Self-efficacy and nutrition knowledge of parents in Western Australia

Karen Lombardi
Edith Cowan University

Follow this and additional works at: https://ro.ecu.edu.au/theses_hons

Part of the Maternal and Child Health Commons, and the Nutrition Commons

Recommended Citation

This Thesis is posted at Research Online.
2013

Self-efficacy and nutrition knowledge of parents in Western Australia

Karen Lombardi

Edith Cowan University

Recommended Citation

This Thesis is posted at Research Online.
You may print or download ONE copy of this document for the purpose of your own research or study.

The University does not authorize you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following:

• Copyright owners are entitled to take legal action against persons who infringe their copyright.
• A reproduction of material that is protected by copyright may be a copyright infringement.
• A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.
Use of Thesis

This copy is the property of Edith Cowan University. However the literary rights of the author must also be respected. If any passage from this thesis is quoted or closely paraphrased in a paper or written work prepared by the user, the source of the passage must be acknowledged in the work. If the user desires to publish a paper or written work containing passages copied or closely paraphrased from this thesis, which passages would in total constitute an infringing copy for the purpose of the Copyright Act, he or she must first obtain the written permission of the author to do so.
Self-efficacy and nutrition knowledge of parents in Western Australia.

by
Karen Lombardi

Student Number: 10184013

This thesis is presented in partial fulfilment of the requirements for the Degree of Bachelor of Health Science (Honours)

Faculty of Health, Engineering and Science
School of Exercise and Health Science

Edith Cowan University

Supervisors: Associate Professor Stacey Waters,
Associate Professor Amanda Devine
and Margaret Miller
Abstract

**Background:** Poor dietary choices and increasingly sedentary lifestyles mean childhood obesity is an increasing problem. Parents have the capacity to significantly affect the food choice of children; therefore by improving their self-efficacy, their nutrition knowledge, attitudes and behaviour, and by providing access to sound nutritional information, the health of children may be improved.

**Purpose:** This research sought to gather preliminary information required to inform the development of nutrition education materials for parents, which will parallel those currently under development for teaching children in schools as part of the Australian curriculum. Research has demonstrated that while educating children about healthy eating is important, it is imperative to engage parents for optimum behaviour change.

**Aim:** To explore parental self-efficacy to provide a healthy diet for their children and how this is related to their knowledge, attitudes and behaviours, with the aim of developing recommendations for future nutrition education interventions for families.

**Design and methods:** This was a mixed methods study, consisting of a sample of parents of children in years 4, 5 and 6 from 56 Western Australian primary schools. A quantitative survey examined their levels nutritional knowledge, attitudes and behaviours, as well as their self-efficacy. Knowledge, attitudes and behaviours were scored, as was self-efficacy. Participants were divided into low, medium and high self-efficacy terciles, according to their scores from a self-efficacy questionnaire. Telephone interviews were conducted with five participants from each tercile, to explore perceived facilitators and barriers to healthy food provision, as well as current sources of nutrition information, and the acceptability of parental nutrition resources aligned with the school curriculum.

**Results:** Knowledge, attitudes and behaviour scores were high in this sample, with most variation in participant's self-efficacy scores. Only “choice behaviours”, those behaviours relating to food choice, were predictive of self-efficacy, and barriers and facilitators identified by the sample were similar across all terciles. The means of overcoming barriers, however, changed according to levels of self-efficacy. Parents identified media sources as their most commonly utilised source of nutritional information, and were open to the idea of nutrition resources aligned with the school curriculum, with online materials favoured.

**Conclusion:** The results show parental self-efficacy is an important determinant in the provision of a healthy diet for families, and may be predicted by parents’ food choice behaviours. Qualitative data showed parental nutrition resources would be welcomed by parents in medium and low self-efficacy terciles, highlighting the need for education targeted toward different self-efficacy terciles.

**Keywords:** nutrition, self-efficacy, parents,
# Table of contents

Abstract .................................................................................................................................................. iii
Table of contents .................................................................................................................................. iv
List of figures ......................................................................................................................................... vi
List of tables .......................................................................................................................................... vii
Declaration ............................................................................................................................................. viii
Acknowledgement ............................................................................................................................... ix

## CHAPTER 1: INTRODUCTION AND BACKGROUND ........................................................................ 1

1.1 Introduction ..................................................................................................................................... 1
1.2 Background to the study ..................................................................................................................... 1
1.3 Purpose and significance of the study ............................................................................................... 2
1.4 Researcher’s position ......................................................................................................................... 2
1.5 Research questions ............................................................................................................................. 3
1.6 Definitions of terms ............................................................................................................................ 3
1.7 Overview of chapters ........................................................................................................................ 4

