Great Recession IFS Briefing Note BN143*, *IFS Briefing Note BN143. London: Institute for Fiscal Studies*. [Online]. Available at: https://www.ifs.org.uk/bns/bn143.pdf. Accessed: 14 June 2017).

Gu, C., Warkentin, S., Mais, L. and Carnell, S. (2017) 'Ethnic differences in parental feeding behaviors in UK parents of preschoolers', *Appetite*. 113, pp. 398–404. doi: 10.1016/j.appet.2017.03.001.

Gunther, C. *et al.* (2019) 'Food parenting practices that influence early adolescents' food choices during independent eating occasions', *Journal of Nutrition Education and Behavior*. 51(8), pp. 993–1002. doi: 10.1016/j.jneb.2019.05.597.

Haase, N. (2008) 'Healthy aspects of potatoes as part of the human diet', *Potato Research*, 51(3–4), pp. 239–258. doi: 10.1007/s11540-008-9111-4.

Hamerschlag, K. and Venkat, K. (2011) *Meat Eater's Guide to Climate Change and Health*, *Meat Eaters Guide*. Envrionmental Working Group. [Online]. Available at: https://www.ewg.org/meateatersguide/ (Accessed: 11 January 2020).

Hammersley, M. and Atkinson, P. (2007) *Ethnography: Principles in Practice.* 3rd edn. England: Routledge.

Hang, H., Davies, I. and Schüring, J. (2020) 'Children's conformity to social norms to eat healthy: A developmental perspective', *Social Science and Medicine*. 244, pp. 1–9. doi: 10.1016/j.socscimed.2019.112666.

Harcombe, Z. (2017) 'Designed by the food industry for wealth, not health: The "Eatwell

Guide"', *British Journal of Sports Medicine*, 51(24), pp. 1730–1731. doi: 10.1136/bjsports-2016-096297.

Hardy, E. (2019) *Bakery chain Greggs sees its shares rocket as vegan sausage rolls prove to be very good for the company's health*, *This is Money*. [Online]. Available at: https://www.thisismoney.co.uk/money/markets/article-7026795/Greggs-shares-spike-vegan-sausage-rolls-fly-shelves.html (Accessed: 14 January 2020).

Harrison, P. and Narayan, G. (2003) 'Differences in behavior, psychological factors, and environmental factors associated with participation in school sports and other activities in adolescence', *Journal of School Health*, 73(3), pp. 113–120. doi: 10.1111/j.1746-1561.2003.tb03585.x.

Harvey, F. and Jowit, J. (2012) *Fruit and vegetable consumption by poorest families falls 30%, figures show*, *The Guardian*. [Online]. Available at: https://www.theguardian.com/lifeandstyle/2012/jan/22/fruit-vegetable-consumption-poorer-families (Accessed: 14 June 2017).

Hawthorne, D. *et al.* (2018) 'Parental reports of lunch-Packing behaviours lack accuracy: Reported barriers and facilitators to packing school lunches', *Canadian Journal of Dietetic Practice and Research*, 79(3), pp. 99–105. doi: 10.3148/cjdpr-2018-011.

Hebdige, D. and Potter, A. (2007) 'A critical reframing of subcultural cool and consumption', *Advances in Consumer Research*, 8, pp. 527–530.

Hemar-Nicolas, V., Gollety, M., Damay, C. and Ezan, P. (2015) '"What brand do you eat ?" The influence of food brands within children' s peer groups', *Young Consumers*, 16(3), pp. 316–331. doi: 10.1108/YC-11-2014-00490.

Herland, M. (2017) 'Reflexive research: Investigating the process of growth in recognition of self-awareness and affect', *Qualitative Social Work*, 16(4), pp. 566–580. doi: 10.1177/1473325016634453.

Hess, J. M., Jonnalagadda, S. and Slavin, J. (2016) 'What is a snack, Why do we snack, and How can we choose better snacks? A review of the definitions of snacking, motivations to snack, contributions to dietary intake, and recommendations for improvement', *Advances in Nutrition*, 7(3), pp. 466–475. doi: 10.3945/an.115.009571.

Hess, T., Jonnalagadda, S. and Slavin, J. (2016) 'The impact of changing food choices on the blue water scarcity footprint and greenhouse gas emissions of the British diet: The example of potato, pasta and rice', *Journal of Cleaner Production*. 112, pp. 4558–4568. doi: 10.1016/j.jclepro.2015.08.098.

Higgs, S. (2015) 'Social norms and their influence on eating behaviours', *Appetite*. 86, pp. 38–44. doi: 10.1016/j.appet.2014.10.021.

Higgs, S. and Thomas, J. (2016) 'Social influences on eating', *Current Opinion in Behavioral Sciences*. 9, pp. 1–6. doi: 10.1016/j.cobeha.2015.10.005.

Hill, L., Casswell, S., Maskill, C., Jones, S. and Wyllie, A. (1998) 'Fruit and vegetables as adolescent food choices in New Zealand', *Health Promotion International*, 13(1), pp. 55–65. doi: 10.1093/heapro/13.1.55.

HM Revenue and Customs (2018) *Soft Drinks Industry Levy*, *Gov*. [Online]. Available at: https://www.gov.uk/topic/business-tax/soft-drinks-industry-levy (Accessed: 1 January 2020).

Hollywood, L., Wells, L., Armstrong, G. and Farley, H. (2013) 'Thinking outside the carton: Attitudes towards milk packaging', *British Food Journal*, 115(6), pp. 899–912. doi: 10.1108/BFJ-Jul-2010-0127.

Holmberg, C., Chaplin, J., Hillman, T. and Berg, C. (2016) 'Adolescents' presentation of

food in social media: An explorative study', *Appetite*. 99, pp. 121–129. doi: 10.1016/j.appet.2016.01.009.

Holtzblatt, K., Wendell, J. and Wood, S. (2005) *Rapid Contextual Design. A How-To Guide to Key Techniques for User-Centred Design.* San Francisco: Morgan Kaufmann Publishers.

Horgen, K. and Brownell, K. (2002) 'Comparison of price change and health message interventions in promoting healthy food choices', *Health Psychology*, 21(5), pp. 505–512. doi: 10.1037/0278-6133.21.5.505.

Horne, P., Lowe, F., Fleming, P. and Dowey, A. (1995) 'An effective procedure for changing food preferences in 5–7-year-old children', *Proceedings of the Nutrition Society*, 54, pp. 441–452. doi: 10.1079/pns19950013.

Van Der Horst, K., Kremers, S., Ferreira, I., Singh, A., Oenema, A. and Brug, J. (2007) 'Perceived parenting style and practices and the consumption of sugar-sweetened beverages by adolescents', *Health Education Research*, 22(2), pp. 295–304. doi: 10.1093/her/cyl080.

Hoyland, A., McWilliams, K., Duff, R. and Walton, J. (2012) 'Breakfast consumption in uk schoolchildren and provision of school breakfast clubs', *Nutrition Bulletin*, 37(3), pp. 232–240. doi: 10.1111/j.1467-3010.2012.01973.x.

Hu, T. and Bazzano, L. A. (2014) 'The low-carbohydrate diet and cardiovascular risk factors: Evidence from epidemiologic studies', *Nutrition, Metabolism and Cardiovascular Diseases*, 24, pp. 337–343. doi: 10.1016/j.numecd.2013.12.008.

Huang, R. and Yang, M. (2013) 'Buy what is advertised on television? Evidence from bans on child-directed food advertising', *Journal of Public Policy and Marketing*, 32(2), pp. 207–222. doi: 10.1509/jppm.11.114.

Hudders, L., De Pauw, P., Cauberghe, V., Panic, K., Zarouali, B. and Rozendaal, E. (2017) 'Shedding new light on how advertising literacy can affect children's processing of embedded advertising formats: A future research agenda', *Journal of Advertising*, 46(2), pp. 333–349. doi: 10.1080/00913367.2016.1269303.

Iannaccone, M., Olimpio, F., Cella, S. and Cotrufo, P. (2016) 'Self-esteem , body shame and eating disorder risk in obese and normal weight adolescents : A mediation model', *Eating Behaviors*. 21, pp. 80–83. doi: 10.1016/j.eatbeh.2015.12.010.

Ilie, S., Sutherland, A. and Vignoles, A. (2017) 'Revisiting free school meal eligibility as a proxy for pupil socio-economic deprivation', *British Educational Research Journal*, 43(2), pp. 253–274. doi: 10.1002/berj.3260.

Institute of Medicine and the Committee on Nutrition Standards for Foods in Schools (2007) *Nutrition Standards for Foods in Schools. Leading the Way Toward Healthier Youth.* National Academies Press. [Online]. Available at: https://www.nap.edu/catalog/11899/nutrition-standards-for-foods-in-schools-leading-the-way-toward. (Accessed: 8 June 2017).

Iversen, O., Dindler, C. and Hansen, E. (2013) 'Understanding teenagers' motivation in participatory design', *International Journal of Child-Computer Interaction*. 1(3–4), pp. 82–87. doi: 10.1016/j.ijcci.2014.02.002.

Van Jaarsveld, C. and Gulliford, M. C. (2015) 'Childhood obesity trends from primary care electronic health records in England between 1994 and 2013: Population-based cohort study', *Archives of Disease in Childhood*, 100(3), pp. 214–219. doi: 10.1136/archdischild-2014-307151.

Jacka, F. *et al.* (2011) 'A prospective study of diet quality and mental health in

adolescents', *PLoS ONE*, 6(9), pp. 1–7. doi: 10.1371/journal.pone.0024805.

Jacobi, C., Agras, S., Bryson, S. and Hammer, L. (2003) 'Behavioral validation, precursors, and concomitants of picky eating in childhood', *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(1), pp. 76–84. doi: 10.1097/00004583-200301000-00013.

James, A. (2007) 'Giving voice to children's voices: Practices and problems, pitfalls and potentials', *American Anthropologist*, 109(2), pp. 261–272. doi: 10.1525/aa.2007.109.2.261.

De Jans, S., Van de Sompel, D., Hudders, L. and Cauberghe, V. (2019) 'Advertising targeting young children: an overview of 10 years of research (2006–2016)', *International Journal of Advertising*. 38(2), pp. 173–206. doi: 10.1080/02650487.2017.1411056.

Jenkins, M. and Harrison, K. S. (1990) 'Focus groups: A discussion', *British Food Journal*, 92(9), pp. 33–37. doi: 10.1108/EUM0000000002333.

Jenkins, S. and Horner, S. D. (2005) 'Barriers that influence eating behaviors in adolescents', *Journal of Pediatric Nursing*, 20(4), pp. 258–267. doi: 10.1016/j.pedn.2005.02.014.

Jick, T. (1979) 'Mixing qualitative and quantitative methods: Triangulation in action', *Administrative Science Quarterly*. 24(4), pp.602-611. doi: 10.2307/2392366.

Jones, N., Conklin, A., Suhrcke, M. and Monsivais, P. (2014) 'The growing price gap between more and less healthy foods: Analysis of a novel longitudinal UK dataset.', *PLoS ONE*, 9(10), pp. 109–343.

Jones, S. and Fabrianesi, B. (2008) 'Gross for kids but good for parents: Differing messages in advertisements for the same products', *Public Health Nutrition*, 11(6), pp. 588–595. doi: 10.1017/S1368980007000894.

Jønsson, S., Angka, S., Olsen, K., Tolver, A. and Olsen, A. (2019) 'Repeated exposure to vegetable-enriched snack bars may increase children's liking for the bars - but not for the vegetables', *Appetite*, 140, pp. 1–9. doi: 10.1016/j.appet.2019.05.002.

Kamphuis, C., Jansen, T., Mackenbach, J. and Van Lenthe, F. (2015) 'Bourdieu's cultural capital in relation to food choices: A systematic review of cultural capital indicators and an empirical proof of concept', *PLoS ONE*, 10(8). doi: 10.1371/journal.pone.0130695.

Kantar Worldpanel (2013) *Appetite for Change? Nutrition and the Nation's Obesity Crisis.* [Online]. Available at: https://www.kantarworldpanel.com/en/PR/Appetite-for-Change--Nutrition-and-the-nations-obesity-crisis- (Accessed: 20 June 2017).

Kantar Worldpanel (2014) *A Global Ranking of the Most Common Chosen Consumer Brands.* [Online]. Available at: https://cn-en.kantar.com/media/985975/2015_global_brand_footprint_report.pdf (Accessed: 14 June 2017).

Kantar Worldpanel (2017) *Winning for Wales and Winning in Wales: A consumption driven perspective.* [Online]. Available at: https://businesswales.gov.wales/foodanddrink/sites/foodanddrink/files/documents/Food%20-%20Research%20-%20Kantar%20-%20Taste%20Wales%20-%20Giles%20Quick%20-%20Consumption%20behaviour.pdf (Accessed: 20.4.20).

Kantar Worldpanel (2016) *The Serious Business of Health.* [Online]. Available at: file:///C:/Users/sm75783/Downloads/Kantar_Worldpanel_Thoughts_on_Health.pdf. (23 January 2017).

Kapetanaki, A., Wills, W., Danesi, G. and Spencer, N. (2019) 'Socioeconomic differences and the potential role of tribes in young people's food and drink purchasing outside school

at lunchtime', *International Journal of Environmental Research and Public Health*, 16(14), pp. 1–15. doi: 10.3390/ijerph16142447.

Kearney, J. (2010) 'Food consumption trends and drivers', *Philosophical Transactions of The Royal Society*, pp. 2793–2807. doi: 10.1098/rstb.2010.0149.

Kelleher, B. (no date) *Maslow's Hierarchy of Needs for Employers*, *Dummies*. [Online]. Available at: https://www.dummies.com/business/human-resources/employee-engagement/maslows-hierarchy-of-needs-for-employees/ (Accessed: 17 February 2020).

Keller, K. *et al.* (2012) 'The impact of food branding on children's eating behavior and obesity', *Physiology and Behavior*. 106(3), pp. 379–386. doi: 10.1016/j.physbeh.2012.03.011.

Kellogg's (2015) *Isolation and Hunger: the reality of the school holidays for struggling families.*, *Kelloggs*. [Online]. Available at: http://pressoffice.kelloggs.co.uk/Going-hungry-so-their-children-can-eat-Third-of-parents-on-lower-incomes-have-skipped-meals-during-school-holidays (Accessed: 14 June 2017).

Kemp, K., Insch, A., Holdsworth, D. and Knight, J. (2010) 'Food miles: Do UK consumers actually care?', *Food Policy*. 35(6), pp. 504–513. doi: 10.1016/j.foodpol.2010.05.011.

Kensing, F. and Greenbaum, J. (2013) 'Heritage - having a say', in Simonsen, J. and Robertson, T. (eds) *Routledge international handbook of participatory design*. New York: Routledge, pp. 21–36.

Key, T., Appleby, P., Crowe, F., Bradbury, K., Schmidt, J. and Travis, R. (2014) 'Cancer in British vegetarians: updated analyses of 4998 incident cancers in a cohort of 32,491 meat eaters, 8612 fish eaters, 18,298 vegetarians, and 2246 vegans', *American Journal of Clinical Nutrition*, 100(2), pp. 378–385. doi: 10.3945/ajcn.113.071266.

Key, T. (2011) 'Fruit and vegetables and cancer risk', *British Journal of Cancer*. 104, pp. 6–11. doi: 10.1038/sj.bjc.6606032.

Kim, H. (2012) 'Research with children: challenges and dilemmas as an insider researcher', *Early Child Development and Care*, 182(2), pp. 263–276. doi: 10.1080/03004430.2011.555818.

Kirkland, D. and Jackson, A. (2009) '"We real cool:" Toward a theory of black masculine literacies', *Reading Research Quarterly*, 44(3), pp. 278–297. doi: 10.1598/rrq.44.3.3.

Knight, C. (2015) '"We can't go back a hundred million years:" Low-carbohydrate dieters' responses to nutritional primitivism', *Food, Culture and Society*. 18(3), pp. 441–461. doi: 10.1080/15528014.2015.1043107.

Kremers, S., Brug, J., De Vries, H. and Engels, R. (2003) 'Parenting style and adolescent fruit consumption', *Appetite*, 41(1), pp. 43–50. doi: 10.1016/S0195-6663(03)00038-2.

Krølner, R., Rasmussen, M., Brug, J., Klepp, K., Wind, M. and Due, P. (2011) 'Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part II: qualitative studies', *International Journal of Behavioral Nutrition and Physical Activity*, 8(112), pp. 1–38. doi: 10.1186/1479-5868-8-112.

Krueger, R. and Casey, M. (2014) 'Focus groups: A practical guide for applied research', in *Focus groups: A practical guide for applied research*. London: SAGE Publications.

Krueger, R. and Casey, M. (2009) *Focus groups : a practical guide for applied research*. London: SAGE Publications.

Kvale, S. (2007) 'Doing Interviews: Validation and generalization of interview knowledge', in *Doing Interviews*, pp. 121–128. London: SAGE Publications.

Lake, A., Rugg-Gunn, A., Hyland, R., Wood, C., Mathers, J. and Adamson, A. (2004) 'Longitudinal dietary change from adolescence to adulthood: Perceptions, attributions and evidence', *Appetite*, 42(3), pp. 255–263. doi: 10.1016/j.appet.2003.11.008.

Lake, A. and Townshend, T. (2006) 'Obesogenic environments: Exploring the built and food environments', *Journal of The Royal Society for the Promotion of Health*, 126(6), pp. 262–267. doi: 10.1177/1466424006070487.

Lakkakula, A., Geaghan, J., Zanovec, M., Pierce, S. and Tuuri, G. (2010) 'Repeated taste exposure increases liking for vegetables by low-income elementary school children', *Appetite*. 55, pp. 226–231. doi: 10.1016/j.appet.2010.06.003.

Lambert, V. and Glacken, M. (2011) 'Engaging with children in research: Theoretical and practical implications of negotiating informed consent/assent', *Nursing Ethics*, 18(6), pp. 781–801. doi: 10.1177/0969733011401122.

Larson, N., Laska, M., Story, M. and Neumark-Sztainer, D. (2012) 'Predictors of fruit and vegetable intake in young adulthood', *Journal of the Academy of Nutrition and Dietetics*. 112(8), pp. 1216–1222. doi: 10.1016/j.jand.2012.03.035.

Larson, N., Story, M., Eisenberg, M. and Neumark-Sztainer, D. (2006) 'Food preparation and purchasing roles among adolescents: Associations with sociodemographic characteristics and diet quality', *Journal of the American Dietetic Association*, 106(2), pp. 211–218. doi: 10.1016/j.jada.2005.10.029.

Larson, N., Miller, J., Watts, A., Story, M. and Neumark-Sztainer, D. (2016) 'Adolescent snacking behaviors are associated with dietary intake and weight status', *The Journal of Nutrition*, 146(7), pp. 1348–1355. doi: 10.3945/jn.116.230334.

Larson, N., Laska, M. N. and Neumark-Sztainer, D. (2019) 'Do young adults value sustainable diet practices? Continuity in values from adolescence to adulthood and linkages to dietary behaviour', *Public Health Nutrition*, 22(14), pp. 2598–2608. doi: 10.1017/S136898001900096X.

Laureati, M. *et al.* (2015) 'Food neophobia and liking for fruits and vegetables are not related to excess weight in Italian children', *Food Quality and Preference*. 40, pp. 125–131. doi: 10.1016/j.foodqual.2014.09.008.

Lavrakas, P. (ed.) (2008) *Encyclopedia of Survey Research Methods*. [Online]. Available at: http://methods.sagepub.com/Reference/encyclopedia-of-survey-research-methods. (Accessed: 20 September 2019).

Lawlor, M. and Prothero, A. (2011) 'Pester power - a battle of wills between children and their parents', *Journal of Marketing Management*, 27(5–6), pp. 561–581. doi: 10.1080/0267257X.2010.495281.

Learning Theories (no date) *Classical and Operant Conditioning (Skinner)*, *Learning Theories*. [Online]. Available at: https://www.learning-theories.com/operant-conditioning-skinner.html. (Accessed: 14 January 2020).

Van Lenthe, F., Jansen, T. and Kamphuis, C. (2015) 'Understanding socio-economic inequalities in food choice behaviour: Can Maslow's pyramid help?', *British Journal of Nutrition*, 113(7), pp. 1139–1147. doi: 10.1017/S0007114515000288.

Letona, P., Chacon, V., Roberto, C. and Barnoya, J. (2014) 'A qualitative study of children's snack food packaging perceptions and preferences', *BMC Public Health*, 14(1), pp. 1–6. doi: 10.1186/1471-2458-14-1274.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L. and Marcus, M. (2006) 'Overeating among seriously overweight children seeking treatment: Results of the children's eating disorder examination', *International Journal of Eating Disorders*, 39(2),

pp. 135–140. doi: 10.1002/eat.20218.

Lincoln, Y. and Guba, E. (2013) *The Constructivist Credo.* California: Left Cross Press Inc. [Online]. Available at: https://ebookcentral.proquest.com/lib/cardiffmet/reader.action?docID=1187038.

Liu, R. (2013) 'Dietary bioactive compounds and their health implications', *Journal of Food Science*, 78(SUPPL.1), pp. 18–25. doi: 10.1111/1750-3841.12101.

Live Science (2015) *What is a calorie?*, *Live Science*. [Online]. Available at: https://www.livescience.com/52802-what-is-a-calorie.html. (Accessed: 13 February 2020).

Lockwood, D. (2018) *'Fresh' Snacking is on the Rise*. [Online]. Available at: https://www.mintel.com/blog/food-market-news/fresh-snacking-is-on-the-rise. (Accessed: 20 September 2019).

Lomer, M., Parkes, G. and Sanderson, J. (2008) 'Review article: Lactose intolerance in clinical practice - Myths and realities', *Alimentary Pharmacology and Therapeutics*, 27(2), pp. 93–103. doi: 10.1111/j.1365-2036.2007.03557.x.

Loopstra, R., Reeves, A., Taylor-Robinson, D., Barr, B., McKee, M. and Stuckler, D. 2015) 'Austerity, sanctions, and the rise of food banks in the UK', *British Medical Journal*, 350, pp. 1–6. doi: 10.1136/bmj.h1775.

Loth, K., MacLehose, R., Larson, N., Berge, J. and Neumark-Sztainer, D. (2016) 'Food availability, modeling and restriction: How are these different aspects of the family eating environment related to adolescent dietary intake?', *Appetite*. 96, pp. 80–86. doi: 10.1016/j.appet.2015.08.026.

Ludvigsen, A. and Scott, S. (2009) 'Real kids don't eat quiche: What food means to children', *Food, Culture and Society*, 12(4), pp. 417–436. doi: 10.2752/175174409X456728.

Ma, A., Jaarsveld, C., Wardle, J. and Cooke, L. (2014) 'Parent-administered exposure to increase children's vegetable acceptance: A randomized controlled trial', *Journal of the Academy of Nutrition and Dietetics*. 114(6), pp. 881–888. doi: 10.1016/j.jand.2013.07.040.

Mackley, A. and Long, R. (2018) *Future Eligibility for Free School Meals and the Pupil Premium.* London. [Online]. Available at: https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CDP-2018-0027. (Accessed: 2 October 2019).

Mak, T. *et al.* (2012) 'Assessing eating context and fruit and vegetable consumption in children: new methods using food diaries in the UK National Diet and Nutrition Survey Rolling Programme', *International Journal of Behavioral Nutrition and Physical Activity*, 9(126), pp. 1–15. doi: 10.1186/1479-5868-9-126.

Manion, A. and Velsor-Friedrich, B. (2017) 'Quality of life and health outcomes in overweight and non-overweight children with Asthma', *Journal of Pediatric Health Care*. 31(1), pp. 37–45. doi: 10.1016/j.pedhc.2016.01.005.

Markowski, K. and Roxburgh, S. (2019) '"If I became a vegan, my family and friends would hate me:" Anticipating vegan stigma as a barrier to plant-based diets', *Appetite*. 135, pp. 1–9. doi: 10.1016/j.appet.2018.12.040.

Marshall, D., O'Donohoe, S. and Kline, S. (2007) 'Families, food, and pester power: Beyond the blame game?', *Journal of Consumer Behaviour*, 6, pp. 164–181. doi: 10.1002/cb.

Maxwell, J. (2013) *Qualitative Research Design: An Interactive Approach.* 3rd edn. England: SAGE Publications.

McDade, T., Chyu, L., Duncan, G., Hoyt, L., Doane, L. and Adam, E. (2011) 'Adolescents' expectations for the future predict health behaviors in early adulthood', *Social Science & Medicine*. 73(3), pp. 391–398. doi: 10.1016/j.socscimed.2011.06.005.

McDermott, L., O'Sullivan, T., Stead, M. and Hastings, G. (2006) 'International food advertising, pester power and its effects', *International Journal of Advertising*, 25(4), pp. 513–539. doi: 10.1080/02650487.2006.11072986.

McDermott, M. *et al.* (2015) 'The theory of planned behaviour and discrete food choices: A systematic review and meta-analysis', *International Journal of Behavioral Nutrition and Physical Activity*. International Journal of Behavioral Nutrition and Physical Activity, 12(1). doi: 10.1186/s12966-015-0324-z.

McDougall, J. *et al.* (2014) 'Effects of 7 days on an ad libitum low-fat vegan diet: The McDougall Program cohort', *Nutrition Journal*, 13(1), pp. 1–7. doi: 10.1186/1475-2891-13-99.

McHugh, C., Anderson, L., Lloyd, J., Logan, S. and Wyatt, K. (2019) 'Influences on diet and physical activity choices of 11 – 13-year-olds in a school setting', *Health Education Journal*, 78(5), pp. 545–556. doi: 10.1177/0017896919826606.

McKeown, A. and Nelson, R. (2018) 'Independent decision making of adolescents regarding food choice', *International Journal of Consumer Studies*, 42(5), pp. 469–477. doi: 10.1111/ijcs.12446.

McKinley, M., Lowis, C., Robson, P., Wallace, J., Morrissey, M., Moran, A. and Livingstone, M. (2005) 'It's good to talk: Children's views on food and nutrition', *European Journal of Clinical Nutrition*, 59(4), pp. 542–551. doi: 10.1038/sj.ejcn.1602113.

McNeal, J. (1991) 'Planning priorities for marketing to children', *Journal of Business Strategy*, 12(3), pp. 12–15. doi: 10.1108/eb039410.

Meinhold, J. and Malkus, A. (2005) 'Adolescent environmental behaviors: Can knowledge, attitudes and self-efficacy make a difference?', *Environment and Behavior*, 37(4), pp. 511–532. doi: 10.1177/0013916504269665.

Melbye, E. and Hansen, H. (2015) 'Promotion and prevention focused feeding strategies: Exploring the effects on healthy and unhealthy child eating', *BioMed Research International*, 2015, pp. 1–7. doi: 10.1155/2015/306306.

Micali, N., Hagberg, K., Petersen, I. and Treasure, J. (2013) 'The incidence of eating disorders in the UK in 2000-2009: Findings from the General Practice Research Database', *British Medical Journal, Open*, 3(5), pp. 3–10. doi: 10.1136/bmjopen-2013-002646.

Mielby, L., Kildegaard, H., Gabrielsen, G., Edelenbos, M. and Thybo, A. (2012) 'Adolescent and adult visual preferences for pictures of fruit and vegetable mixes - Effect of complexity', *Food Quality and Preference*. 26(2), pp. 188–195. doi: 10.1016/j.foodqual.2012.04.014.

Mielby, L. H., Edelenbos, M. and Thybo, A. K. (2012) 'Comparison of rating, best-worst scaling, and adolescents' real choices of snacks', *Food Quality and Preference*, 25(2), pp. 140–147. doi: 10.1016/j.foodqual.2012.02.007.

Miles, M., Huberman, A. and Saldana, J. (2020) *Qualitative Data Analysis*. 5th edn. London: SAGE Publications.

Milton, A. and Rodgers, P. (2013) *Research Methods for Product Design*. 1st edn. London: Laurence King.

Mintel (2017) *Consumer Snacking: UK, March 2017.* [Online]. Available at:

http://academic.mintel.com.ezproxy.cardiffmet.ac.uk/homepages/sector_overview/3/. (Accessed: 4 January 2020).

Mintel (2019) *Global Food And Drink Trends 2030*. [Online]. Available at: https://www.mintel.com/press-centre/food-and-drink/mintel-announces-global-food-and-drink-trends-for-2030 (Accessed: 5 January 2020).

Mohiuddin, K., Gordon, R., Magee, C. and Lee, J. (2016) 'A conceptual framework of cool for social marketing', *Journal of Social Marketing*, 6(2), pp. 121–143. doi: 10.1108/JSOCM-07-2015-0046.

Moore, E. (2004) 'Advertising and the Changing World of Advertising', *Journal of Business Ethics*, 52(2), pp. 161–167.

Moore, S., Murphy, S., Tapper, K. and Moore, L. (2010) 'From policy to plate: Barriers to implementing healthy eating policies in primary schools in Wales', *Health Policy*. 94(3), pp. 239–245. doi: 10.1016/j.healthpol.2009.10.001.

Morgan, D. (2010) 'Reconsidering the role of interaction in analyzing and reporting focus groups', *Qualitative Health Research*. doi: 10.1177/1049732310364627.

Morrill, B., Madden, G., Wengreen, G., Msepi, J. and Aguilar, S. (2016) 'A randomized controlled trial of the Food Dudes program: Tangible rewards are more effective than social rewards for increasing short- and long-term fruit and vegetable consumption', *Journal of the Academy of Nutrition and Dietetics*. 116(4), pp. 618–629. doi: 10.1016/j.jand.2015.07.001.

Morse, J. (2010) 'Simultaneous and sequential qualitative mixed method designs', *Qualitative Inquiry*, 16(6), pp. 483–491. doi: 10.1177/1077800410364741.

Myles, I. (2014) 'Fast food fever: Reviewing the impacts of the Western diet on immunity', *Nutrition Journal*, 13(1), pp. 1–17. doi: 10.1186/1475-2891-13-61.

Nairn, A. and Fine, C. (2008) 'Who's messing with my mind? The implications of dual-process models for the ethics of advertising to children', *International Journal of Advertising*, 27(3), pp. 447–470. doi: 10.2501/S0265048708080062.

Nancarrow, C., Nancarrow, P. and Page, J. (2002) 'An analysis of the concept of cool and its marketing implications', *Journal of Consumer Behaviour*, 1(4), pp. 311–322. doi: 10.1002/cb.77.

National Farmers' Union (no date) *The Fruit & Veg Pledge*, *NFU*. [Online]. Available at: https://www.nfuonline.com/assets/6105 (Accessed: 10 September 2019).

National Health Service (2014) *What are 'reference intakes' on food labels?* [Online]. Available at: http://www.nhs.uk/Livewell/Goodfood/Pages/reference-intakes-RI-guideline-daily-amounts-GDA.aspx. (Accessed: 20 March 2017).

National Health Service (2017a) *Fruit and Vegetables*, *Health Survey HSCIC*. [Online]. Available at: http://healthsurvey.hscic.gov.uk/data-visualisation/data-visualisation/explore-the-trends/fruit-vegetables.aspx?type=child. (Accessed: 19 September 2019).

National Health Service (2017b) *Obesity*. [Online]. Available at: https://www.nhsinform.scot/illnesses-and-conditions/nutritional/obesity. (Accessed: 3 May 2017).

National Health Service (2019a) *Statistics on Obesity, Physical Activity and Diet, England, 2019*. [Online]. Available at: https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/statistics-on-obesity-physical-activity-and-diet-england-2019. (Accessed: 5 January 2020).

National Health Service (2019b) *The Eatwell Guide*, *NHS*. [Online]. Available at:

https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/ (Accessed: 4 January 2019).

National Health Service (no date a) *About Healthy Start*. [Online]. Available at: https://www.healthystart.nhs.uk/healthy-start-vouchers/ (Accessed: 1 January 2020).

National Health Service (no date b) *Anorexia*, *National Health Service*. [Online]. Available at: https://www.nhs.uk/conditions/anorexia/ (Accessed: 8 June 2017).

National Health Service (no date c) *Overview: Bulimia*, *National Health Service*. [Online]. Available at: https://www.nhs.uk/conditions/bulimia/ (Accessed: 14 February 2020).

National Health Service (no date d) *Vegetarian and vegan diets Q&A*, *National Health Service*. [Online]. Available at: https://www.nhs.uk/live-well/eat-well/vegetarian-and-vegan-diets-q-and-a/ (Accessed: 14 February 2020).

National Health Service (no date e) *What is the body mass index (BMI)?*, *National Health Service*. [Online]. Available at: https://www.nhs.uk/common-health-questions/lifestyle/what-is-the-body-mass-index-bmi/ (Accessed: 13 February 2020).

National Health Service Wales (2010) *Change4Life launches in Wales*, *National Health Service*. [Online]. Available at: https://www.wales.nhs.uk/news/15765 (Accessed: 17 February 2020).

Neilson, L. *et al.* (2016) 'Students' Food Intake from Home-Packed Lunches in the Traditional versus Balanced School Day', *Canadian Journal of Dietetic Practice and Research*, 78(1), pp. 3–10. doi: 10.3148/cjdpr-2016-024.

Nekitsing, C., Hetherington, M. and Blundell-Birtill, P. (2018) 'Developing healthy food preferences in preschool children through taste exposure, sensory learning, and nutrition education', *Current Obesity Reports*. Current Obesity Reports, 7(1), pp. 60–67. doi: 10.1007/s13679-018-0297-8.

Neumark-Sztainer, D., Story, M., Perry, C. and Casey, M. (1999) 'Factors influencing food choices of adolescents', *Journal of the American Dietetic Association*, pp. 929–937. doi: 10.1016/S0002-8223(99)00222-9.

Neumark-Sztainer, D., Larson, N., Fulkerson, J., Eisenberg, M. and Story, M. (2010) 'Family meals and adolescents: What have we learned from Project EAT (Eating Among Teens)?', *Public Health Nutrition*, 13(7), pp. 1113–1121. doi: 10.1017/S1368980010000169.

Nga, V. *et al.* (2019) 'School education and childhood obesity: A systemic review', *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*. 13(4), pp. 2495–2501. doi: 10.1016/j.dsx.2019.07.014.

Niblett, P. *et al.* (2019) 'Sugar reduction: Report on progress between 2015 and 2018 September 2019 About Public Heath England', *Public Health England*, (September), pp. 1–108.

Nicklaus, S., Boggio, V., Chabanet, C. and Issanchou, S. (2005) 'A prospective study of food variety seeking in childhood, adolescence and early adult life', *Appetite*, 44, pp. 289–297. doi: 10.1016/j.appet.2005.01.006.

Nørgaard, M., Sørensen, B. and Brunsø, K. (2014) 'A concept test of novel healthy snacks among adolescents: Antecedents of preferences and buying intentions', *Food Quality and Preference*, 33, pp. 17–26. doi: 10.1016/j.foodqual.2013.10.010.

Nørgaard, M., Sørensen, B. and Grunert, K. (2014) 'Social and individual determinants of adolescents' acceptance of novel healthy and cool snack products', *Appetite*. 83, pp. 226–235. doi: 10.1016/j.appet.2014.08.028.

O'Dea, J. (2003) 'Why do kids eat healthful food? Perceived benefits of and barriers to

healthful eating and physical activity among children and adolescents', *Journal of the American Dietetic Association*, 103(4), pp. 497–501. doi: 10.1053/jada.2003.50064.

O'Donnell, K. and Wardlow, D. (2000) 'A Theory on the Origins of Coolness', *ACR North American Advances*, NA-27. [Online]. Available at: http://www.acrwebsite.org/search/view-conference-proceedings.aspx?Id=8351 (Accessed: 10 January 2019).

O'Keefe, L. (2016) *The rise of veganism and plant-based diets signals boost for fresh produce sales.*, *Produce Business*. [Online]. Available at: http://www.producebusinessuk.com/purchasing/stories/2016/12/20/the-rise-of-veganism-and-plant-based-diets-signals-boost-for-fresh-produce-sales (Accessed: 3 April 2017).

Ofcom (2010) 'Code on the scheduing of television advertising'. Ofcom, pp. 1–4. [Online]. Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0014/32162/costa-april-2016.pdf. (Accessed: 8 June 2017),

Office for National Statistics (2019) *Health state life expectancies by national deprivation deciles, England and Wales: 2015 to 2017*. [Online]. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthinequalities/bulletins/healthstatelifeexpectanciesbyindexofmultipledeprivationimd/2015to2017. (Accessed: 14 January 2020).

Ofsted (2006) *Healthy Eating in Schools*. Ofsted. [Online]. Available at: https://dera.ioe.ac.uk/1124/1/Food%20in%20schools.pdf. (Accessed: 22 March 2017).

Ogden, J., Reynolds, R. and Smith, A. (2006) 'Expanding the concept of parental control: A role for overt and covert control in children's snacking behaviour?', *Appetite*. 47(1), pp. 100–106. doi: 10.1016/j.appet.2006.03.330.

Oliver, J. (2018) *We've #AdEnough of junk food marketin*. [Online]. Available at: https://www.jamieoliver.com/features/weve-adenough-of-junk-food-marketing/ (Accessed: 10 October 2019).

Olsen, A., Ritz, C., Kraaij, L. and Møller, P. (2012a) 'Children's liking and intake of vegetables: A school-based intervention study', *Food Quality and Preference*. 23(2), pp. 90–98. doi: 10.1016/j.foodqual.2011.10.004.

Olsen, A., Ritz, C., Kramer, L. and Møller, P. (2012b) 'Serving styles of raw snack vegetables. What do children want?', *Appetite*. 59, pp. 556–562. doi: 10.1016/j.appet.2012.07.002.

Ortlipp, M. (2008) 'Keeping and using reflective journals in the qualitative research process.', *The Qualitative Report*, 13(4), pp. 695–705.

Oxford Dictionary (no date) *Deprivation*, *Oxford Dictionary*. [Online]. Available at: https://en.oxforddictionaries.com/definition/deprivation (Accessed: 5 May 2017).

Pachtrat, T. (2006) 'We call it a grain of sand: The interpretive orientation and a human social science', in Yanow, D. and Schwartz-Shea, P. (ed.) *Interpretation and method empirical research methods and the interpretive turn.* M.E. Sharpe, Inc., New York., pp. 373-397. [Online]. Available at: https://ebookcentral.proquest.com/lib/cardiffmet/reader.action?docID=302458.

Palmer, E. and Carpenter, C. (2006) 'Food and beverage marketing to children and youth', *Media Psychology*, 8, pp. 165–190.

Papoutsi, G., Nayga, R., Lazaridis, P. and Drichoutis, A. (2015) 'Fat tax, subsidy or both? The role of information and children's pester power in food choice', *Journal of Economic Behavior and Organization*. 117, pp. 196–208. doi: 10.1016/j.jebo.2015.06.011.

Parker, D. (2019) 'Veg Power - getting kids excited about vegetables. Results from the impact assessment'. London.

Passmore, S. and Harris, G. (2005) ‘School Nutrition Action Groups and their effect upon secondary school-aged pupils’ food choices’, *Nutrition Bulletin*, 30(4), pp. 364–369. doi: 10.1111/j.1467-3010.2005.00530.x.

Patrick, H., Nicklas, T., Hughes, S. and Morales, M. (2005) ‘The benefits of authoritative feeding style: Caregiver feeding styles and children’s food consumption patterns’, *Appetite*, 44(2), pp. 243–249. doi: 10.1016/j.appet.2002.07.001.

Patton, M. (2002) *Qualitative Research and Evaluation Methods.* 1st edn. London: SAGE Publications.

Patton, M. (2015) *Qualitative Research and Evaluation Methods.* 4th edn. London: SAGE Publications.

Pearson, N., Atkin, A., Biddle, S., Gorely, T. and Edwardson, C. (2010) ‘Parenting styles, family structure and adolescent dietary behaviour’, *Public Health Nutrition*, 13(8), pp. 1245–1253. doi: 10.1017/S1368980009992217.

Pearson, N., Ball, K. and Crawford, D. (2011) ‘Predictors of changes in adolescents’ consumption of fruits, vegetables and energy-dense snacks’, *British Journal of Nutrition*, 105(5), pp. 795–803. doi: 10.1017/S0007114510004290.

Pedersen, S., Grønhøj, A. and Thøgersen, J. (2015) ‘Following family or friends. Social norms in adolescent healthy eating’, *Appetite*. 86, pp. 54–60. doi: 10.1016/j.appet.2014.07.030.

Pescud, M. and Pettigrew, S. (2014) ‘Parents’ experiences with hiding vegetables as a strategy for improving children’s diets’, *British Food Journal*, 116(12), pp. 1853–1863. doi: 10.1108/BFJ-06-2012-0155.

Phelan, S. and Kinsella, E. (2013) ‘Picture this... Safety, dignity, and voice - Ethical research with children: Practical considerations for the reflexive researcher’, *Qualitative Inquiry*, 19(2), pp. 81–90. doi: 10.1177/1077800412462987.

Piachaud, D. (2008) ‘Freedom to be a child: Commercial pressures on children’, *Social Policy & Society 2*. doi: 10.1017/S1474746408004417.

Piaget, J. (1952) *The Origin of Intelligence in the Child*. 2nd edn. London: W. W. Norton & Company.

Pillow, W. (2003) ‘Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research’, *International Journal of Qualitative Studies in Education*, 16(2), pp. 175–196. doi: 10.1080/0951839032000060635.

Pope, L. and Wolf, R. (2012) ‘The influence of labeling the vegetable content of snack food on children’s taste preferences: A pilot study’, *Journal of Nutrition Education and Behavior*. 44(2), pp. 178–182. doi: 10.1016/j.jneb.2010.02.006.

Poutain, D. and Robins, D. (2000) *Cool Rules: Anatomy of an Attitude*.

Powell, V. and Gellatley, J. (2016) *The Incredible Vegan Health Report. What Science and Experience say about Vegan Diets and Human Health.* [Online]. Available at: https://www.vivahealth.org.uk/sites/default/files/The-Incredible-Vegan-Health-Report.pdf. (Accessed: 3 January 2020).

Pret A Manger (no date) *Veggie Pret*, *Pret A Manger*. [Online]. Available at: https://www.pret.co.uk/en-gb/veggie-pret (Accessed: 14 January 2020).

Psychologist World (no date) *Pavlov’s Dogs and Classical Conditioning*, *Psychologist World*. [Online]. Available at: https://www.psychologistworld.com/behavior/pavlov-dogs-classical-conditioning (Accessed: 14 January 2020).

Public Health England (2015a) *Changes in Children's Body Mass Index Between 2006/07 and 2013/14: National Child Measurement Programme.* [Online]. Available at: https://ssat.khub.net/documents/31798783/32388073/Changes+in+children%E2%80%99s+body+mass+index+between+2006-07+and+2013-14.pdf/9b1a42df-741d-4089-bd33-49124839eb7e?version=1.0 (Accessed: 5 May 2017).

Public Health England (2015b) *Sugar Reduction: The evidence for action About Public Health England*, *Public Health England*. [Online]. Available at: www.gov.uk/phe%5Cnwww.facebook.com/PublicHealthEngland. (Accessed: 3 June 2017).

Public Health England (2016) *From Plate to Guide: What, why and how for the eatwell model.* [Online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/579388/eatwell_model_guide_report.pdf (Accessed: 5 May 2017).

Public Health England (2017a) *Guidelines on reducing sugar in food published for industry*, *Public Health England*. [Online]. Available at: https://www.gov.uk/government/news/guidelines-on-reducing-sugar-in-food-published-for-industry (Accessed: 14 January 2020).

Public Health England (2017b) *Health Matters: Obesity and the Food Environment*. [Online]. Available at: https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2. (Accessed: 8 June 2017).

Public Health England (2018) *100 calorie snacks - Change4Life*, *National Health Service*. [Online]. Available at: https://www.nhs.uk/change4life/food-facts/healthier-snacks-for-kids/100-calorie-snacks#UDj0QF3VeUXR8Ew8.97 (Accessed: 30 January 2020).

Public Health England and Food Standards Agency (2014) *National Diet and Nutrition Survey: Results from Years 1, 2, 3 and 4 (combined) of the Rolling Programme (2008/2009 – 2011/2012).* [Online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/310995/NDNS_Y1_to_4_UK_report.pdf. (Accessed: 22 March 2017).

Public Health England and Food Standards Agency (2016) *National Diet and Nutrition Survey: Results from Years 5 and 6 (combined) of the Rolling Programme (2012/2013-2013/2014).* [Online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551352/NDNS_Y5_6_UK_Main_Text.pdf. (Accessed: 14 June 2017).