## CHAPTER 2: REVIEW OF THE LITERATURE .............................................................................. 5

2.1 Introduction ..................................................................................................................................... 5

  **Section 1** ...................................................................................................................................... 6

2.2 Factors affecting parental influence and food choice ...................................................................... 6
2.3 Parental nutritional knowledge .......................................................................................................... 9
2.4 Parental behaviours .......................................................................................................................... 10
2.5 Parental attitudes ............................................................................................................................... 11
2.6 Theoretical framework ...................................................................................................................... 13
2.7 Knowledge, attitudes, behaviour and self-efficacy .......................................................................... 16

  **Section 2** ...................................................................................................................................... 17

2.8 Introduction ..................................................................................................................................... 17
2.9 Sources of nutritional information ................................................................................................... 17
2.10 Parental nutrition literacy ............................................................................................................... 18
2.11 Barriers and facilitators of healthy food choices .......................................................................... 19
2.12 Conclusion ...................................................................................................................................... 21

## CHAPTER 3: METHODOLOGY ................................................................................................. 22

3.1 Research design ............................................................................................................................... 22
3.2 Ethics ............................................................................................................................................... 23
3.3 Instruments ....................................................................................................................................... 23
3.4 Sample selection .............................................................................................................................. 26
3.5 Recruitment of participants ............................................................................................................ 26
List of figures

Figure 1: Influences on food choice ................................................................. 7
Figure 2: Research methodology ................................................................. 22
Figure 3: Data analysis plan ........................................................................... 28
Figure 4: Frequency of self-efficacy scores ................................................... 32
Figure 5: The distribution of knowledge scores ............................................. 34
Figure 6: The mean distribution of BANKS attitude scores ........................... 35
Figure 7: The distribution of purchasing behaviour scores ............................. 37
Figure 8: The mean distribution of choice scores ......................................... 38
Figure 9: The distribution of health literacy scores ....................................... 39
Figure 10: Sources of nutrition information .................................................. 41
# List of tables

<table>
<thead>
<tr>
<th>Table 1: SEIFA deciles of participating schools</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2: Self-efficacy terciles</td>
<td>29</td>
</tr>
<tr>
<td>Table 3: Demographic Information of Study Participants</td>
<td>31</td>
</tr>
<tr>
<td>Table 4: The Relationship between Demographics and Self-efficacy</td>
<td>33</td>
</tr>
<tr>
<td>Table 5: Frequency of Responses to BANKS Attitudes Questions</td>
<td>35</td>
</tr>
<tr>
<td>Table 6: Frequencies of Responses to Question, “How Important is your Family’s Nutrition to you?”</td>
<td>36</td>
</tr>
<tr>
<td>Table 7: Frequencies of Responses to Question, “How Interested are you in Nutrition?”</td>
<td>36</td>
</tr>
<tr>
<td>Table 8: How Often do you Prepare Food for your Family?</td>
<td>38</td>
</tr>
<tr>
<td>Table 9: Knowledge, Attitudes, Behaviours and Health Literacy as Predictors of Self-Efficacy</td>
<td>40</td>
</tr>
</tbody>
</table>
Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

ii) contain any material previously published or written by another person except where due reference is made in the text; or

iii) contain any defamatory material.

Signed

Karen Lombardi
Edith Cowan University
Student number: 10184013
Acknowledgement

I wish to thank my supervisors Associate Professor Stacey Waters, Associate Professor Amanda Devine and Ms Margaret Miller for their incredible support, great patience and the wealth of knowledge they shared with me.

I would also like to thank my wonderful friends and family, who celebrated, commiserated and encouraged me along the way. My husband, Don, without whose support I would not have been able to finish this busy year, and my children, Andrew, Alex and Hannah, who put up with my unsociable hours, pitched in and helped when required, and did so without complaint, most of the time!

Finally I would like to thank all of the participants in this research, without whom there would be no thesis.
CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

According to the World Health Organization (WHO), childhood obesity is one of the most important health issues facing children in the twenty first century (World Health Organization, 2013). Children are developing non-communicable diseases such as diabetes and cardiovascular disease at earlier ages than previous generations, while mental health issues associated with being overweight and obese are increasing (Puhl & Latner, 2007). The causes of overweight and obesity include sedentary lifestyles, availability and accessibility of energy dense foods and social and environmental factors such as promotion of unhealthy foods to children through the media (Borra, Kelly, Shirreffs, Neville, & Geiger, 2003). Aside from prevention of obesity, good nutrition and an appropriate diet are essential for healthy growth and general wellbeing of children (Australian Institute of Health and Welfare, 2009).