Public Health Wales NHS Trust (2018) *The case for action on obesity in Wales*. Cardiff. [Online]. Available at: http://www.wales.nhs.uk/sitesplus/documents/888/150119%20The%20case%20for%20action%20on%20obesity%20in%20Wales%200ae%20FINAL1.pdf. (Accessed: 5 January 2020).

Puhl, R., Wall, M., Chen, C., Bryn Austin, S., Eisenberg, M. and Neumark-Sztainer, D. (2017) 'Experiences of weight teasing in adolescence and weight-related outcomes in adulthood: A 15-year longitudinal study', *Preventive Medicine*. 100, pp. 173–179. doi: 10.1016/j.ypmed.2017.04.023.

Punch, S. (2002) 'Research with children: The same or different from research with adults?', *Childhood*, 9(3), pp. 321–341. doi: 10.1177/0907568202009003045.

Quinn, S. (2016) *Number of vegans in Britain rises by 360% in 10 years.* [Online]. Available at: http://www.telegraph.co.uk/food-and-drink/news/number-of-vegans-in-britain-rises-by-360-in-10-years/. (Accessed: 4 January 2020).

Rahman, K. (2013) '"Wow! It's cool:" The meaning of coolness in marketing', *Marketing Intelligence and Planning*, 31(6), pp. 620–638. doi: 10.1108/MIP-09-2012-0094.

Rasmussen, M. *et al.* (2006) 'Determinants of fruit and vegetable consumption among children and adolescents: A review of the literature. Part I: Quantitative studies', *International Journal of Behavioral Nutrition and Physical Activity*, 3, pp. 1–19. doi: 10.1186/1479-5868-3-22.

Revill, J. and Hill, A. (2005) *Victory for Jamie in School Meal War*, *The Guardian*. [Online]. Available at: https://www.theguardian.com/society/2005/mar/06/schoolmeals (Accessed: 3 January 2020).

Richards, G. and Smith, A. (2016) 'Breakfast and energy drink sonsumption in secondary school children: Breakfast omission, in isolation or in combination with frequent energy drink use, is associated with Stress, Anxiety, and Depression Cross-Sectionally, but not at 6-month follow-up', *Frontiers in Psychology*, 7(February), pp. 1–10. doi: 10.3389/fpsyg.2016.00106.

de Ridder, D., Kroese, F., Evers, C., Adriaanse, M. and Gillebaart, M. (2017) 'Healthy diet: Health impact, prevalence, correlates, and interventions', *Psychology and Health*. 32(8), pp. 907–941. doi: 10.1080/08870446.2017.1316849.

Riley, H. (2010) 'Potato consumption in the UK-why is "meat and two veg" no longer the traditional British meal?', *Nutrition Bulletin*, 35(4), pp. 320–331. doi: 10.1111/j.1467-3010.2010.01864.x.

Robertson, A., Lobstein, T. and Knai, C. (2007) *Obesity and socio-economic groups in Europe: Evidence review and implications for action*, *Brussels: European Commission*.

Robinson, E., Blissett, J. and Higgs, S. (2013) 'Social influences on eating: Implications for nutritional interventions', *Nutrition Research Reviews*, 26(2), pp. 166–176. doi: 10.1017/S0954422413000127.

Robinson, E. and Hardman, C. (2016) 'Empty plates and larger waists: A cross-sectional study of factors associated with plate clearing habits and body weight', *European Journal of Clinical Nutrition*. Nature Publishing Group, 70(6), pp. 750–752. doi: 10.1038/ejcn.2015.218.

Rodgers, R. *et al.* (2013) 'Maternal feeding practices predict weight gain and obesogenic eating behaviors in young children: A prospective study', *International Journal of Behavioral Nutrition and Physical Activity*, 10, pp. 1–10. doi: 10.1186/1479-5868-10-24.

Rogers, E. (2003) *Diffusion of Innovations*. 5th Editio. Sydney: Simon and Schuster.

Rogol, A., Clark, P. and Roemmich, J. (2000) 'Growth and pubertal development in children and adolescents: Effects of diet and physical activity', *American Journal of Clinical Nutrition*, 72(2 SUPPL.), pp. 521–528. doi: 10.1093/ajcn/72.2.521s.

Ronto, R., Ball, L., Pendergast, D. and Harris, N. (2016) 'Adolescents' perspectives on food literacy and its impact on their dietary behaviours', *Appetite*. 107, pp. 549–557. doi: 10.1016/j.appet.2016.09.006.

Roos, E. *et al.* (2008) 'Trends of socioeconomic differences in daily vegetable consumption, 1979-2002', *European Journal of Clinical Nutrition*, 62(7), pp. 823–833. doi: 10.1038/sj.ejcn.1602798.

Röös, E., Sundberg, C. and Hansson, P. (2010) 'Uncertainties in the carbon footprint of food products: A case study on table potatoes', *International Journal of Life Cycle Assessment*, 15(5), pp. 478–488. doi: 10.1007/s11367-010-0171-8.

Roper, S. and La Niece, C. (2009) 'The importance of brands in the lunch-box choices of low-income British school children', *Journal of Consumer Behaviour*, 8, pp. 84–99. doi:

10.1002/cb.

Rosen, D. and Neumark-Sztainer, D. (1998) 'Review of options for primary prevention of eating disturbances among adolescents', *Journal of Adolescent Health*, 23(6), pp. 354–363. doi: 10.1016/S1054-139X(98)00017-2.

Royal Society for Public Health (2015) 'Tackling the UK's childhood obesity epidemic obesity epidemic', *Royal Society For Public Health*, (November), pp. 1–7.

Rozendaal, E., Buijzen, M. and Valkenburg, P. (2011) 'Children's understanding of advertisers' persuasive tactics', *International Journal of Advertising*, 30(2), pp. 329–350. doi: 10.2501/IJA-30-2-329-350.

Rubin, J. and Chisnell, D. (2008) *Handbook of Usability Testing. How to Plan, Design and Conduct Effective Tests.* 2nd edn. Indianapolis: Wiley Publishing.

Rundh, B. (2005) 'The multi-faceted dimension of packaging: Marketing logistic or marketing tool?', *British Food Journal*, 107(9), pp. 670–684. doi: 10.1108/00070700510615053.

Rundh, B. (2009) 'Packaging design: Creating competitive advantage with product packaging', *British Food Journal*, 111(9), pp. 988–1002. doi: 10.1108/00070700910992880.

Sabur, R. (2018) *Suppliers ditch 'vegan' label to encourage meat eaters*, *The Telegraph*. [Online]. Available at: https://www.telegraph.co.uk/news/2018/08/24/suppliers-ditch-vegan-label-encourage-meat-eaters/ (Accessed: 24 January 2020).

Salmasi, L. and Celidoni, M. (2017) 'Investigating the poverty-obesity paradox in Europe', *Economics and Human Biology*. 26, pp. 70–85. doi: 10.1016/j.ehb.2017.02.005.

Saltzman, J. and Liechty, J. (2016) 'Family correlates of childhood binge eating: A systematic review', *Eating Behaviors*. 22, pp. 62–71. doi: 10.1016/j.eatbeh.2016.03.027.

Salvy, S., Kluczynski, M., Nitecki, L. and O'Connor, B. (2012) 'Peer influence on youth's snack purchases: A laboratory analog of convenience store shopping', *Eating Behaviors*, 13(3), pp. 233–239. doi: 10.1016/j.eatbeh.2012.03.005.

dos Santos, Q. *et al.* (2019) 'Impact of a nudging intervention and factors associated with vegetable dish choice among European adolescents', *European Journal of Nutrition*. Springer Berlin Heidelberg, 0(0), pp. 1–17. doi: 10.1007/s00394-019-01903-y.

Saxton, G. (2005) 'Collections of cool', *Young Consumers*, 6(2), pp. 18–27. doi: 10.1108/17473610510680786.

Scaglioni, S., Cosmi, V., Ciappolino, V., Brambilla, P. and Agostoni, C. (2018) 'Factors influencing children's eating behaviours', *Nutrients*, 10(6), pp. 1–17. doi: 10.3390/nu10060706.

Scarborough, P. *et al.* (2014) 'Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK', *Climatic Change*, 125(2), pp. 179–192. doi: 10.1007/s10584-014-1169-1.

Schor, J. and Ford, M. (2007) 'From tastes great to cool: Children's food marketing and the rise of the symbolic', *Journal of Law, Medicine and Ethics*, 35(1), pp. 10–21. doi: 10.1111/j.1748-720X.2007.00110.x.

Schweitzer, J.-P. *et al.* (2018) 'UNWRAPPED: How Throwaway Plastic Is Failing To Solve Europe's Food Waste Problem (and what we need to do instead)', pp. 1–28.

Share, M. and Stewart-Knox, B. (2012) 'Determinants of food choice in Irish adolescents', *Food Quality and Preference*. 25(1), pp. 57–62. doi: 10.1016/j.foodqual.2011.12.005.

Sharma, A., Moon, J., Bailey-Davis, L. and Conklin, M. (2017) 'Food choices and service evaluation under time constraints: the school lunch environment', *International Journal of Contemporary Hospitality Management*, 29(12), pp. 3191–3210. doi: 10.1108/IJCHM-06-2015-0269.

Shepherd, J. *et al.* (2006) 'Young people and healthy eating: A systematic review of research on barriers and facilitators', *Health Education Research*, 21(2), pp. 239–257. doi: 10.1093/her/cyh060.

Sicherer, S. (2011) 'Epidemiology of food allergy', *Journal of Allergy and Clinical Immunology*. 127(3), pp. 594–602. doi: 10.1016/j.jaci.2010.11.044.

Sievert, K., Hussain, S., Page, M., Wang, Y. Hughes, H. and Malek, M. (2019) 'Effect of breakfast on weight and energy intake: Systematic review and meta-analysis of randomised controlled trials', *British Medical Journal*, 364, pp. 1–12. doi: 10.1136/bmj.l42.

Silayoi, P. and Speece, M. (2004) 'Packaging and purchase decisions: An exploratory study on the impact of involvement level and time pressure', *British Food Journal*, 106(8), pp. 607–628. doi: 10.1108/00070700410553602.

Silverman, D. (2007) *A very short, fairly interesting and reasonably cheap book about Qualitative Research.* London: SAGE Publications.

Silverman, D. (2010) *Qualitative research: Theory, method and practice.* 3rd edn. London: SAGE Publications.

Smith, E., Scarborough, P., Rayner, M. and Briggs, A. (2018) 'Should we tax unhealthy food and drink?', *Proceedings of the Nutrition Society*, 77(3), pp. 314–320. doi: 10.1017/S0029665117004165.

Smith, M. (2019) *Concern about the environment at highest levels on record*, *YouGov*. [Online]. Available at: https://yougov.co.uk/topics/politics/articles-reports/2019/06/05/concern-environment-record-highs (Accessed: 30 January 2020).

Soss, J. (2006) 'Talking our way to meaningful explanations: A practice centered view of interviewing for interpretative research', in Yanow, D. and Schwartz-Shea, P. (ed.) *Interpretation and method empirical research methods and the interpretive turn.* M.E. Sharpe, Inc., New York., pp. 127-149. [Online]. Available at: https://ebookcentral.proquest.com/lib/cardiffmet/reader.action?docID=302458.

Southgate, N. (2003) 'Coolhunting, account planning and the ancient cool of Aristotle', *Marketing Intelligence & Planning*, 21(7), pp. 453–461. doi: 10.1108/02634500310504304.

Spencer, E., Appleby, P., Davey, G. and Key, T. (2003) 'Diet and body mass index in 38000 EPIC-Oxford meat-eaters, fish-eaters, vegetarians and vegans', *International Journal of Obesity*, 27(6), pp. 728–734. doi: 10.1038/sj.ijo.0802300.

Stead, M., McDermott, L., Marie, A. and Adamson, A. (2011) 'Why healthy eating is bad for young people's health: Identity, belonging and food', *Social Science & Medicine*. 72(7), pp. 1131–1139. doi: 10.1016/j.socscimed.2010.12.029.

Stefani, G., Romano, D. and Cavicchi, A. (2006) 'Consumer expectations, liking and willingness to pay for specialty foods: Do sensory characteristics tell the whole story?', *Food Quality and Preference*, 17(1), pp. 53–62. doi: 10.1016/j.foodqual.2005.07.010.

Steinberg, L. and Monahan, K. C. (2007) 'Age differences in resistance to peer influence', *Developmental Psychology*, 43(6), pp. 1531–1543. doi: 10.1037/0012-1649.43.6.1531.

Steinmetz, K. and Potter, J. (1996) 'Vegetables, fruit, and cancer prevention: A review', *Journal of the American Dietetic Association*, pp. 1027–1039. doi: 10.1016/S0002-8223(96)00273-8.

Stevens, L., Nicholas, Jo., Wood, L. and Nelson, M. (2013) 'School lunches v. packed lunches: a comparison of secondary schools in England following the introduction of compulsory school food standards', *Public Health Nutrition*, 16(6), pp. 1037–1042. doi: 10.1017/S1368980013000852.

Stevenson, C., Doherty, G., Barnett, J., Muldoon, O. and Trew, K. (2007) 'Adolescents' views of food and eating: Identifying barriers to healthy eating', *Journal of Adolescence*, 30(3), pp. 417–434. doi: 10.1016/j.adolescence.2006.04.005.

Stewart Agras, W., Hammer, L., McNicholas, F. and Kraemer, H. (2004) 'Risk factors for childhood overweight: A prospective study from birth to 9.5 years', *Journal of Pediatrics*, 145(1), pp. 20–25. doi: 10.1016/j.jpeds.2004.03.023.

Stone, H., Bleibaum, R. and Thomas, H. (2012) *Sensory Evaluation Practice*. 4th edn. England: Academic Press.

Story, M. and French, S. (2004) 'Food advertising and marketing directed at children and adolescents in the US', *International Journal of Behavioral Nutrition and Physical Activity*, 17, pp. 1–17. doi: 10.1186/1479-5868-1-3.

Story, M., Neumark-Sztainer, D. and French, S. (2002) 'Individual and environmental influences on adolescent eating behaviors', *The American Dietetic Association*, 102(3), pp. 40–51. doi: 10.1016/S0002-8223(02)90421-9.

Strachan, J. and Pavie-Latour, V. (2017) 'Food for thought: Shouldn't we actually target food advertising more towards kids and not less?', *International Journal of Market Research*, 50(1), pp. 13–27. doi: 10.1177/147078530805000104.

Sturgis, P., Smith, P. and Hughes, G. (2006) *A Study of Suitable Methods for Raising Response Rates in School Surveys*. [Online]. Available at: http://dera.ioe.ac.uk/6378/1/RR721.pdf.

Sundar, S., Tamul, D. and Wu, M. (2014) 'Capturing "cool:" Measures for assessing coolness of technological products', *International Journal of Human Computer Studies*, 72(2), pp. 169–180. doi: 10.1016/j.ijhcs.2013.09.008.

Surjadi, F., Takeuchi, D. and Umoren, J. (2017) 'Racial and ethnic differences in longitudinal patterns of family mealtimes: Link to adolescent fruit and vegetable consumption', *Journal of Nutrition Education and Behavior*. 49(3), pp. 244–249. doi: 10.1016/j.jneb.2016.10.022.

Swinburn, B. *et al.* (2011) 'The global obesity pandemic: Shaped by global drivers and local environments', *The Lancet*. 378, pp. 804–814. doi: 10.1016/S0140-6736(11)60813-1.

Sylvetsky, A. *et al.* (2013) 'Youth understanding of healthy eating and obesity: A focus group study', *Journal of Obesity*, pp. 1–6. doi: 10.1155/2013/670295.

Szulc, A. *et al.* (2012) 'Naturalism, agency and ethics in ethnographic research with children. Suggestions for debate', *AnthropoChildren*, 2, pp. 1–11.

Tapp, A. and Bird, S. (2008) 'Social marketing and the meaning of cool', *Social Marketing Quarterly*, 14(1), pp. 18–29.

Taylor, A. and Loopstra, R. (2016) *Too Poor to Eat. Food insecurity in the UK*, *The Food Foundation*. [Online]. Available at: http://foodfoundation.org.uk/wp-content/uploads/2016/07/FoodInsecurityBriefing-May-2016-FINAL.pdf%0Awww.foodfoundation.org.uk. (Accessed: 3 May 2017).

Taylor, C. (2018) 'The reliability of free school meal eligibility as a measure of socio-economic disadvantage: evidence from the Millennium Cohort Study in Wales', *British Journal of Educational Studies*. Routledge, 66(1), pp. 29–51. doi:

10.1080/00071005.2017.1330464.

Taylor, J., Sutter, C., Ontai, L., Nishina, A. and Zidenberg-Cherr, S. (2019) 'Comparisons of school and home-packed lunches for fruit and vegetable dietary behaviours among school-aged youths', *Public Health Nutrition*, 22(10), pp. 1850–1857. doi: 10.1017/S136898001900017X.

Teeman, D. *et al.* (2010) *The Third Evaluation of the School Fruit and Vegetable Scheme*, *National Foundation for Educational Research*. [Online]. Available at: https://webarchive.nationalarchives.gov.uk/20130124054158/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/documents/digitalasset/dh_114345.pdf. (Accessed: 18 September 2019).

Tesco Plc (2019) *Tesco launches affordable new range of plant-based family favourites to cater for UK's biggest food trend*, *Tesco Plc*. [Online]. Available at: https://www.tescoplc.com/news/2019/new-plant-based-range/ (Accessed: 14 January 2019).

The Children's Society (2018) *Welsh Government consultation on revised eligibility criteria for free school meals in Wales due to rollout of Universal Credit The Children's Society*.

The Flexitarian (no date) *What is the flexitarian diet?*, *The Flexitarian*. [Online]. Available at: https://theflexitarian.co.uk/the-flexitarian-diet/ (Accessed: 2 January 2020).

The Food Foundation (2016) 'Veg Facts A briefing by the Food Foundation', *The Food Foundation*, 44(November). [Online]. Available at: https://foodfoundation.org.uk/wp-content/uploads/2016/11/FF-Veg-Doc-V5.pdf. (Accessed: 8 June 2017).

The Food Foundation (2018) *UK's annual fruit and veg advertising budget used up just 19 days into the new year*, *The Food Foundation*. [Online]. Available at: https://foodfoundation.org.uk/uks-annual-fruit-and-veg-advertising-budget-used-up-just-19-days-into-the-new-year/ (Accessed: 31 October 2019).

The Stationery Office (1998) *Independent Inquiry into Inequalities in Health Report.* [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/265503/ih.pdfThe Stationery Office. (Accessed: 14 June 2017).

The Vegan Society (no date) *Definition of Veganism*. [Online]. Available at: https://www.vegansociety.com/go-vegan/definition-veganism (Accessed: 2 January 2020).

Tohill, B., Seymour, J., Serdula, M., Kettel-Khan, L. and Rolls, B. (2004) 'What epidemiologic studies tell us about the relationship between fruit and vegetable consumption and body weight', *Nutrition Reviews*, 62(10), pp. 365–374. doi: 10.1301/nr.2004.oct.365-374.

Torun, B. (2005) 'Energy requirements of children and adolescents', *Public Health Nutrition*, 8(7), pp. 968–993.

Trivedi, M., Sridhar, K. and Kumar, A. (2016) 'Impact of healthy alternatives on consumer choice: A balancing act', *Journal of Retailing*. New York University, 92(1), pp. 65–82. doi: 10.1016/j.jretai.2015.05.003.

Tuorila, H. (2015) 'From sensory evaluation to sensory and consumer research of food: An autobiographical perspective', *Food Quality and Preference*. 40, pp. 255–262. doi: 10.1016/j.foodqual.2014.05.006.

Turnwald, B., Boles, D. and Crum, A. (2017) 'Associations between indulgent descriptions and vegetable consumption: twisted carrots and dynamite beets.', *JAMA Internal Medicine*, 177(8), pp. 1213–1216. doi: 10.1001/jamainternmed.2017.1630.

Food Standards Agency (2013) 'Guide to Creating a Front of Pack (FoP) Nutrition Label

for Pre-packed Products Sold through Retail Outlets', *Food Standards Agency*, (June), p. 27. [Online]. Available at: www.dh.gsi.gov.uk. (Accessed: 22 March 2017).

UK Government (2013) *Protected food name: Pembrokeshire early potatoes/Pembrokeshire earlies*. [Online]. Available at: https://www.gov.uk/government/publications/protected-food-name-pembrokeshire-early-potatoespembrokeshire-earlies-pgi. (Accessed: 14 January 2020).

United States Department of Agriculture (no date) *Vegetables: Foods from Roots, Stems, Bark, and Leaves*, *United States Department of Agriculture*. [Online]. Available at: https://www.fs.fed.us/wildflowers/ethnobotany/food/vegetables.shtml (Accessed: 17 February 2020).

Upton, D., Upton, P. and Taylor, C. (2013) 'Increasing children's lunchtime consumption of fruit and vegetables: An evaluation of the Food Dudes programme', *Public Health Nutrition*, 16(6), pp. 1066–1072. doi: 10.1017/S1368980012004612.

Vaitkeviciute, R., Ball, L. E. and Harris, N. (2015) 'The relationship between food literacy and dietary intake in adolescents: A systematic review', *Public Health Nutrition*, 18(4), pp. 649–658. doi: 10.1017/S1368980014000962.

Veganuary (2019) *A quarter of a million people tried vegan and almost half will stay vegan!*, *Veganuary*. [Online]. Available at: https://uk.veganuary.com/blog/veganuary-2019-the-results-are-in/ (Accessed: 2 January 2020).

Vereecken, C. A., Keukelier, E. and Maes, L. (2004) 'Influence of mother's educational level on food parenting practices and food habits of young children', *Appetite*, 43(1), pp. 93–103. doi: 10.1016/j.appet.2004.04.002.

Vergnaud, A. C. *et al.* (2010) 'Meat consumption and prospective weight change in participants of the EPIC-PANACEA study', *American Journal of Clinical Nutrition*, 92(2), pp. 398–407. doi: 10.3945/ajcn.2009.28713.

Vernelli, T. (2019) 'The Veganuary Effect: How a 31-day challenge is changing the future of food'. Food Matters Live, London, 19 and 20 November.

Viner, R. *et al.* (2015) 'Life course epidemiology: Recognising the importance of puberty', *Journal of Epidemiology and Community Health*, 69(8), pp. 719–720. doi: 10.1136/jech-2015-205607.

Wadhera, D., Phillips, E., Wilkie, L. and Boggess, M. (2015) 'Perceived recollection of frequent exposure to foods in childhood is associated with adulthood liking', *Appetite*. 89, pp. 22–32. doi: 10.1016/j.appet.2015.01.011.

Wahlen, S., van der Horst, H. and Pothoff, R. (2016) 'How convenient!? Adolescents' vistas on food competences in a convenience context', *British Food Journal*, 118(11), pp. 2828–2838. doi: 10.1108/BFJ-12-2015-0479.

Wales Future Generations Commissioner for Wales (no date) *Well-being of Future Generations (Wales) Act 2015*. [Online]. Available at: https://futuregenerations.wales/about-us/future-generations-act/ (Accessed: 24 September 2019).

Wang, J. and Fielding-Singh, P. (2018) 'How food rules at home influence independent adolescent food choices', *Journal of Adolescent Health*. 63(2), pp. 219–226. doi: 10.1016/j.jadohealth.2018.02.010.

Wang, X. *et al.* (2014) 'Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: Systematic review and dose-response meta-analysis of prospective cohort studies', *BMJ (Online)*, 349(September), p. 5472. doi: 10.1136/bmj.g4490.

Wanless, D. (2004) *Securing Good Health for the Whole Population: Final Report*. Norwich. [Online]. Available at: https://www.southampton.gov.uk/moderngov/documents/s19272/prevention-appx 1 wanless summary.pdf. (Accessed: 15 June 2017).

Ward, Z., Long, M., Resch, S., Giles, C., Cradock, A. and Gortmaker, S. (2017) 'Simulation of growth trajectories of childhood obesity into adulthood', *The New England Journal of Medicine*, 377(22), pp. 2145–2153. doi: 10.1056/NEJMoa1703860.

Wardle, J., Sanderson, S., Guthrie, C., Rapoport, L. and Plomin, R. (2002) 'Parental feeding style and the intergenerational transmission of obesity risk', *Obesity Research*, 10(6), pp. 453–462. doi: 10.1038/oby.2002.63.

Wardle, J., Carnell, S., Haworth, C. and Plomin, R.. (2008) 'Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment', *American Journal of Clinical Nutrition*, 87(2), pp. 398–404. doi: 10.1093/ajcn/87.2.398.

Warren, E., Parry, O., Lynch, R. and Murphy, S. (2008) '"If I don't like it then I can choose what I want": Welsh school children's accounts of preference for and control over food choice', *Health Promotion International*, 23(2), pp. 144–151. doi: 10.1093/heapro/dam045.

Welsh Government (2016) *Welsh Health Survey 2015: Health of children.* [Online]. Available at: http://gov.wales/docs/statistics/2016/160929-welsh-health-survey-2015-health-children-en.pdf. (Accessed: 4 January 2017).

Welsh Government (2019a) *Healthy Weight: Healthy Wales. Our national ambitions to prevent and reduce obesity in Wales.*, *Health and Social Care: Public Health*. Cardiff. doi: 10.1126/science.1168312.

Welsh Government (2019b) *National Survey for Wales*. [Online]. Available at: https://gov.wales/national-survey-wales-april-2018-march-2019 (Accessed: 4 January 2020).

Welsh Local Government Association. (2009) *Healthy Eating in Schools (Wales) Measure 2009.* Cardiff. [Online]. Available at: http://www.legislation.gov.uk/mwa/2009/3/pdfs/mwa_20090003_en.pdf. (Accessed: 14 June 2017).

Welsh Local Government Association. (2013) *The Healthy Eating in Schools (Nutritional Standards and Requirements).* [Online]. Available at: http://www.legislation.gov.uk/wsi/2013/1984/pdfs/wsi_20131984_mi.pdf. (Accessed: 3 May 2017).

Wengreen, H., Madden, G., Aguilar, S., Smits, R., Jones, B. (2013) 'Incentivizing children's fruit and vegetable consumption: results of a United States pilot study of the Food Dudes program', *Journal of Nutrition Education and Behavior*. 45(1), pp. 54–59. doi: 10.1016/j.jneb.2012.06.001.

Wiium, N. and Wold, B. (2009) 'An ecological system approach to adolescent smoking behavior', *Journal of Youth and Adolescence*, 38(10), pp. 1351–1363. doi: 10.1007/s10964-008-9349-9.

Willett, W. *et al.* (2019) 'Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems', *The Lancet*, 393(10170), pp. 447–492. doi: 10.1016/S0140-6736(18)31788-4.

Wilson, A., Buckley, E., Buckley, J. and Bogomolova, S. (2016) 'Nudging healthier food and beverage choices through salience and priming. Evidence from a systematic review', *Food Quality and Preference*. 51, pp. 47–64. doi: 10.1016/j.foodqual.2016.02.009.

Winpenny, E., Corder, K., Jones, A., Ambrosini, G., White, M. and van Sluijs, E. (2017)

‘Changes in diet from age 10 to 14 years and prospective associations with school lunch choice’, *Appetite*. 116, pp. 259–267. doi: 10.1016/j.appet.2017.05.012.

World Cancer Research Fund International (no date a) *Plant Foods: Eat more Grains, Fruit and Beans.*, *World Cancer Research Fund International*. [Online]. Available at: http://www.wcrf.org/int/research-we-fund/cancer-prevention-recommendations/plant-foods. (Accessed: 18 September 2019).

World Cancer Research Fund International (no date b) *Poor diet and cancer risk: Can unhealthy eating give you cancer?*, *World Cancer Research Fund International*. [Online]. Available at: https://www.wcrf-uk.org/uk/preventing-cancer/what-can-increase-your-risk-cancer/poor-diet-and-cancer-risk. (Accessed: 31 December 2019).

World Health Organisation/Regional Office for Europe (2014) *Obesity and Inequities*, *World Health Organisation*. [Online]. Available at: http://www.euro.who.int/__data/assets/pdf_file/0003/247638/obesity-090514.pdf. Accessed: 14 June 2017).

World Health Organisation (2015a) *Noncommunicable diseases: Fact sheet.* [Online]. Available at: http://www.who.int/mediacentre/factsheets/fs355/en/. (Accessed: 18 June 2017).

World Health Organisation (2015b) *Q&A on the carcinogenicity of the consumption of red meat and processed meat.*, *World Health Organisation*. [Online]. Available at: http://www.who.int/features/qa/cancer-red-meat/en/. (Accessed: 31 December 2019).

World Health Organisation (2016) *Draft Implementation Plan for the recommendations of the Commission on Ending Childhood Obesity.* [Online]. Available at: http://www.who.int/end-childhood-obesity/commission-ending-childhood-obesity-draft-implementation-plan.pdf?ua=1. (Accessed: 3 January 2020).

World Health Organisation (no date a) *Childhood overweight and obesity*. [Online]. Available at: https://www.who.int/dietphysicalactivity/childhood/en/ (Accessed: 3 May 2017).

World Health Organisation (no date b) *Promoting fruit and vegetable consumption around the world*, *World Health Organisation*. [Online]. Available at: https://www.who.int/dietphysicalactivity/fruit/en/index2.html. (Accessed: 31 December 2019).

World Health Organisation (no date c) *Recognizing Adolescence*, *World Health Organisation*. [Online]. Available at: https://apps.who.int/adolescent/second-decade/section2/page1/recognizing-adolescence.html (Accessed: 13 February 2020).

World Health Organisation (no date d) *Unhealthy diet*. [Online]. Available at: https://www.who.int/gho/ncd/risk_factors/unhealthy_diet_text/en/ (Accessed: 9 September 2019).

Wragg, E. (1994) *An Introduction to Classroom Observation*. 2nd edn. London: Routledge.

WRAP (2010) *School Food Waste*. [Online]. Available at: http://www.wrap.org.uk/sites/files/wrap/Food%20Waste%20in%20Schools%20Summary%20Report.pdf (Accessed: 13 February 2020).

WRAP (2011) *Food Waste in Schools*. [Online]. Available at: http://www.wrap.org.uk/sites/files/wrap/Food Waste in Schools Summary Report.pdf. (Accessed: 13 February 2020).

Yanow, D. (2006a) ‘Neither rigorous nor objective? Interrogating criteria for knowledge claims in interpretive science’, in Yanow, D. and Schwartz-Shea, P. (ed.) *Interpretation and method empirical research methods and the interpretive turn.* M.E. Sharpe, Inc., New

York., pp. 67-88. [Online]. Available at: https://ebookcentral.proquest.com/lib/cardiffmet/reader.action?docID=302458.

Yanow, D. (2006b) 'Thinking interpretively: Philosophical presuppositions and the human sciences', in *Interpretation and method empirical research methods and the interpretive turn*. M.E. Sharpe, Inc., New York., pp. 5–26. [Online]. Available at: https://ebookcentral.proquest.com/lib/cardiffmet/reader.action?docID=302458.

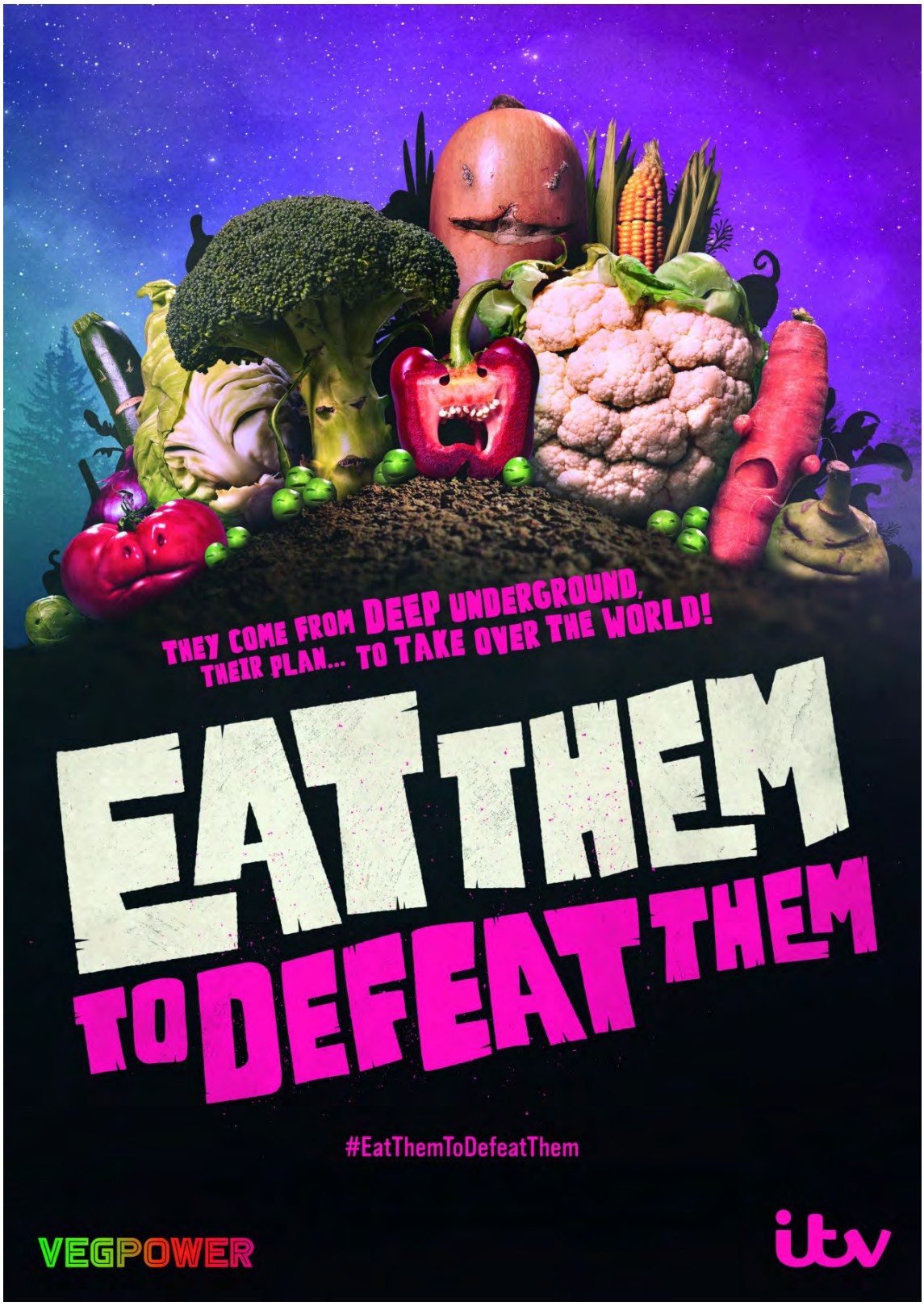
Yee, A., Lwin, M. and Ho, S. (2017) 'The influence of parental practices on child promotive and preventive food consumption behaviors: A systematic review and meta-analysis', *International Journal of Behavioral Nutrition and Physical Activity*. 14(1), pp. 1–14. doi: 10.1186/s12966-017-0501-3.

Zeinstra, G., Koelen, M., Kok, F., and de Graaf, C. (2010) 'The influence of preparation method on children's liking for vegetables', *Food Quality and Preference*. 21(8), pp. 906–914. doi: 10.1016/j.foodqual.2009.12.006.

Zeinstra, G., Koelen, M., Kok, F. and de Graaf, C. (2009) 'Children's hard-wired aversion to pure vegetable tastes. A "failed" flavour-nutrient learning study', *Appetite*, 52(2), pp. 528–530. doi: 10.1016/j.appet.2008.11.006.

Appendix A (Literature Review)

Appendix A.1: Eat Them to Defeat Them



(ITV and VegPower, 2019).

Appendix B (Methodology Phases One and Two)

Appendix B.1.: Interviews and Focus Groups Ethical Consent

Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

CARDIFF SCHOOL of ART & DESIGN

Date: 29 January 2019

Cardiff School of Art & Design
Cardiff Metropolitan University
Western Avenue
Cardiff
CF5 2YB

Dear Alice,

Project Title: Making vegetables "cool": Improving the Eating Habits of Wale's Younger Generation
CSAD EC reference number: 05_1718_A (AG)

Thank you for submitting your application for ethics approval. I can confirm that CSAD REC has approved your application.

This Ethics approval is valid for a twelve months from the date of this letter. Should your project extend beyond this time an application for an extension to the approval will be required by CSAD REC.

Please note, your project has been granted ethics protocol approval based on the information provided in your application. However, should this change at any point during your study or should you wish to engage participants to undertake further research then you are required to reapply to CSAD REC for ethics approval.

Best Wishes

Dr. Stephen Thompson
Chair: Cardiff School of Art and Design Research Ethics Committee
CSAD Head of Academic Development
Cardiff Metropolitan University

Appendix B.2.: Catering Manager Interview Prompt Sheet

- MENU:
    - Do you have a rotating menu?
    - What particular dishes are popular?
    - Have you noticed any summer and winter trends? E.g., less salad sold over the winter months.
    - What carbohydrate do you think is the most popular? E.g., pasta, rice, potatoes.
    - Would you say that the menu is healthy?
    - Are cereal bars, cakes, crisps available to purchase?

- FOOD PURCHASING:
    - Is there a breakfast club?
    - What products are available at break time and what sells well?
    - Are there vending machines?
    - Do some pupils bring snacks and purchase a main meal? Do some pupils bring a packed lunch and purchase snacks?

- POTATOES:
    - How are potatoes cooked and offered on the menu?
    - How many times a week are chips available?
    - How are the chips cooked? E.g., fried, oven baked.

- FRUIT AND VEGETABLES:
    - What do you think pupils' favourite vegetable is?
    - Do pupils purchase fruit?
    - Is there a salad bar?

Appendix B.3: Catering Staff Focus Group Information Sheet

Catering Staff Focus Group Information Sheet

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour who will work with you. There are no additional requirements needed in regards to your ability.

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the focus group will be to discuss: (i) adolescents' behaviour; (ii) adolescents' attitudes to food in general and vegetables in particular; (iii) education, peer pressure and marketing.

Do I have to take part?

No. It is up to you whether or not you decide to take part in the study. If you do decide to take part then you may keep a copy of this information sheet and sign the consent form, giving your permission to take part in the study.

What will happen if I take part?

You will be in a group of 6–10 other individuals. Alice will ask questions and discussion will be encouraged. The focus group will last 20–30 minutes.

Are there any benefits of taking part?

You will gain experience of taking part in a focus group session, providing you with some insight into what a research process involves. It may be personally interesting to discuss the topic with a group of others and hear what their opinions are.

Are there any disadvantages of taking part?

We are unaware of any disadvantages of taking part.

How we protect your privacy:

No videoing or photography will take place, but voices will be recorded using an audio recorder. The audio files will be destroyed after the content has been transcribed. All data collected will be kept strictly confidential at Cardiff

Metropolitan University. Data collected may be shared in an anonymised form, but **neither you, nor the school will be identified or identifiable**.

The right to withdraw:

If you can no longer take part in the research then you can stop and withdraw at any time. You do not need to provide a reason.

What will happen to the results?

The results of the focus groups will be used to inform Alice's research project. All results will be anonymised and may be published in peer-reviewed journals and/or conference proceedings, but neither you, nor the school will be identified or identifiable.

Who is organising and funding the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan university and has funding from KESS2 (Knowledge Economy Skills Scholarships). Alice is working in collaboration with Puffin Produce (a vegetable producer in Pembrokeshire, West Wales).

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.4.: Catering Staff Focus Group Consent Form

PARTICIPANT CONSENT FORM

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
Name of Researcher: Alice Gilmour

Participant to complete this section: **Please initial each box.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐
3. I agree to take part in the above study. ☐
4. I agree to the focus group being audio recorded. ☐
5. I agree to the use of anonymised quotes in publications. ☐

_____ _____
Name of Participant Date

_____
Signature of Participant

__*Alice Gilmour*_____ _____
Name of person taking consent Date

_____
Signature of person taking consent

** When completed, 1 copy for participant & 1 copy for researcher site file*
If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk. **Thank you for taking part in this research.**

Appendix B.5: Catering Staff Focus Group Question Prompt Sheet

The semi-structured question schedule for catering staff focus groups in Phase One

Introductory Questions:

- What vegetables are popular at the school?
- Do you use any techniques to disguise or encourage vegetable consumption? Is 'stealth' / hiding vegetables a good idea?

Main Questions:

- How easy is it for pupils to eat their *5-A-Day* / consume vegetables?
- Is healthy eating a major driver for parents / pupils / the school?
- Do you think pupils' parents are strict about what they eat? Why / why not?
- Would parents be surprised by what their adolescent is buying at school?
- What would make it easier for adolescents to eat more healthful foods? E.g., changing social norms to make it 'cool' to eat healthily.

What influences pupils' food choices? Do these factors change?

- Is convenience a factor that influences what they buy? What foods are convenient?
- Do you think taste preferences influence what they eat?
- Do you think their parents influence their food choices?
- Do you think the price of foods influences what they buy?
- Do you think social media influences what they decide to eat?
- How much do peers and friends have an influence?

Ending Questions:

- Our goal is to help young people eat more vegetables and develop better eating habits. Do you have any advice?
- What would make it easier for adolescents to eat more healthful foods?

Appendix B.6: Parents Focus Group Information Sheet

Parents Focus Group Information Sheet

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour who will work with you. There are no additional requirements needed in regards to your ability.

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the focus group will be to discuss: (i) adolescents' behaviour; (ii) adolescents' attitudes to food in general and vegetables in particular; (iii) education, peer pressure and marketing.

Do I have to take part?

No. It is up to you whether or not you decide to take part in the study. If you do decide to take part then you may keep a copy of this information sheet and sign the consent form, giving your permission to take part in the study.

What will happen if I take part?

You will be in a group of 6–10 other individuals. Alice will ask questions and discussion will be encouraged. The focus group will last 20–30 minutes.

Are there any benefits of taking part?

You will gain experience of taking part in a focus group session, providing you with some insight into what a research process involves. It may be personally interesting to discuss the topic with a group of others and hear what their opinions are.

Are there any disadvantages of taking part?

We are unaware of any disadvantages of taking part.

How we protect your privacy:

No videoing or photography will take place, but voices will be recorded using an audio recorder. The audio files will be destroyed after the content has been transcribed. All data collected will be kept strictly confidential at Cardiff

Metropolitan University. Data collected may be shared in an anonymised form, but **neither you, nor the school will be identified or identifiable**.

The right to withdraw:

If you can no longer take part in the research then you can stop and withdraw at any time. You do not need to provide a reason.

What will happen to the results?

The results of the focus groups will be used to inform Alice's research project. All results will be anonymised and may be published in peer-reviewed journals and/or conference proceedings, but neither you, nor the school will be identified or identifiable.

Who is organising and funding the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan university and has funding from KESS2 (Knowledge Economy Skills Scholarships). Alice is working in collaboration with Puffin Produce (a vegetable producer in Pembrokeshire, West Wales).

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.7: Parents Focus Group Consent Form

PARTICIPANT CONSENT FORM

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
Name of Researcher: Alice Gilmour

Participant to complete this section: **Please initial each box.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐
3. I agree to take part in the above study. ☐
4. I agree to the focus group being audio recorded. ☐
5. I agree to the use of anonymised quotes in publications. ☐

_____ _____
Name of Participant Date

_____
Signature of Participant

__*Alice Gilmour*_____ _____

Name of person taking consent Date

_____
Signature of person taking consent

** When completed, 1 copy for participant & 1 copy for researcher site file*
If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk. **Thank you for taking part in this research.**

Appendix B.8: Parents Focus Group Question Prompt Sheet

The semi-structured question schedule for parents' focus groups in Phase One

Introductory Questions:

- Please could we go around in a circle and could you say your name and the age of your children. You don't need to say your children's name(s). So, my name is Alice and I don't have any children.
- What is your child's favourite vegetable?

Main Questions:

- What vegetables do they not like eating? Do you make them eat the vegetables that they don't like?
- Is there anything you do to encourage vegetable consumption? E.g. Giving them rewards if they eat all their vegetables.
- Does your adolescent take a packed lunch or do they have school dinners?
- Do you check online what your child is buying?
- Do you think that they are health-conscious?
- Do your children normally eat breakfast before they go to school?
- Do they eat food outside of meal times? Snacking?
- What do you think influences your adolescent's food choices?
- Do you think taste preferences are a factor in what foods they decide to eat? If something tastes nice, will they want it?
- Do you think that convenience or time considerations are a factor that influences their food choice? E.g. Wanting something that is quick.
- Do you think cost influences their food choice?
- Do you think that friends influence what they eat?
- What about the influence of media? Marketing? TV adverts? Celebrities? Do you think that advertisements influence them?

Ending Questions:

- So one of the goals for my PhD is to help young people eat more vegetables and develop better eating habits, like eat more regularly, not skip meals and eating more vegetables. Do you have any advice?
- OK, I think that is the end. Is there anything else that anyone wants to say?