The eating habits and physical activity behaviours demonstrated by children are heavily influenced by their parents, who are the main “gatekeepers” of household nutrition (Wansink, 2006, p. 1324). Parents act as role models of food choices and food consumption, and as such, have the capacity to significantly effect change in a child’s diet and food choice (Tucker, Irwin, He, Bouck, & Pollett, 2006). Therefore, to improve nutritional knowledge, intake and access to healthy foods of children, parents require access to sound nutrition information, need to adopt positive attitudes to nutrition and increase their self-efficacy to provide a healthy diet (Decker, 2012).

Self-efficacy is the confidence one has in his or her ability to perform a task, and is a construct important to a number of theories which relate to health behaviours (Baranowski, Perry, & Parcel, 2002). Self-efficacy impacts nutritional choice in a number of ways and has been identified as a significant factor in determination of regular healthy eating. Moreover, those who exhibit high levels of self-efficacy in regard to nutrition are able to employ effective self-regulatory strategies (Anderson, Winett, & Wojcik, 2007). Studies have demonstrated that self-efficacy reported by parents parallels their children’s self-efficacy, meaning improvements in the self-efficacy of parents will, in turn, improve the self-efficacy of children in relation to nutritional choices (Decker, 2012).

1.2 Background to the study

This study comprised a formative assessment of the nutritional knowledge, attitudes, behaviours, and self-efficacy of parents in Western Australian in relation to nutrition. It was a sequential mixed methods design, consisting of a self-administered online survey taken by 123 participants, and 15 qualitative interviews conducted with parents with high, medium and low levels of self-efficacy.
This research sought to answer five research questions, which related to nutritional knowledge, attitudes and behaviour of parents and their self-efficacy to provide a nutritious diet for their families. The research also explored barriers and facilitators to provision of a healthy diet as identified by parents, as well as the kinds of nutritional information they currently access. The findings of this study may be utilised in development of nutrition education resources for parents, which will sit alongside the classroom resources currently being developed by the Child Health Promotion Research Centre (CHPRC) at Edith Cowan University (ECU).

1.3 Purpose and significance of the study

This formative study has gathered the preliminary information required to inform the development of nutrition education materials for parents, which may parallel nutrition lessons being taught to children in schools. Research has demonstrated that while educating children about nutrition is important, it is imperative to engage parents for optimal behaviour change (Clark, Goyder, Bissell, Blank, & Peters, 2007).

This study is significant as it not only looks at nutritional knowledge, attitudes and behaviour, but more importantly, at the associations of these factors with levels of self-efficacy. Parental knowledge of nutrition is generally high, and their reported attitudes desirable, yet their behaviours in relation to family nutrition are less than ideal (Noble, Stead, Jones, McDermott, & McVie, 2007). Parents face numerous challenges to the provision of a healthy diet, which include busy lifestyles and time constraints, as well as factors such as the availability of low cost, energy dense, nutrient poor foods and social pressures (Noble et al., 2007). Those with high levels of self-efficacy are more confident to make healthy food choices even faced with such barriers, and are more likely to achieve greater levels of nutritional balance than those who lack confidence to make such choices (Anderson et al., 2007). This study will provide evidence to support development of future interventions which will focus on improving the self-efficacy of parents in relation to children’s nutrition, which, in turn, will improve nutritional behaviours.

1.4 Researcher’s position

This research is situated in a social constructivist paradigm, which makes the ontological assumption that people attempt to make sense of their experiences subjectively, and do so based on the social, historical and cultural norms of the society in which they live (Creswell, 2009). Social constructivism recognises that knowledge is gained in partnership with others and with the society in which one lives, therefore nutrition knowledge, attitudes and behaviours are built in collaboration with environmental and social factors (Begoray, Wharf-Higgins, & MacDonald, 2009).

In this paradigm, the researcher’s intent is to make sense of these experiences, or to interpret them and as such, must acknowledge the manner in which their own experience of the norms in the society in which
they live may shape such interpretation (Creswell, 2009). The researcher’s position is based upon an interest in nutrition, and the fact she is the parent of a growing family. Due to her existing knowledge and personal interest in this topic, the researcher feels that her worldview may be present in the analysis of this material.

1.5 Research questions

This study aims to explore parental self-efficacy to provide a healthy diet for their children, and how this is related to their knowledge, attitudes and behaviours, with the intention of developing recommendations for future nutrition education interventions for families.

The specific research questions are:

1. What are parents’ current knowledge, attitudes and behaviours related to the provision of a healthy diet for their family?
2. What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours towards healthy eating?
3. What are the barriers and facilitators for parents putting nutrition knowledge into action?
4. What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?
5. What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?