Appendix B.9: School Canteen Observations Ethical Consent

Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

CARDIFF SCHOOL of ART & DESIGN

Date: 17th September 2018

Cardiff School of Art & Design
Cardiff Metropolitan University
Western Avenue
Cardiff
CF5 2YB

Dear Alice Gilmour

Project Title: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
CSAD EC reference number: 05_1718_A (AG)

Thank you for resubmitting your application for ethics approval. I can confirm that CSAD REC has approved your application via Chair's Action.

This Ethics approval is valid for **12 months** from the date of this letter. Should your project extend beyond this time an application for an extension to the approval will be required by CSAD REC.

Please note, your project has been granted ethics protocol approval based on the information provided in your application. However, should this change at any point during your study or should you wish to engage participants to undertake further research then you are required to reapply to CSAD REC for ethics approval.

Best Wishes

Dr. Stephen Thompson
Chair: Cardiff School of Art and Design Research Ethics Committee
CSAD Head of Academic Development
Cardiff Metropolitan University

Appendix B.10: School Canteen Observations Information Sheet

Information Sheet – School-based Observation

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour who will work with you. The observational period will take place over two non-consecutive days in the school canteen during morning break time and lunchtime. The research will be purely observation and Alice will not talk to or interact with any of the pupils.

Overview of the research:

Data has been collected from all three secondary schools involved in the research. There will be four stages of research collection:

(1) Data mining (collecting data sets from purchases made at school).
(2) School-based observation.
(3) Focus groups at schools.
(4) Ethnographic observation (observing families outside school).

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the school-based observation is collect qualitative data regarding what pupils are buying when uninfluenced by their parents as well as their behaviour in the school canteen.

Covert research:

The research is covert, so pupils will not be made aware that they are being observed. As the research is in a public place and no sensitive data will be collected, this meets the required ethical guidelines. The purpose of doing covert research is to avoid pupils altering their behaviour as of a result of being aware that they are taking part in a research study.

The research process:

Alice will observe the adolescents eating and behaviour in school canteen. Factors such as these will be noted:

(i) The buying patterns of adolescents when not under the influence of their parents.
(ii) Food waste.
(iii) Eating outside or inside.
(iv) Eating sitting down or standing up etc.

(v) Use of cutlery or hands.
(vi) Drink with meal, components of meals etc.

There will be no talking or any other form of interaction between Alice and the adolescents. The research is focused on observation and notes will be handwritten. No recording equipment such as audio or visual recording will be used. Another individual may also help to provide a second set of eyes to help improve the rigour of the study. A few informal questions may be asked to catering staff during the observational period.

Are there any benefits of taking part?

You will be helping with a PhD research project that ultimately aims to improve the eating habits of Wales' younger generation.

Are there any disadvantages of taking part?

We are unaware of any disadvantage to taking part.

Risk Assessment:

- ANONYMITY: Data will be kept anonymised. No videoing or photography of pupils will take place. Data collected may be shared in an anonymised form, but neither you, nor the school will be identified or identifiable. Individuals will not be able to be identified or identifiable in any publications.

- CONFIDENTIALITY: Data will be stored securely on university computers and will not be shared with external parties. Data will be destroyed after use. Names will not be recorded and all data collected will be kept strictly confidential at Cardiff Metropolitan University.

- EXPERIMENTER/INVESTIGATOR EFFECTS: In order to avoid the adolescents acting in a more socially desirable way as a result of being watched, Alice intends on keeping a low profile. Dressing similarly to a teacher or member of staff and using an A5 clipboard rather than A4 should make the researcher status less obvious.

What will happen to the results?

The results of the school-based observation will be used to inform the later stages of Alice's research project. Results will be shared with the company sponsoring this research (Puffin Produce) and may be published in peer-reviewed journals and/or conference proceedings, but neither you, nor the school will be identified or identifiable.

Who is organising and funding the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan university and has funding from KESS2 (Knowledge Economy Skills Scholarships). Alice is working in collaboration with Puffin Produce (a vegetable producer in Pembrokeshire, West Wales).

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.11: School Canteen Observation Consent Form

Consent Form – School-based Observation

School:

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation

Name of Researcher: Alice Gilmour

Participant to complete this section: **Please initial each box.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that the schools participation is voluntary and that I am able to withdraw from the research study at any time, without giving any reason. ☐
3. I agree to take part in the above study. ☐
4. I agree to written notes being made by the researcher. ☐
5. I agree to photographs being taken. ☐

_____ _____

Signature of Participant Date

_____

Name

_____ _____

Signature of Researcher Date

_____

Name of Researcher

** When completed, 1 copy for participant & 1 copy for researcher site file*

Further information: If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk. **Thank you for taking part in this research.**

Appendix B.12: School Canteen Observation Prompt Sheet

- SOCIAL INTERACTION
    - Conversations?
    - Groups?
    - Social pressures?

- THE FOOD AND DRINKS OFFERED
    - Selection?
    - Vending machines?
    - Drink with meal?
    - Prices?
    - Packed lunches. What is brought in?
    - Water fountains, location?

- BREAK TIME AND LUNCHTIME
    - Supervision? Staff interaction?
    - Speed of service?
    - Enough time to eat?

- AMBIENCE
    - Space?
    - Smell?
    - Noise?
    - General behaviour?
    - Displays?
    - Seating availability? Choosing to stand?

- EATING HABITS
    - Choice?
    - Cutlery usage?
    - Food combinations?
    - Leave site?

- WASTE
    - Food left over?

Appendix B.13: Adolescents Focus Group Information Sheet

Adolescents' Focus Group Information Sheet

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

Alice Gilmour is a university student who will be running focus groups at your school for her research.

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The focus group will discuss your ideas on what you like to eat, where you like to eat, when you like to eat and why.

Do I have to take part?

No. It is up to you whether you want to take part or not. If you do decide to take part then your parent and/or caregiver must sign the consent form and you must sign the assent form.

What will happen if I take part?

You will be in a group of 6–10 other students in Years 7 and 8. Alice will ask questions and discussion will be encouraged. The focus group will last 20–30 minutes.

Are there any benefits of taking part?

You will gain experience of taking part research and it will be interesting to discuss the subject amongst your peers and hear what their opinions are.

Are there any disadvantages of taking part?

We are unaware of any disadvantage to taking part.

How we protect your privacy:

Your name will not be recorded and all data collected will be kept strictly anonymous. You will not be able to be identified or identifiable in any publications. The school will also not be identified or identifiable. No videoing or photography will take place, but voices will be recorded using an audio recorder. After Alice has typed up the audio recordings, the audio data will be deleted.

The right to withdraw:

If you can no longer take part in the research then you can stop and withdraw at any time. You do not have to give a reason.

What will happen to the results?

The results of the focus groups will be used to help Alice with her PhD research project.

Who is organising the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan University.

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.14: Adolescents Focus Group Assent Form

PARTICIPANT ASSENT FORM

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
Name of Researcher: Alice Gilmour

Participant to complete this section: Please initial each box.

6. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
7. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐
8. I agree to take part in the above study. ☐
9. I agree to the focus group being audio recorded ☐
10. I agree to the use of anonymised quotes in publications ☐

_____ _____
Name of Participant Date

_____
Signature of Participant

__*Alice Gilmour*_____ _____
Name of person taking consent Date

_____
Signature of person taking consent

** When completed, 1 copy for participant & 1 copy for researcher site file*
If you have any questions about the project, please do not hesitate to email

algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.15: Adolescents Focus Group Information Sheet for Parents

Parents and/or Caregivers' Focus Group Information Sheet

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour who will work with your child. The focus groups will take place in a classroom at school. There are no additional requirements needed in regards to your child's ability.

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the focus group is to discuss: (i) consumer behaviour; (ii) attitudes to food generally and vegetables in particular; (iii) education, peer pressure and marketing.

Do they have to take part?

No. It is up to you and your child whether or not they take part in the study. If your child does decide to take part then you may keep a copy of this information sheet and sign the consent form, giving your permission for them to take part in the study. Your child will also need to sign an assent form.

What will happen if they take part?

They will be in a group of 6–10 other students in Years 7 and 8. Alice will ask questions and discussion will be encouraged. The focus group will last 20–30 minutes.

Are there any benefits of taking part?

Your child will gain experience of taking part in a focus group session, providing them with some insight into what a research study involves. It may be personally interesting for them to discuss the topic in question with a group of other individuals and hear what their opinions are.

Are there any disadvantages of taking part?

We are unaware of any disadvantage to taking part.

How we protect their privacy:

Names will not be recorded and all data collected will be kept strictly confidential at Cardiff Metropolitan University. Individuals will not be able to be identified or identifiable in any publications. The school will also not be identified or identifiable. No videoing or photography will take place, but voices will be recorded using an audio recorder. The audio files will be destroyed after their content has been transcribed. Data collected may be shared in an anonymised form, but **neither your child nor the school will be identified or identifiable**.

The right to withdraw:

If your child can no longer take part in the research then they can stop and withdraw at any time. They do not need to provide a reason.

What will happen to the results?

The results of the focus groups will be used to inform the later stages of Alice's research project. All results will be anonymised and may be published in peer-reviewed journals and/or conference proceedings, but neither your child nor the school will be identified or identifiable.

Who is organising the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan University.

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix B.16: Adolescents Focus Group Consent Form for Parents

PARTICIPANT CONSENT FORM

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
Name of Researcher: Alice Gilmour

Participant to complete this section: Please initial each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my child's participation is voluntary and that they are free to withdraw at any time, without giving any reason. ☐
3. I agree for my child to take part in the above study. ☐
4. I agree to the focus group being audio recorded. ☐
5. I agree to the use of anonymised quotes in publications. ☐

_____ _____
Name of Parent/Caregiver Date

_____
Signature of Parent/Caregiver

__*Alice Gilmour*_____ _____
Name of person taking consent Date

_____
Signature of person taking consent

** When completed, 1 copy for participant & 1 copy for researcher site file*
If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk. **Thank you for taking part in this research.**

Appendix B.17: Adolescents Focus Group Question Prompt Sheet

The semi-structured question schedule for the adolescents' focus groups in Phase Two

Introductory Questions:

- We are going to start by going around in a circle and I want everyone to say their first name and what your favourite vegetable is. So I am going to start and then we will go this way. OK. So, my name is Alice and my favourite vegetable is carrots. (Gesture to left / clockwise).
- Why do you like these vegetables?
- Are there any vegetables that you don't like?
- Why don't you like these vegetables?

'Health' Questions:

- So in general, would you say that you eat healthily?
- What does "healthy" mean?
- Do you think you eat enough vegetables and fruit? Does everyone think they eat their *5-A-Day*? How many of your *5-A-Day* do you think you eat?
- Does anyone eat fruit and vegetables as snacks?
- Do you think in general, for people your age, is it hard or easy to eat your *5-A-Day*?
- What sort of things have you learnt about healthy eating and vegetables at school? Are the lessons useful?

'Daily Routine' Questions:

- Do you eat breakfast before you come to school? / Before you come to school, do you usually eat anything?
- When you come to school, do you normally have a packed lunch or a school dinner? Which is healthier, or which do you like more? Does anyone get a cooked main meal at school?
- So what sort of things do you buy when you have school dinners?
- What sort of things do people like to buy at break time?

What Influences Food Choices?

- Does your family eat healthily or unhealthily?
- Do you think healthy eating is important to your parents? / Do your families try and make you eat more healthy foods?
- Do you think your parents would be surprised by what you are eating at school?
- Do your parents have an influence on what you buy?
- Do you think that convenience is a factor in what you choose to buy?
- Do your parents give you a budget? Does anyone have to keep an eye on how much they are spending?

- Are there healthy options at school? / Are the convenient options healthy?
- What about what your friends buy, does that influence what you want to eat?
- Do people buy food for their friends? / Do you ever buy food for your friends?
- If all your friends were getting a slice of pizza, would you get a slice of pizza to fit in? / What if all your friends were getting pizza, then would you feel like the odd one out if you wanted to get something healthy? / Would your friends say something if you had a really healthy meal? / What if all your friends were eating and you went to get a salad? / Would you feel embarrassed if you were eating vegetables when all your friends were eating chocolates?
- Do you think that taste influences what you buy?
- What about what you see on TV, or on social media, like *Facebook*. Does that influence what you eat?
- What other things influence what you buy, or what you eat at school? / Is there anything else which influences what you choose?

Ending Questions:

- What would make it easier for young people to eat more vegetables and healthy foods?
- So if the goal of my research is to help young people eat more vegetables and develop better eating habits, do you have any advice? How could people eat more healthy foods?
- OK, we have finished all the questions. Is there anything that anyone wants to say before we end?

Appendix C (Data Mining)

Appendix C.1.: School A Data from 8th February to 8th March 2019

Time of day	Food Item	Unit Price	Year 7 quant.	Yr 7. Sales	Year 8 quant.	Yr 8. Sales	Year 9 quant.	Yr 9. Sales
Breakfast / Break time	Bacon Roll	£1.00	255	£255.00	108	£108.00	181	£181.00
	Sausage Bap	£1.00	62	£62.00	63	£63.00	55	£55.00
	Double Bacon Roll	£1.50	4	£6.00	8	£12.00	12	£18.00
	Cheese on Toast	£0.70	67	£46.90	23	£16.10	22	£15.40
	Bacon and Sausage Roll	£1.50	11	£16.50	11	£16.50	13	£19.50
	Toast	£0.16	716	£114.56	617	£98.72	617	£98.72
	Teacake	£0.75	56	£42.00	54	£40.50	69	£51.75
	Croissant	£0.65	168	£109.20	83	£53.95	99	£64.35
	Crumpet	£0.35	22	£7.70	6	£2.10	8	£2.80
	Porridge	£1.25	0	£0.00	0	£0.00	1	£1.25
All times	Fresh Fruit	£0.45	37	£16.65	16	£7.20	19	£8.55
	Fresh Fruit Pot	£0.85	66	£56.10	102	£86.70	70	£59.50
Lunch time	Dish of the Day	£2.00	22	£44.00	24	£48.00	25	£50.00
	Hearty Meal	£2.00	556	£1,112.00	569	£1,138.00	554	£1,108.00
	Hearty & Dessert	£2.45	17	£41.65	16	£39.20	18	£44.10
	Vegetarian Dish	£2.00	14	£28.00	11	£22.00	8	£16.00
	Vegetarian & Dessert	£2.45	1	£2.45	1	£2.45	2	£4.90
	Curry & Chips	£2.00	49	£98.00	24	£48.00	39	£78.00
	Half & Half	£2.00	32	£64.00	39	£78.00	21	£42.00
	Lunch Pot	£1.95	36	£70.20	41	£79.95	31	£60.45
	Pizza Plain	£1.05	756	£793.80	507	£532.35	433	£454.65
	Hot Dog	£1.25	58	£72.20	42	£52.75	91	£51.25
	Burger in a Bun	£1.50	150	£225.00	133	£199.50	153	£229.50
	Pasta Pot	£1.80	51	£91.80	35	£63.00	25	£45.00
	Small Pasta Pot	£1.20	6	£7.20	9	£10.80	4	£4.80
	Chips and Tomato Sauce	£1.15	14	£16.10	49	£56.35	31	£35.65
	Meal Deal	£1.80	3	£5.40	20	£16.00	9	£7.20
	Hot Savoury Roll	£1.25	85	£106.25	57	£71.25	66	£82.50
	Cheese Wheel	£1.00	1	£1.00	0	£0.00	0	£0.00
	Plain Jacket	£1.00	0	£0.00	4	£4.00	0	£0.00
	Jacket & 1 Filling	£1.50	14	£21.00	14	£21.00	8	£12.00
	Jacket & 2 Fillings	£1.75	42	£73.50	34	£59.50	40	£70.00
	Salad Bar Pot	£1.50	62	£93.00	11	£16.50	16	£24.00
	Soup & Roll	£1.50	10	£15.00	0	£0.00	0	£0.00
	Baguette Standard	£1.80	139	£250.20	100	£180.00	148	£266.40
	Hot Baguette	£1.80	42	£75.60	46	£82.80	36	£64.80
	Panini	£1.75	304	£532.00	250	£437.50	338	£591.50
	Sandwich Classic	£1.45	147	£213.15	106	£153.70	103	£149.35

	Sandwich Luxury	£1.80	83	£149.40	66	£118.80	60	£108.00
	Basic Wrap	£1.65	1	£1.65	1	£1.65	2	£3.30
	Luxury Wrap	£1.90	25	£47.50	26	£49.40	21	£39.90
	Hot Wrap	£1.80	0	£0.00	0	£0.00	1	£1.80
	Sub Roll	£1.65	31	£51.15	34	£56.10	26	£42.90
	Spaghetti Hoops	£0.60	1	£0.60	13	£7.80	2	£1.20
	Tomato Sauce	£0.15	98	£14.70	60	£9.00	131	£19.65
	Beans	£0.60	6	£3.60	2	£1.20	10	£6.00
	Extra Cheese	£0.40	34	£13.60	49	£19.60	95	£38.00
Puddings	Home Bake	£0.55	181	£99.55	157	£86.35	229	£125.95
	Luxury Home Bake	£0.70	325	£227.50	281	£196.70	409	£286.30
	Cookie 45p	£0.45	635	£285.75	562	£252.90	775	£348.75
	Cookie 55p	£0.55	105	£57.75	93	£51.15	160	£88.00
	Luxury Cookie	£0.70	54	£37.80	81	£56.70	92	£64.40
	Ice Cream	£0.60	10	£6.00	2	£1.20	3	£1.80
	Muffin	£0.85	0	£0.00	1	£0.85	2	£1.70
	Pudding and Custard	£0.80	50	£40.00	36	£28.80	47	£37.60
	Jelly	£0.60	24	£14.40	24	£14.40	11	£6.60
	Angel Delight	£0.50	10	£6.00	5	£3.00	5	£3.00
	Yoghurt	£0.60	16	£9.60	4	£2.40	10	£6.00
	Luxury Yoghurt	£0.90	3	£2.70	0	£0.00	6	£5.40
	Muller Pots	£0.50	3	£1.50	0	£0.00	0	£0.00
Drinks	Water	£0.45	324	£145.80	492	£222.75	455	£204.75
	Drink 70p	£0.70	198	£138.60	212	£148.40	159	£111.30
	Small Juice Burst	£0.90	265	£238.50	170	£153.00	150	£135.00
	Juice Burst	£1.25	94	£117.50	121	£151.25	149	£186.25
	Carton Juice	£0.65	76	£49.40	99	£20.80	50	£32.50
	Luxury Coffee	£0.85	4	£3.40	2	£1.70	23	£19.55
	Milk 1 Pint	£0.55	5	£2.75	16	£8.80	56	£30.80
	Milkshake Carton	£0.65	36	£23.40	45	£29.25	63	£40.95
	Yazoo	£1.25	54	£67.50	153	£191.25	56	£70.00
	Radnor Fizz	£0.65	421	£273.65	410	£266.50	303	£196.95
	Large Hot Drink	£1.10	0	£0.00	0	£0.00	2	£2.20
	Tea	£0.65	2	£1.30	0	£0.00	3	£1.95
	Hot Chocolate	£0.80	189	£151.20	175	£140.00	91	£72.80
	SUSO Can	£0.70	171	£119.70	236	£165.20	204	£142.80

Appendix C.2.: School B Data from 8th February to 8th March 2019

Time of day	Food Item	Quantity Sold	Unit Price	Cash Sales	FSM Sales	Total Sales	KS3 Sales
Breakfast	Bacon Bagel	164		£212.99	£42.76	£255.75	£227.85
	Subs / Bagel 2 fillings	7	£2.50	£2.50	£15.00	£17.50	£0.00
	Subs / Bagel 3 fillings	1	£3.00	£0.00	£2.85	£3.00	£0.00
	Plain Bagel	162		£0.15	£30.60	£97.44	£97.44
	Toast	3	£0.25	£0.25	£0.50	£0.75	£0.75
		3079		£2,225.20	£494.51	£2,786.20	
Morning Break	Mini Cheddars	255		£186.80	£34.61	£221.41	£158.90
	Assorted 1/2 Panini	226		£144.70	£47.57	£192.27	£192.27
	Assorted Panini full	955		£1,380.12	£245.76	£1,625.88	£1,246.78
	Assorted Bagel	715		£885.59	£225.14	£1,110.73	£736.87
	Breakfast Muffin Bacon	21		£22.50	£4.00	£26.50	£24.00
	Crusty Bacon Roll	247		£242.84	£29.74	£272.58	£164.34
	Foccacia Pizza	922		£776.01	£192.30	£968.31	£323.40
	French Bread Pizza	375		£366.90	£101.85	£468.75	£430.00
	Hot Dog (V)	8		£7.35	£1.05	£8.40	£0.00
	Spicy potato wedges	787		£697.27	£168.85	£866.12	£646.80
	Sauce portion	73		£6.00	£2.78	£8.78	
	Pretzel	98	£0.90	£79.02	£9.90	£88.92	£33.30
	Baked Doughnut						£54.00
	Croissants						£221.58
	Danish		£0.90				£36.00
	Pancake and Syrup		£0.60				£63.00
	Waffle and fruit	14	£1.10	£12.10	£3.30	£15.40	£13.20
		3260		£3,095.58	£1,066.85	£5,874.05	
Grab And Go	Baguette Classic	70		£54.54	£59.06	£113.60	£44.36
	Baguette Deli	335		£379.91	£246.87	£626.78	£401.82
	Baguette Solo	95		£80.05	£57.99	£138.04	£61.10
	Filled Bagel	1	£1.60	£1.60	£0.00	£1.60	£0.00
	Panini	3		£2.09	£3.35	£5.44	£0.00
	Panini Deli	1	£1.80	£0.00	£1.80	£1.80	£0.00
	Sandwiches Classic	22		£16.53	£16.82	£33.35	£14.50
	Sandwiches Deli	37		£32.82	£27.66	£60.48	£36.04
	Sandwiches Solo	35		£19.50	£26.25	£45.75	£6.25
	Toastie Classic	1	£1.45	£1.45	£0.00	£1.45	£0.00
	Toastie Solo	1	£1.25	£0.00	£1.25	£1.25	£0.00

	Toastie/Sand 2 fillings	5		£8.84	£0.00	£8.64	£0.00
	Wraps	163		£176.63	£87.37	£264.00	£104.32
	Salad pots 375cc	1	£1.80	£0.00	£1.80	£1.80	£0.00
	Salad pots 500cc	15		£10.80	£19.44	£30.24	£0.00
	Fruit	54	£0.50	£20.90	£6.20	£27.10	£13.60
	Fruit Pot	311	£0.75	£171.40	£62.90	£234.30	£160.95
	Yogurt Round Thick	2	£0.77	£1.54	£0.00	£1.54	£0.00
	Jelly Pots 7oz	67		£38.70	£4.85	£43.55	£35.10
	Mousse Pots 7oz	156		£82.94	£26.82	£109.76	£81.48
		1375		£1,100.24	£650.43	£1,750.47	
Lunch	Main Meal	629		£930.32	£245.54	£1,175.86	£660.08
	Meal Deal / Meal and dessert	2703		£3,761.59	£2,812.46	£6,574.05	£4,038.80
	Classic Tray Bake	2574		£1,723.71	£283.14	£2,006.85	£1,207.00
	Deli Tray Bake	47		£36.25	£6.05	£42.30	£33.30
	Solo Tray Bake	256		£141.90	£24.63	£166.53	£166.53
	Burger and side	8		£16.40	£0.00	£16.40	£0.00
	Burger Meal Deal	11		£7.52	£19.74	£27.26	£0.00
	Protein/Meat	11	£0.65	£1.30	£5.85	£7.15	
	Meat/Fish Option	134		£164.75	£36.55	£201.30	£172.80
	Nachos to Share	19		£21.30	£7.50	£28.80	£0.00
	Pizza Box	1	£6.00	£0.00	£6.00	£6.00	£0.00
	Burger / Hot Dog	49	£1.80	£72.00	£16.20	£88.20	£0.00
	Pasta	701		£1,001.55	£226.60	£1,228.15	£969.15
	Pasta with extra cheese	529		£858.05	£173.50	£1,031.55	£764.37
	Pasta / Chips / Roast potatoes	1038		£723.33	£263.53	£986.86	£593.04
	Pizza (Meat)	133		£154.85	£18.05	£172.90	£169.00
	Pizza (Veg.)	960		£869.55	£234.68	£1,104.23	£625.83
	JP (Jacket Potato)	18		£2.55	£12.17	£14.72	£13.12
	JP cheese and beans	35		£42.82	£23.04	£65.86	£50.32
	JP tuna mayonnaise	6		£10.50	£0.00	£10.50	£0.00
	Garlic Bread / Half Naan	384		£77.65	£18.45	£96.10	£77.60
	Bread	65		£11.40	£1.60	£13.00	£4.00
	Coleslaw Pot 4oz	2	£0.55	£0.55	£0.55	£1.10	£0.00
	Cheese Pots 4oz	629		£276.90	£69.05	£345.95	£252.45
	Vegetables / Baked Beans	161		£59.62	£29.26	£88.88	£1.10
	Tortilla Crisps	663		£316.67	£48.53	£365.20	£296.46
	Dessert	150		£85.20	£12.30	£97.50	£97.70
	Dessert and Custard	10	£0.75	£6.00	£1.50	£7.50	£6.75
	Assorted Biscuits	38		£14.94	£2.25	£17.19	£6.75

	Digestive Biscuit	174		£83.25	£13.36	£96.61	£65.78
	Ginger Bread Man	168		£42.86	£8.15	£51.01	£39.18
	Giant Cookie	591		£473.95	£87.50	£561.45	£543.40
	Go Ahead	66		£57.34	£5.74	£63.08	£43.79
	Nutri Grain	4		£3.38	£0.40	£3.78	£2.70
	Nutri Grain Yogurt	10		£5.75	£2.92	£8.67	£3.40
	Waffle	1947	£0.90	£1,458.54	£294.30	£1,752.84	£1,377.80
	Traybakes	34	£0.75	£21.20	£4.30	£25.50	£0.00
	Hippeas						£14.40
	Cheesecake / Sponge	60		£72.95	£17.05	£90.00	£0.00
	Cinnamon Whirl	635		£393.15	£83.25	£476.40	£348.90
	Oreo	18	£0.30	£10.83	£1.00	£11.83	£0.00
	Jumbo Muffin	547		£485.90	£61.30	£547.20	£322.00
	Mini Muffin	155		£61.19	£8.65	£69.84	£66.69
		16373		£14,559.46	£5,186.64	£19,746.10	
Drinks	Water 330ml	646	£0.65	£311.25	£110.21	£421.46	£269.04
	Water 500ml	696	£0.85	£480.05	£113.25	£593.30	£353.77
	Water 750ml	225	£1.00	£188.85	£38.15	£225.00	£132.00
	Cuplet Juice		£0.40				£48.20
	Calypso Jubblie 185ml	25	£0.40	£10.00	£2.80	£12.80	£5.00
	Calypso Pure 150ml Carton	479	£0.40	£187.86	£75.92	£263.78	£231.91
	Capri Sun	3	£0.75	£2.25	£0.00	£2.25	£0.75
	Tropicana 150ml bottle	14		£7.50	£1.60	£9.10	£9.10
	Jelly Sqeeze	85		£37.10	£9.85	£46.95	£46.75
	Radnor	2081		£1,722.20	£359.60	£2,081.80	£1,668.40
	Viva Milk	702		£347.95	£108.81	£455.56	£399.93
	Yazoo 300ml	1075		£768.55	£308.65	£1,075.20	£800.20
	Tea 9oz	20		£20.20	£2.10	£22.40	£0.00
	Coffee 9oz	154		£117.26	£48.54	£165.80	£0.00
	Frappe	11		£20.40	£1.60	£22.00	£0.00
	SUSO	21	£1.00	£20.20	£1.00	£21.20	£0.00
	Hot Chocolate	30		£22.00	£8.80	£30.80	£0.00
		4700	£2.55	£3,283.47	£929.27	£4,209.64	

Appendix C.3.: School C Data from 8th February to 8th March 2019

Category	Food Item	Quantity Sold
Breakfast / Break time	Porridge	10
	Breakfast Pots	7
	Cereal	24
	Milk and Breakfast	83
	Bacon Bap	409
	Croissant	1413
	Teacakes / Crumpets	1504
	Bacon Croissant	1497
	Bacon, sausage and egg	80
	Cheese Bagel	72
	Mini Panini	4170
	Waffle	2291
	Toast and Butter	9701
	Toast and Jam	1831
		23092
Cold Drinks	Water	5913
	Juice Carton	1326
	Juice Burst	72
	Small Juice Burst	2115
	SUSO	1277
	Slush	190
	Radnor Fizz	5107
	Daioni Milk	47
	Milk Carton	231
	Milk Shake	1395
		17673
Hot Drinks	Black Tea	15
	White Tea	115
	Coffee	1606
	Daioni Coffee	46
	Herbal Tea	51
	Hot Drink	2235
	Hot Drink and Syrup	447
		4515
Cold Foods / Sandwiches	Salad Pot	99
	New Salad	34
	Salad Individual	622
	Pasta Pot	197

	Extra Tuna	2
	Baguette	137
	Turkey Baguette	542
	New Wrap	82
	Savoury Wrap	1588
	Veggie Wrap	134
	No Wrap	179
	Sandwich Special	508
	Sandwich / small roll	1559
	Sub Roll	82
	Vienna Roll	33
	Wraps and Bagels	209
	Southern Chicken	1
	Toastie	216
	Cheesy Beans on Toast	605
	Cheese and Bacon Cross	71
	Egg Muffin	9
	Half Bagel	1281
	Hot Wrap Twist	147
		8337
Hot Foods	Hot Main	4422
	Beans / Spaghetti	195
	Chips	1271
	Calzone	2866
	Jacket Potato with cheese and beans	515
	Jacket Filling	3
		9272
Puddings	Cake	2212
	Traybake	2427
	Digestives	1038
	Shortbread	753
	Bronte Shortbread	819
	Gingerbread	550
	Healthy Bar	164
	Jelly	507
	Jelly Squeeze	33
	Muller Rice	33
	Rachel's fruit yogurt	42
	Small Yogurts	220
		8798
Fruit	Free Fruit	371

	Whole Fruit	1540
	Fruit Pot	102
	Fruit Salad	7
		2020
Condiments	Sauce Sachet	311
		311

Appendix D (Photos of School Canteens)

Appendix D.1.: Photos from School A

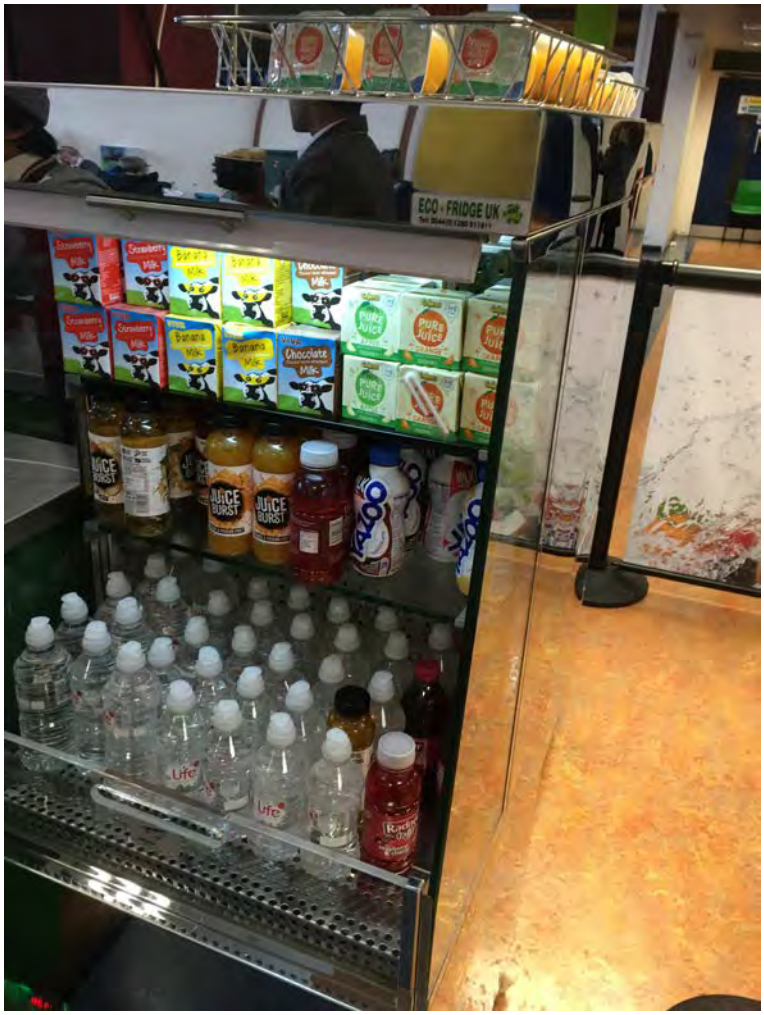

CARAMEL


CARAMEL

Appendix D.2.: Photos from School B


FRESH
SNACKS
FUSION
BREAKFAST
FUN


chickpea puffs
IPPEAS


ECO-FRIDGE UK
Strawberry Milk
Banana Milk
Chocolate Milk
PURE JUICE
JUICE BURST
Yazoo
Life


Mousse
Fruit Po
75p
Wrap
Yazoo
Strawberry Milk
Chocolate Milk
PURE JUICE
APPLE PEAR
Life


Vegetables
FRESH HERBS


HERBS


VICTOR

Appendix D.3.: Photos from School C


Standard Sandwich £1.32
100% Fresh
Jelly £0.50
Standard Sandwich £1.32
100% Honest
Jelly £0.50
100% humming
Standard Sandwich £1.32
Jelly £0.50
Premium Sandwich £1.49
Fruit Salad £0.60
Yoghurt £0.45


McVitie's
Digestives


Yawning is a Silent Scream for a Banana....
...Stop Screaming Eat a Banana
FRUIT 30p
(One Free Piece on a Friday)

Appendix E (Methodology Phase Three)

Appendix E.1: Participatory Design Research Ethical Consent

Hi Alice,

Steve has confirmed that he has approved your ethics applications by Chair's Action.

Best wishes

Debbie

Appendix E.2: Participatory Design Research Information Sheet

Information Sheet – Working Group Research

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

This project is led by PhD student Alice Gilmour who will work with you. The working group research will take around 30–40 minutes during two Year 8 lessons. Alice will provide a brief and the materials required for the pupils to work on. Due to ethical reasons, the teacher will lead the sessions and Alice will not talk to or interact with any of the pupils. She may make hand-written notes during the research and will photograph the pupils' work at the end of the session.

Overview of the research:

Three schools were involved in the data collection for stages one to five. This information sheet explains stage six in detail.

(1) Data mining (collecting data sets from purchases made at school).
(2) Catering manager interviews.
(3) Focus groups with catering staff (x3 groups) and parents (x1 group).
(4) School canteen observations over two non-consecutive school days.
(5) Focus groups with adolescents aged 11- to 13-years-old (Year 7 and 8).
(6) Working groups with adolescents aged 12- to 13-years old (Year 8).
(7) Focus groups with parents (x2 groups).

The purpose of the project:

Alice is researching how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the working groups with adolescents is to gain an insight into what pupils regard to be a good design of a vegetable-based snacking product.

Are there any benefits of taking part?

You will be helping with a PhD research project that ultimately aims to improve the eating habits of Wales' younger generation.

Are there any disadvantages of taking part?

We are unaware of any disadvantage to taking part.

Risk Assessment:

- ANONYMITY: Names will not be recorded and all data collected will be kept strictly confidential at Cardiff Metropolitan University. Individuals will not be able to be identified or identifiable in any publications. The school will also not be identified or identifiable. No pupils will be photographed, videoed or audio recorded, but work will be photographed after the session. **Data collected may be shared in an anonymised format, but neither you, nor the school will be identified or identifiable.**

- CONFIDENTIALITY: Data will be stored securely on university computers and will not be shared with external parties. Data will be destroyed after use. Names will not be recorded and all data collected will be kept strictly confidential at Cardiff Metropolitan University.

- EXPERIMENTER/INVESTIGATOR EFFECTS: No recording equipment such as audio or video recording will be used in order to help pupils feel at ease and avoid them acting in a particularly socially desirable. Alice will keep a low profile and photograph work and worksheets at the end of the session.

What will happen to the results?

The results of the working group will be used to inform the design process of Alice's research project. Designs will be developed and discussed during focus groups with parents. The results will be shared with the company sponsoring this research (Puffin Produce) and may be published in peer-reviewed journals and/or conference proceedings, but neither you, nor the school will be identified or identifiable.

Who is organising and funding the research?

Alice is organising the research. She is a PhD student based at Cardiff Metropolitan University and has funding from KESS2 (Knowledge Economy Skills Scholarships). Alice is working in collaboration with Puffin Produce (a vegetable producer in Pembrokeshire, West Wales).

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix E.3: Participatory Design Research Consent Form

Consent Form – Participatory Design Research

School: XXXXXXXXXXXXXXXXXXXXXX

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation
Name of Researcher: Alice Gilmour

Participant to complete this section: **Please initial each box.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that the schools participation is voluntary and that I am able to withdraw from the research study at any time, without giving any reason. ☐
3. I agree to take part in the above study. ☐
4. I agree to hand-written notes being made by the researcher. ☐
5. I agree to photographs being taken of the board and pupils' worksheets. ☐

_____ _____
Signature of Loco Parentis
Date

XXXXXXXXXXXXXXXXXXXXXXx

Name of Loco Parentis

_____ _____
Signature of Researcher
Date

Alice Gilmour
Name of Researcher

** When completed, 1 copy for participant & 1 copy for researcher site file*

Further information: If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk. **Thank you for taking part in this research.**

Appendix E.4: Parents Focus Group Information Sheet

Parents Focus Group Information Sheet

Project Title: 'Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation'

In brief:

There will be two focus group sessions at lunchtime.

- **Thursday 14th November 2019: 12:15pm to 1:00pm in B3.07.**
- **Thursday 28th November 2019: 12:15pm to 1:00pm in B3.07.**

Please arrive at 12:00pm so that we can start promptly. You will be encouraged to think about what you purchase for your adolescent-aged children and what factors influence your decision making process. The focus group facilitators will show you various snack products and ask for feedback in both sessions. There are no additional requirements regarding your ability to take part.

The purpose of the project:

The purpose of the research is to explore how to make vegetables "cool" whilst also improving the eating habits of Wales' younger generation. The purpose of the focus group will be to enable a greater understanding into what parents believe influences what snacks they purchase for their adolescent-aged children to consume. Ultimately, the research will help with the development of a new product and the subsequent marketing strategies.

Do I have to take part?

No. It is up to you whether or not you decide to take part in the study. If you do decide to take part then must sign the consent form, giving your permission to take part in the study.

What will happen if I take part?

There will be up to eight people taking part in the focus group. The focus group facilitators will ask questions and discussion will be encouraged. The focus group will last 35–45 minutes.

Are there any benefits of taking part?

A free lunch will be provided for participants. You will gain experience of taking part in a focus group session, providing you with some insight into what a research process involves. It may be personally interesting to discuss the topic with a group

of others and hear what their opinions are.

Are there any disadvantages of taking part?

We are unaware of any disadvantages of taking part.

How we protect your privacy:

Names will not be recorded and all photographs and data collected will be kept strictly confidential at Cardiff Metropolitan University. Data collected may be shared in an anonymised form, but neither you, nor your family will not be identified or identifiable. The audio files, photographs and videos will be destroyed after use in this research project.

The right to withdraw:

If you can no longer take part in the research then you can stop and withdraw at any time. You do not need to provide a reason.

What will happen to the results?

The results of the focus groups will be used to inform the research project. All results will be anonymised and may be published in peer-reviewed journals and/or conference proceedings, but you will not be identified or identifiable.

Who is organising and funding the research?

The focus groups will be facilitated by Professor Steve Gill and Professor Gareth Loudon. Alice Gilmour is organising the research. She is a PhD student based at Cardiff Metropolitan university and has funding from KESS2 (Knowledge Economy Skills Scholarships). Alice is working in collaboration with Puffin Produce (a vegetable producer in Pembrokeshire, West Wales).

Further information

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix E.5: Parents Focus Group Consent Form

PARTICIPANT CONSENT FORM

Title of Project: Making Vegetables "cool": Improving the Eating Habits of Wales' Younger Generation

---

Participant to complete this section: **Please initial each box.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐
3. I agree to take part in the above study. ☐
4. I agree to being audio recorded, videoed and photographed. ☐
5. I agree to the use of anonymised quotes in publications. ☐

_____ _____

Name of Participant Date

_____

Signature of Participant

_____ _____

Name of person taking consent Date

_____

Signature of person taking consent

If you have any questions about the project, please do not hesitate to email algilmour@cardiffmet.ac.uk.

Thank you for taking part in this research.

Appendix E.6: First Parents Focus Group Question Prompt Sheet

The semi-structured question schedule for the first parents' focus groups in Phase Three

Introductory Question:

- Go around in a circle and say your first name, then give a brief personal introduction.

Snacks:

- How would you define a 'snack'?
- What times of day does your adolescent usually eat a snack?
- What snacks do you provide for your adolescent?
- How much say does your adolescent have over the snacks bought? Has this changed as they have become older?
- What snacks do they currently like to eat?
- Have you had any experiences when you bought a snack that they refused to eat?
- Are there any criteria that you take into consideration when buying snacks (or food in general) for your adolescent?

Competitor Snack Products:

Show images of competitor products.

- Which products appeal more / less, why?
- How do you navigate or differentiate between options when in the supermarket?
- Do the product sizes and price influence what you buy?

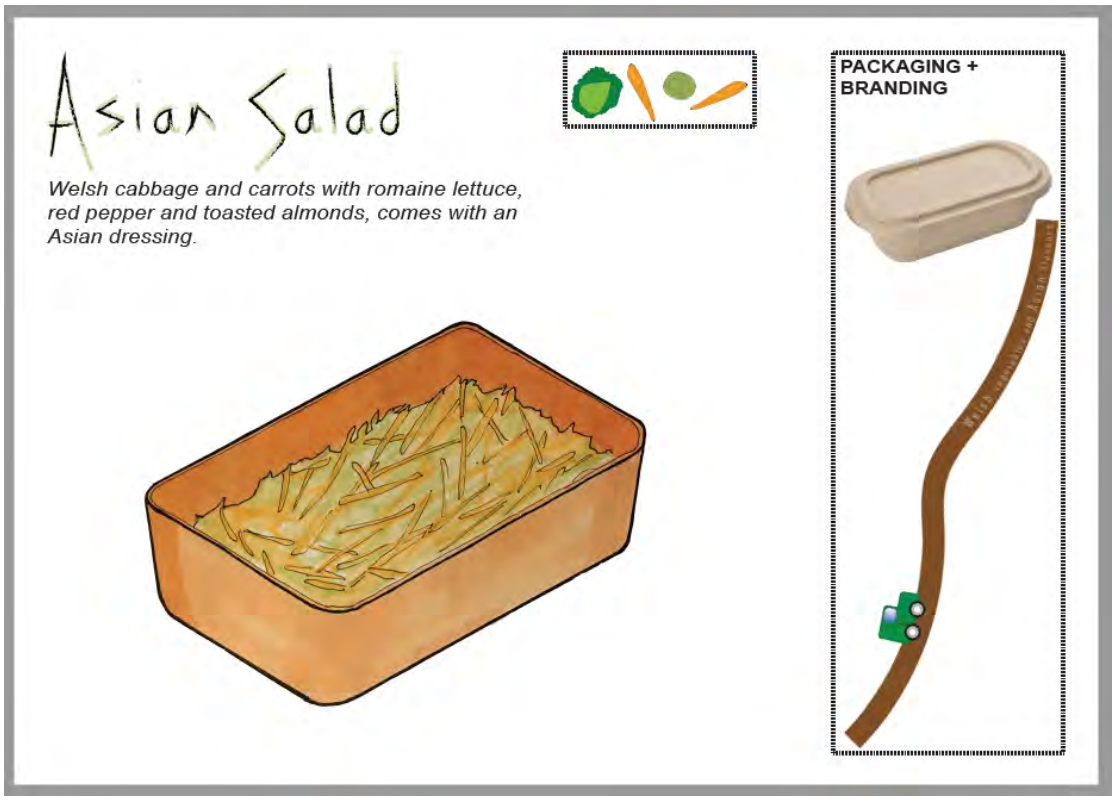
Show NPD:

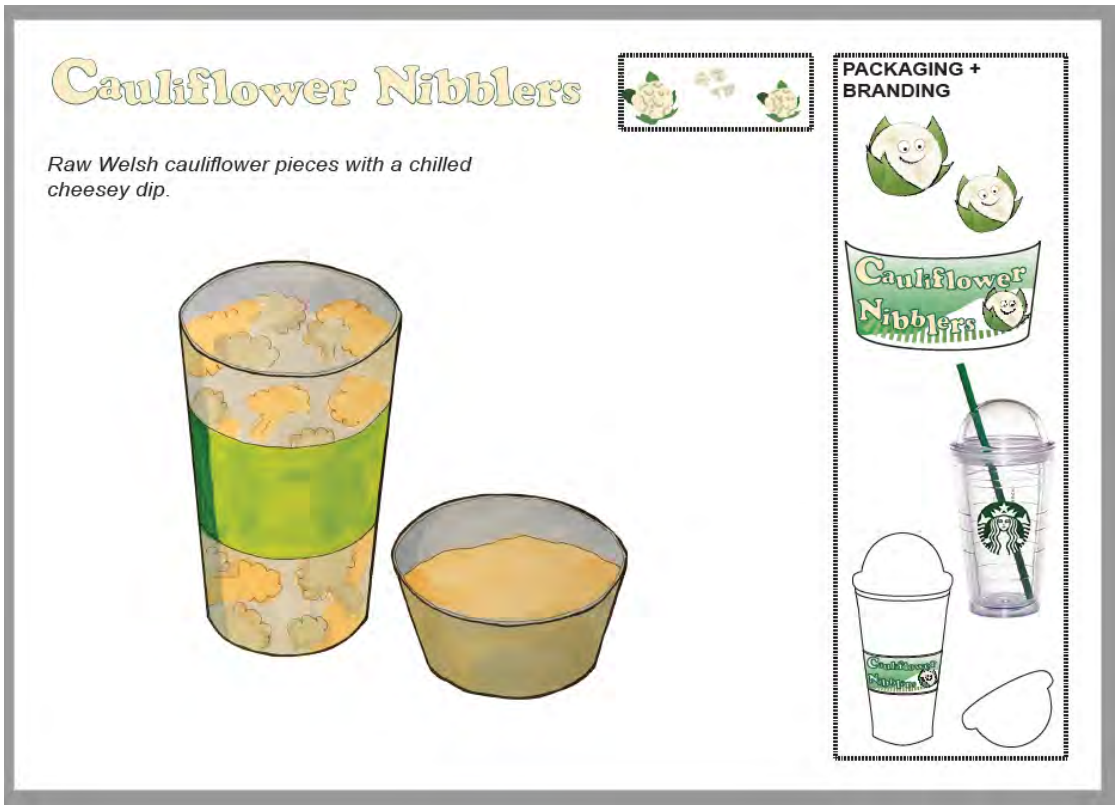
Show the four NPD design concepts.

- How appealing / distinctive are the snacks?
- Would your adolescent(s) eat these? Why / Why not?
- What messages / impressions are being conveyed and which elements show this?
- What are the strengths / weaknesses?
- What could be improved?
- Would you expect a fork to be included?
- Would your adolescent eat this cold? Should there be the option of heating it up?
- Should the packaging be clear / translucent so that the vegetables can be seen?
- How much would you pay for this snack?
- What other flavours would you like to see?

Remind participants: Same time, same place in exactly two weeks.

Appendix E.7: First Parents Focus Group NPD Concepts





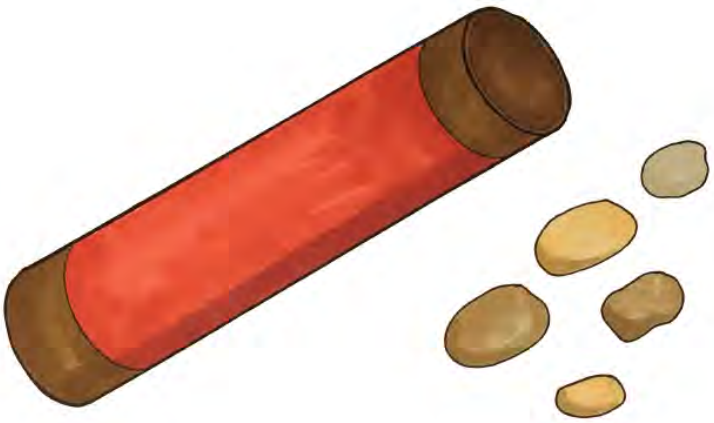
Moroccan couscous

Cauliflower couscous with courgettes, peppers, dried apricots, chopped fresh parsley, toasted sliced almonds and balsamic vinegar.

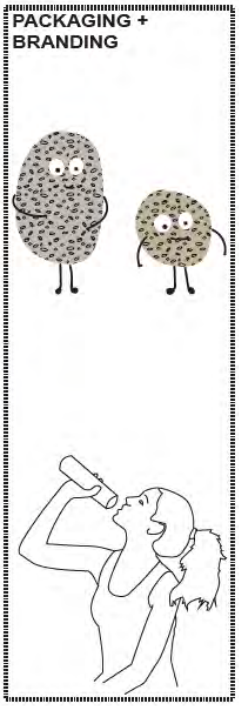
PACKAGING + BRANDING

Baby Bites

Paprika spiced Welsh baby potatoes in a handy tube.



PACKAGING + BRANDING



Appendix E.8: Second Parents Focus Group Question Prompt Sheet

The semi-structured question schedule for the second parents' focus groups in Phase Three

Introductory Questions:

- We are going to go around the table clockwise, please say your name and the age of your children.
- Can you remember what your adolescent has been snacking on so far this week?

Show NPD:

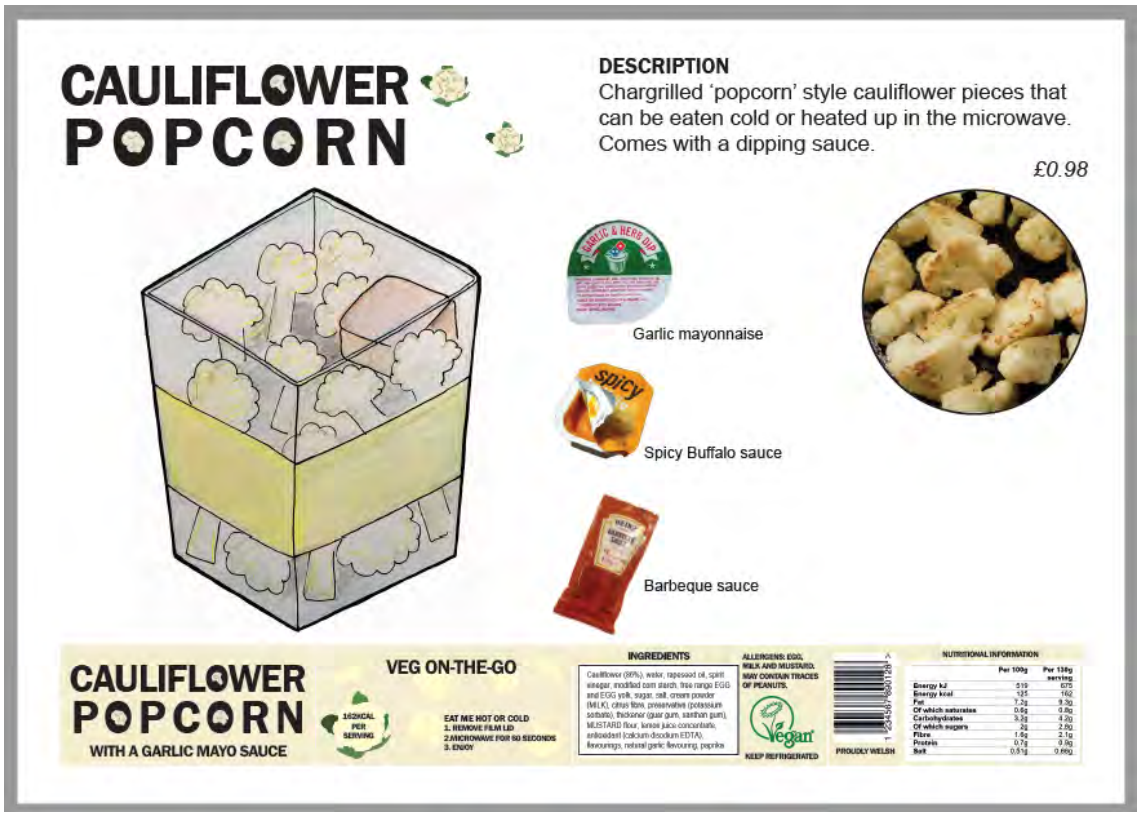
Put the four NPD design concepts on the table and briefly introduce.

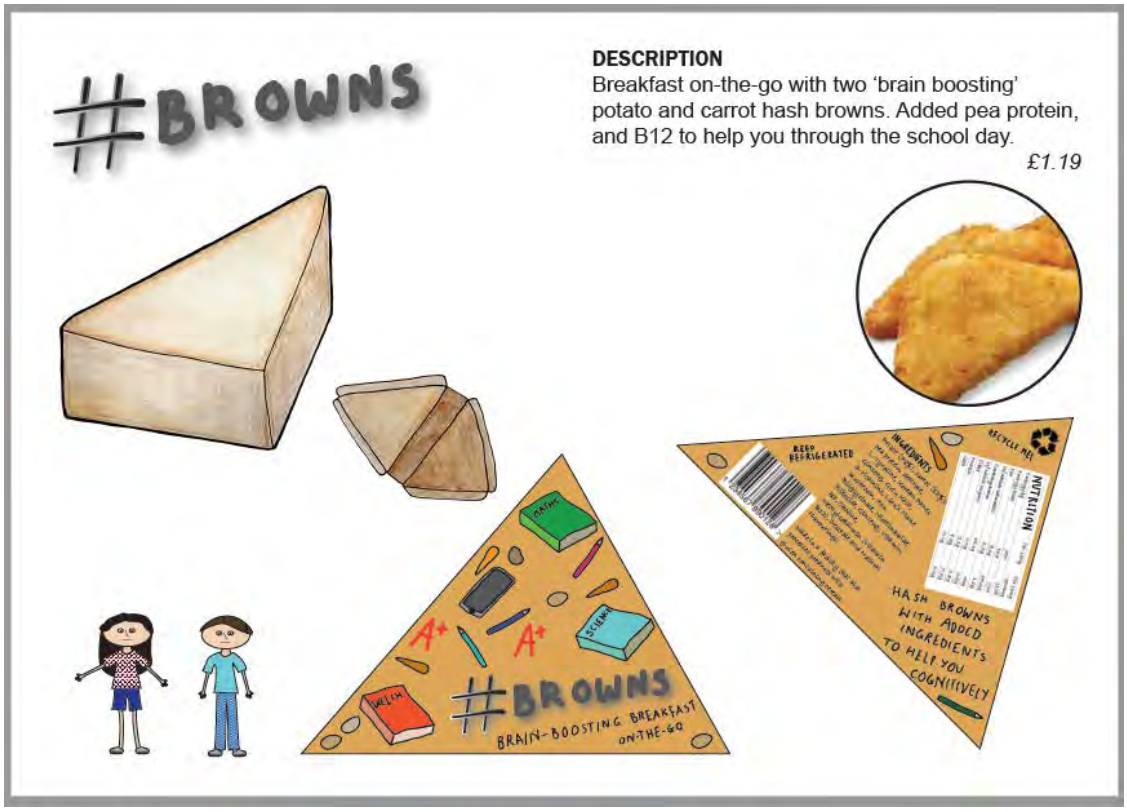
- How appealing / motivating / distinctive are the snacks?
- Would your adolescent(s) eat these? Why / Why not?
- What messages, impressions are being conveyed and which elements show this?
- What are the strengths / weaknesses?
- What could be improved?
- Would you expect a fork with any of these products?
- What do you think about the Welsh flag?
- Would your adolescent eat this hot or cold?
- Cauliflower popcorn: Explore potato 'popcorn' / mixed vegetable 'popcorn' too.

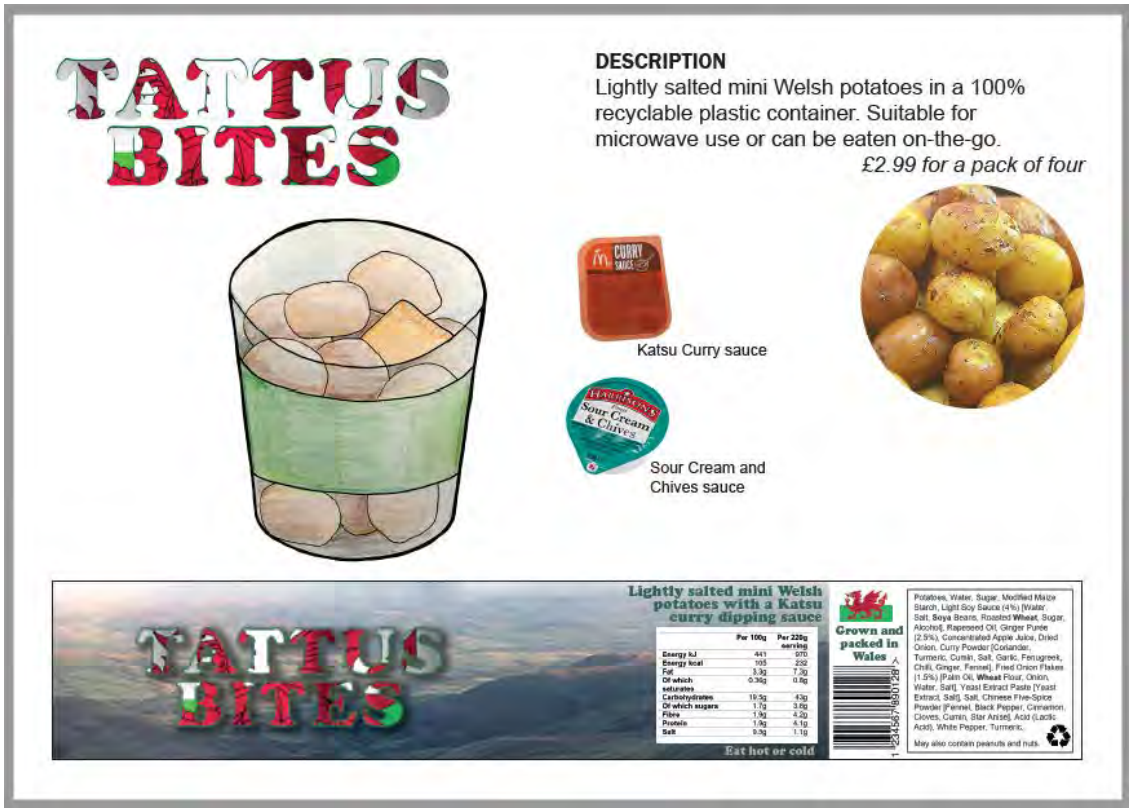
Welsh Vegetables:

- Do your adolescent(s) like… Cauliflower?
  Potatoes?
  Cabbage?
- How important is it that these vegetables are grown in Wales?
- If the vegetables in these products were produced by a grower-owned farming business, how important is that to you?

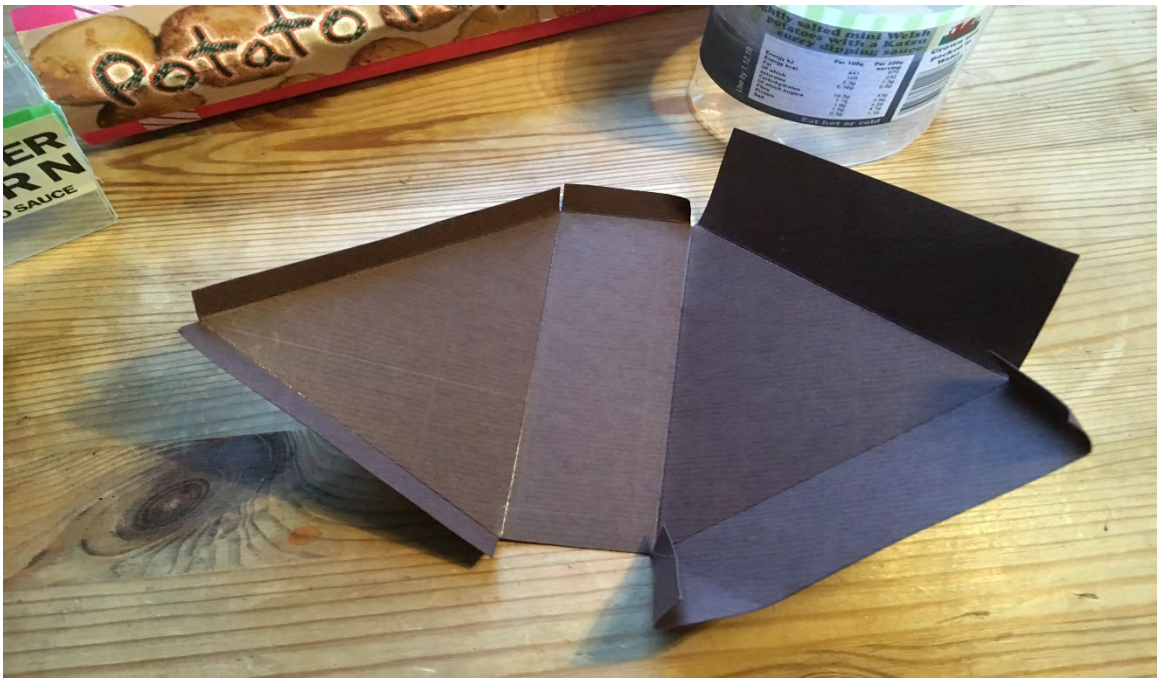
Appendix E.9.: Second Parents Focus Group NPD Concepts




#BROWNS
DESCRIPTION
Breakfast on-the-go with two 'brain boosting' potato and carrot hash browns. Added pea protein, and B12 to help you through the school day.
£1.19
KEEP REFRIGERATED
INGREDIENTS
RECYCLE ME
NUTRITION
HASH BROWNS WITH ADDED INGREDIENTS TO HELP YOU COGNITIVELY
A+
A+
#BROWNS
BRAIN-BOOSTING BREAKFAST ON-THE-GO


TATTUS BITES
DESCRIPTION
Lightly salted mini Welsh potatoes in a 100% recyclable plastic container. Suitable for microwave use or can be eaten on-the-go.
£2.99 for a pack of four
CURRY SAUCE
Katsu Curry sauce
Sour Cream & Chives
Sour Cream and Chives sauce
TATTUS BITES
Lightly salted mini Welsh potatoes with a Katsu curry dipping sauce
Per 100g
Per 220g serving
Energy kJ 441 970
Energy kcal 105 232
Fat 3.3g 7.3g
Of which saturates 0.36g 0.8g
Carbohydrates 19.5g 43g
Of which sugars 1.7g 3.8g
Fibre 1.9g 4.2g
Proteins 1.9g 4.1g
Salt 0.5g 1.1g
Eat hot or cold
Grown and packed in Wales
Potatoes, Water, Sugar, Modified Maize Starch, Light Soy Sauce (4%) [Water, Salt, Soya Beans, Roasted Wheat, Sugar, Alcohol], Rapeseed Oil, Ginger Purée (2.5%), Concentrated Apple Juice, Dried Onion, Curry Powder [Coriander, Turmeric, Cumin, Salt, Garlic, Fenugreek, Chilli, Ginger, Fennel], Fried Onion Flakes (1.5%) [Palm Oil, Wheat Flour, Onion, Water, Salt], Yeast Extract Paste [Yeast Extract, Salt], Salt, Chinese Five-Spice Powder [Fennel, Black Pepper, Cinnamon, Cloves, Cumin, Star Anise], Acid (Lactic Acid), White Pepper, Turmeric.
May also contain peanuts and nuts.

Appendix E.10.: Photographs of Physical Prototypes



Appendix F (Participatory Design Results)

Appendix F.1.: Snacks Eaten

Type of Product		Number
Fruit	'Fruit'	4
	Apple	6
	Orange	7
	Peach	2
	Banana	7
	Nectarine	1
	Plums	1
	Grapes	6
	Pineapple	1
	Melon	2
	Watermelon	5
	Strawberries	6
	Blackberries	1
	Raspberries	1
	Blueberries	4
	Grapefruit	1
	Fruit salad	1
	Fruit bags	1
	Raisins / sultanas	2
Vegetables	Carrots / baby carrots / sticks	9
	Peppers	3
	Cucumber / baby cucumbers	5
	Corn	1
	Tomatoes / Cherry tomatoes	2
	Gherkins	1
	Potatoes	1
	Lettuce	1
Nuts and Seeds	'Nuts'	5
	Almonds	1
	Roasted salted peanuts	1
	Monkey nuts	1
	Sesame seeds	1
Confectionery	Chocolate	13
	White chocolate	1
	Milk chocolate	1
	Cadbury's	1
	Caramels	1
	Toffees	1
	Candy / sweets	7
	Marshmallow	1

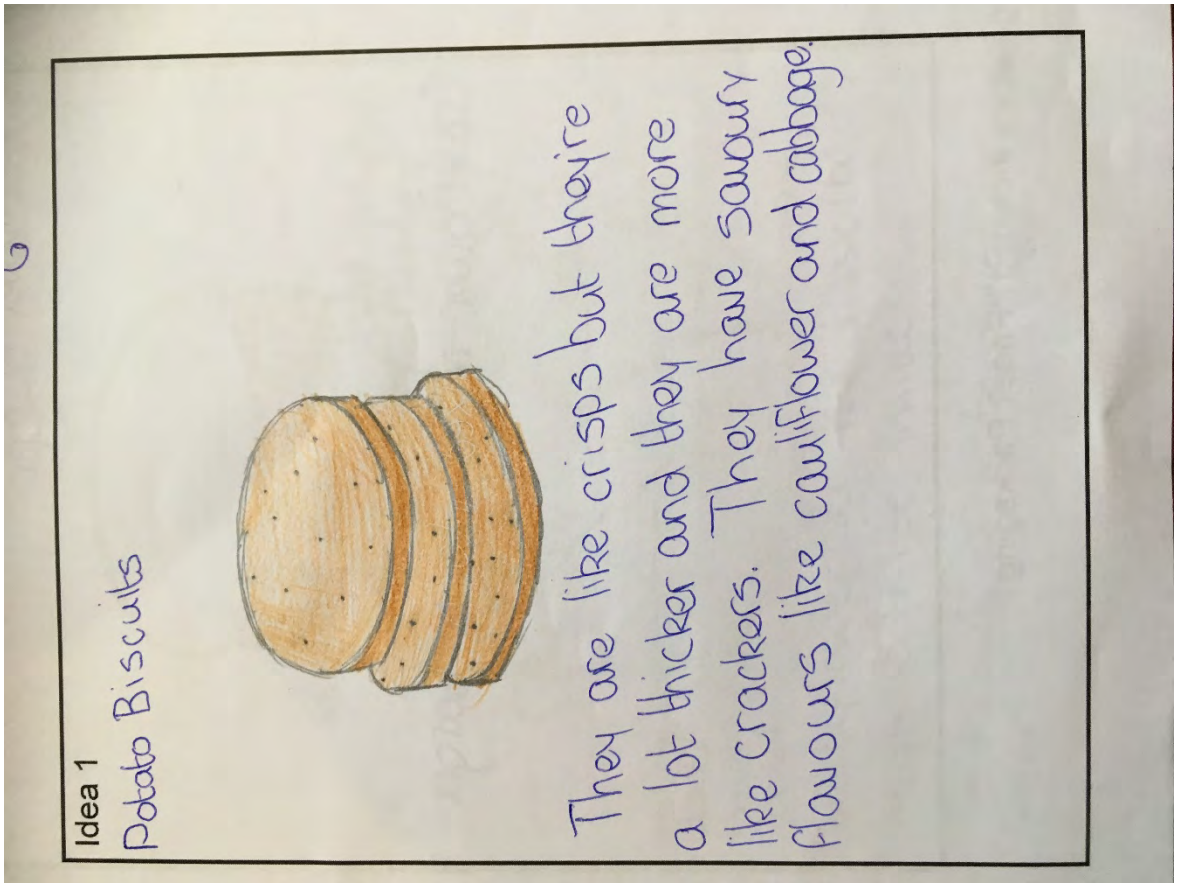
	Cereal bars	1
	Breakfast bars	1
	Snack bars	1
Sweet Baked Goods	Cake	5
	Mr Kipling cake bar	1
	French fancies	1
	Layered cake	1
	Mini rolls	2
	Chocolate cake	1
	Brownies	2
	Millionaire shortbread	1
	Muffin	1
	Doughnuts	1
	Swiss roll	1
	Cookies	5
	Biscuits	8
	Caramel digestives	1
	Oreos	2
	Bourbon biscuits	1
	Cinnamon sticks	1
	Brioche buns	1
	Hot cross buns	1
	Malt loaf	1
	Waffles	1
	Pancake	1
Sweet Snacks	Ice cream	1
	Ice lolly	1
	Nutella	1
	Yogurt / Greek yogurt	4
	Cereal	1
	Granola	1
Savoury Baked Goods	Panini	1
	Pizza	1
	Bread / Toast	3
	Sandwich	1
	Hummus and flatbread	1
	Sausage roll	1
	Tikkia (Indian)	1
	Poppadom	1
Savoury Snacks	Crisps	10
	Doritoes	2
	Snack-A-Jacks	1
	Crackers	8

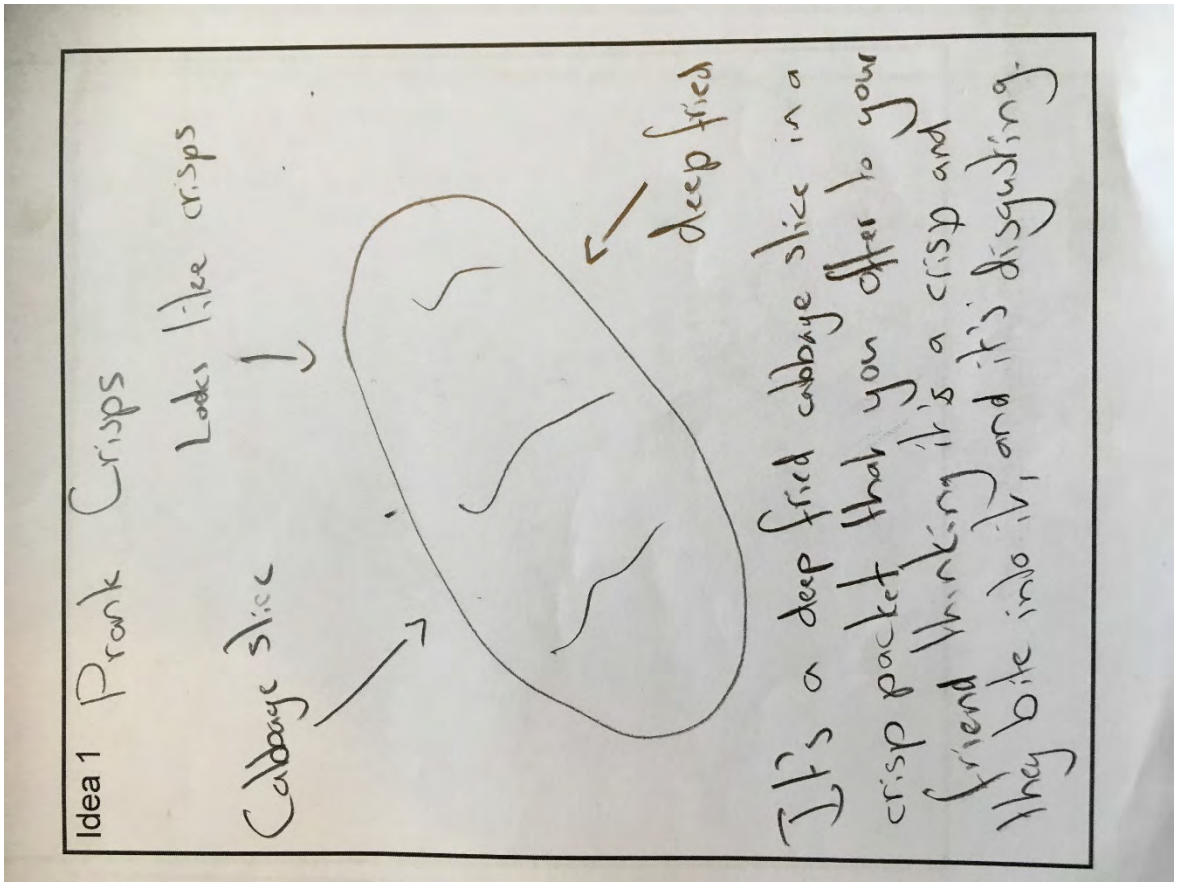
	Breadsticks	2
	Noodles	1
	Soup	1
	Tuna	2
	Cheese	9
	Cheese string	1
	Babybel	2
	Cheese dippers	1
	Cheese and pineapple	1
	Pepperoni	1
	Hummus	2
	Chicken	3
	Chicken satas	1
	Leg of ham	1
	Pork crackling	1
	‘Gogo Chalia’	1
‘Fast Food’	Deep fried Mars bar	1
	Chips	3
	Potato wedges	1
	Chicken nuggets	2
	Turkey twizzlers	1
	Burger	1
	Pizza	1
Drinks	*Cola / Coca-Cola*	2
	Juice	1
	Grape Juice	1
	Grape juice	1
	Smoothie	2
	Milkshake	2
	Yazoo	1
	Tea	1

Appendix F.2.: Foods Associated with Cauliflower, Potato and Cabbage

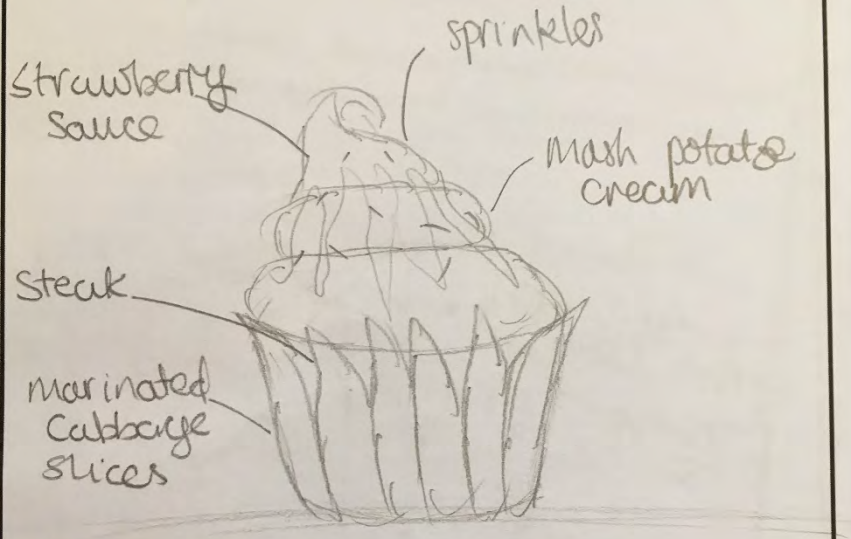
Cauliflower	Potato	Cabbage
With a dip	Chips	Cabbage soup
Cauliflower cheese	Potato doughnuts ('not available here')	Kimchi (girl wrote on board)
Tursh (red/salty/sour)	Crisps	In bread and pasta
Popcorn cauliflower	Potato and leek soup	Sauerkraut (spelt for teacher)
Cauliflower pizza	Potato salad	Broth
Cauliflower steak	Tikia (savoury Pakistani dish)	Roast dinner
Stir fry	Potato noodle soup	Stew
Roast dinner	Potato wedges	
	Potato curry	
	Stew	
	Mashed potato	
	Hash browns	
	Potato waffles	
	Roast potatoes	
	Jacket potatoes	
	Boiled potatoes	
	French fries	
	Spanish omelette	

Appendix F.3.: Some Responses to the Design Brief





Idea 3

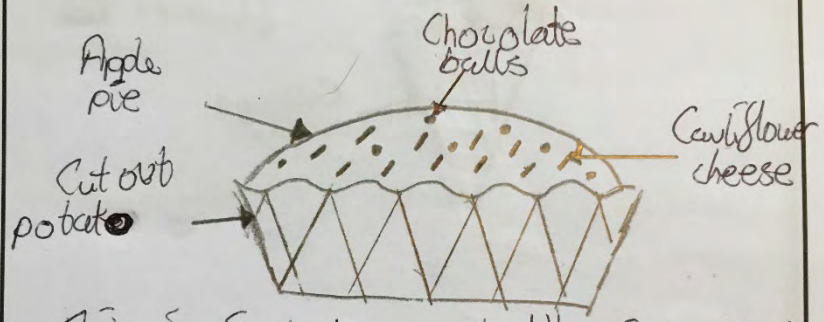


- Mash potatoe as the cream on the cupcake
- Steak as the base
- Marinated cabbage as the cupcake case.

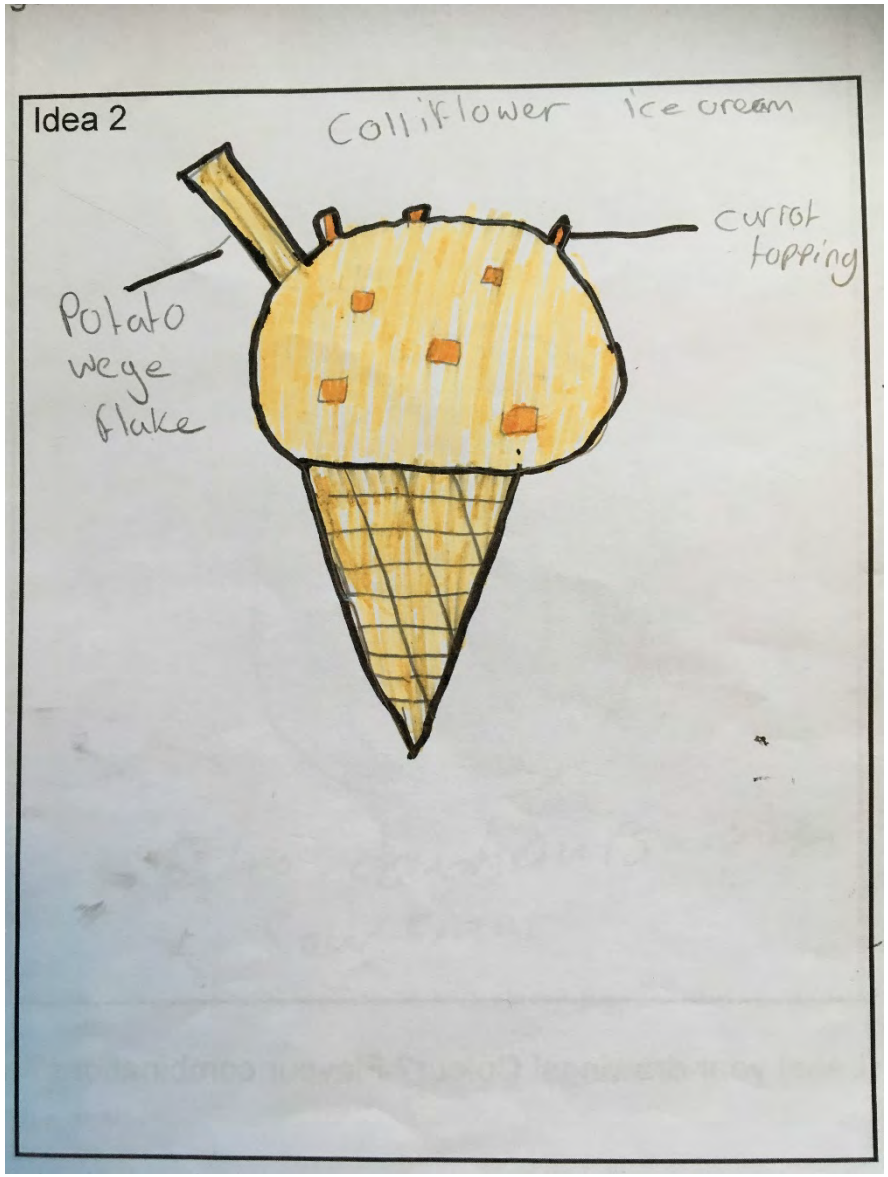
Label your drawings! Colour? Flavour combinations? Ve

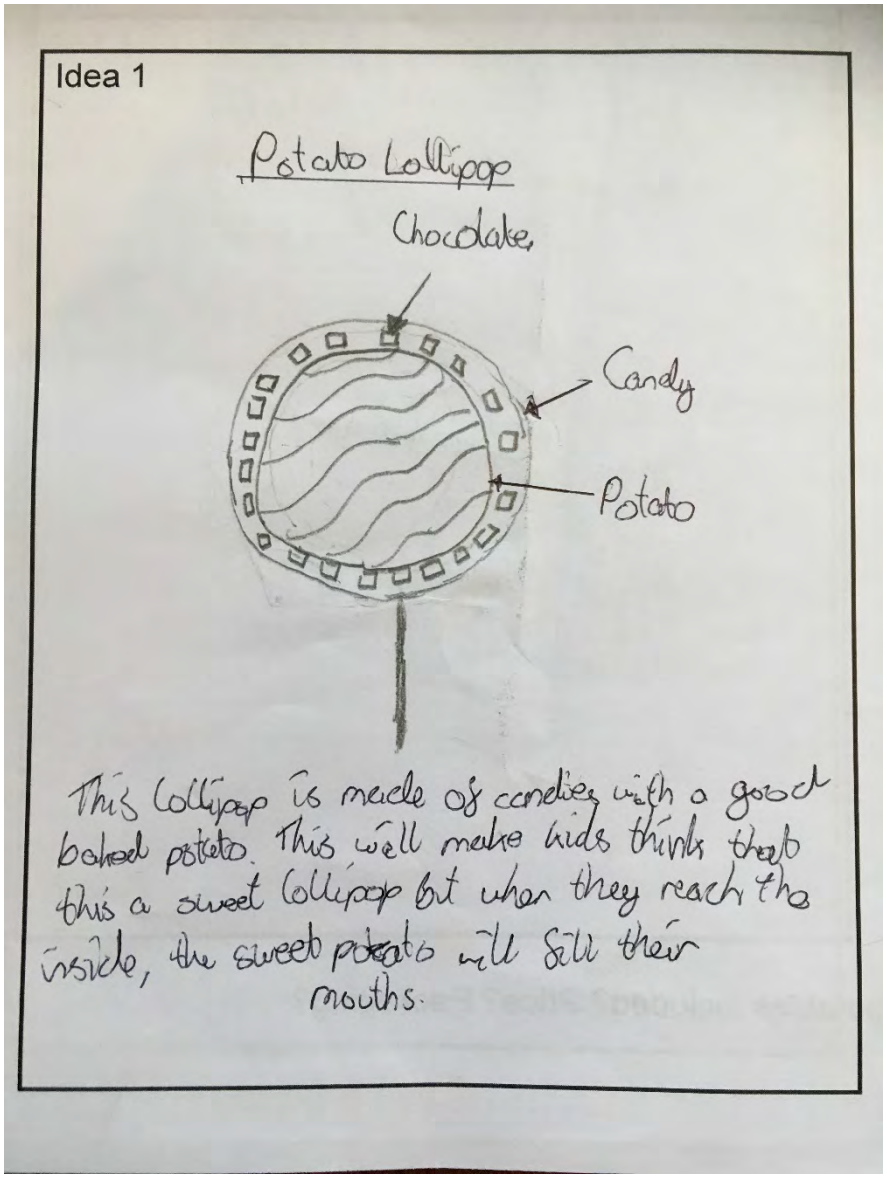
Idea 2

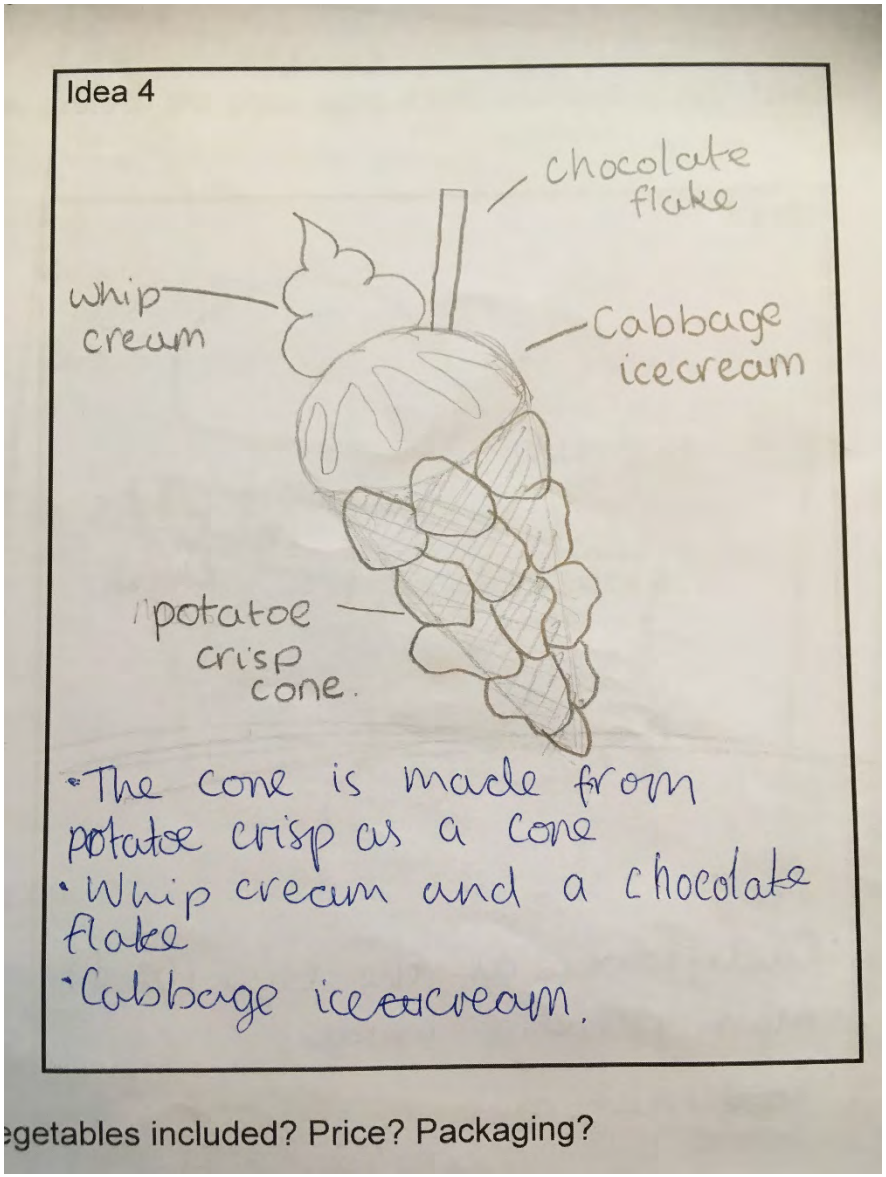
Cauli & Apple Pie



This pie includes some healthy ingredient which exist of cauliflower, apples. There will be hidden chocolate balls to add a sweet taste to the pie.


Idea 2
Colliflower ice cream
carrot topping
Potato wege flake


Idea 1
Potato Lollipop
Chocolate
Candy
Potato
This lollipop is made of candies with a good baked potato. This will make kids think that this a sweet lollipop but when they reach the inside, the sweet potato will fill their mouths.


Idea 4
chocolate flake
whip cream
Cabbage icecream
potatoe crisp cone.
• The cone is made from potatoe crisp as a cone
• Whip cream and a chocolate flake
• Cabbage icecream.
egetables included? Price? Packaging?


cdiflower basted pizza

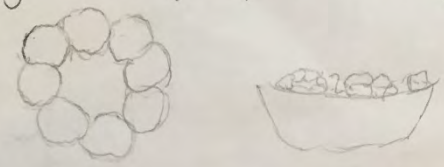
Idea 2

Potato Popcorn

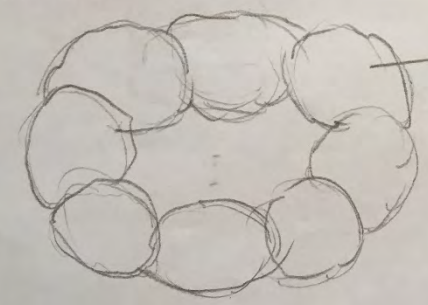
They look like small pieces of popcorn but it's actually mashed potato inside nutshells which have been baked with spices for flavour

Idea 1

Potato- Mixed into a sesame, blackseed, water, flour & syrup dough (sweet from pakistan) shaped into ball donuts



~~Potato & Cauliflower - Buns similar to Tikia (savoury sweet from pakistan) on outside and cauliflower meat inside.~~



Potato & Tikki Dough balls fried and together (savoury