1.6 Definitions of terms

1. Nutritional information- informative content pertaining to all aspects of nutrition, including food composition, healthy food selection and preparation, nutrition requirements and the effects of diet on health.
2. Parents – “caregiver or the person most responsible” for the “healthy behaviours” exhibited by the child (Decker, 2012, p. 155).
3. Children - children in school years 4, 5 or 6 in Western Australia.
4. Nutrition support materials- information and practical suggestions to improve nutrition knowledge, skills and self-efficacy of parents to provide healthy family nutrition.
5. Self-efficacy - the belief one has about their ability to perform a task, and the self-confidence they have in their ability to overcome barriers which may make that task more challenging (Bandura, 1998).
1.7 Overview of chapters

This thesis consists of five chapters:
Chapter one provided an introduction to the research problem, background to the study, the research questions and a definition of terms;
Chapter two provides a review of the current literature in this area;
Chapter three details methodology of the study;
Chapter four outlines results of the quantitative survey and qualitative interviews;
Chapter five discusses quantitative findings and their significance, and discusses qualitative data. The limitations of the study, recommendations and implications for future study in this area are also examined in this chapter.
CHAPTER 2: REVIEW OF THE LITERATURE

2.1 Introduction

Popular culture currently has a fascination with nutrition and its relationship to good health, with magazines, newspapers and television programs dedicated to its discussion (Conte, 2008). It may be reasonable to expect that such widespread interest means nutritional knowledge within the community is high, and nutritional balance is being met, however nutritional intakes are not optimal, with almost one in five Western Australian children classified as overweight or obese in 2011 (Department of Health, 2012).

Adequate nutrition has the capacity to improve quality of life, enhance health and wellbeing and is particularly important to growth and development of children, with habits formed in childhood influencing health in adulthood (Strategic Inter-Governmental Nutrition Alliance of the National Public Health Partnership, 2001). Whilst achieving adequate nutrition is problematic in the developing world, in the developed world over-nutrition is fast becoming a major public health problem (World Health Organization, 2006).

Obesity has been defined by the WHO as “abnormal or excessive fat accumulation that may impair health” (World Health Organization, 2006). The WHO states approximately 42 million children are obese worldwide, with those who are overweight as children likely to continue to be overweight or obese into adulthood, which ultimately influences their health outcomes (World Health Organization, 2013). Poor health due to obesity in adulthood increases the likelihood of developing chronic diseases such as cardiovascular disease, Type 2 diabetes and some forms of cancer (National Health and Medical Research Council, 2011), as well as increasing the prevalence of mental health conditions such as depression and anxiety (Puhl & Latner, 2007). The availability of energy dense, nutrient poor foods, and increasingly sedentary lifestyles are factors contributing to overweight and obesity in Australia (Australian Bureau of Statistics, 2009a).

Attitudes and behaviours associated with diet and physical activity are formed in childhood, with children influenced by parents and families (Clark et al., 2007), as well as factors such as the environment in which they live, their socio-economic status and with the culture in which they are raised (O'Dea, 2008; Swinburn & Egger, 2002). With this view, the following literature review will examine the influence parental knowledge, attitudes and behaviours have upon the nutrition of their children, the influence of self-efficacy on nutrition, barriers parents identify which hinder the provision of a healthful diet, and sources of information currently used by parents.

The literature will be reviewed in two sections. The first section of this review will examine the knowledge, attitudes and behaviours of parents, and their self-efficacy to provide a healthy diet. The second section will explore barriers and facilitators to the provision of a healthy diet and their implications for the design of interventions which aim to improve the quality of family’s diets.
Section 1

2.2 Factors affecting parental influence and food choice

A plethora of literature exists which focuses on the role of parents, the family environment and the home as factors which largely determine the nutritional intake and health and wellness outcomes of children, both in the short and longer terms (Swinburn & Egger, 2002). Modelling of nutritional behaviours such as food choice (Zarnowiecki, Sinn, Petkov, & Dollman, 2012), the parental role as nutritional gatekeepers (Wansink, 2006) and parent nutritional literacy largely determines the quality of nutrition available to children (Miller, Gibson, & Applegate, 2010), as well as children’s attitudes towards food (Zarnowiecki et al., 2012). Furthermore, nutritional attitudes, knowledge and behaviours of parents may be positively influenced by nutrition education and lead to better feeding practices and food choices for their children (Tabak, Tate, Stevens, Siega-Riz, & Ward, 2012). Whilst nutrition education can increase knowledge, this alone is not enough to change nutritional behavior (Contento, 2008).

Some may assume those with high levels of nutritional knowledge, will make good nutritional choices, however, this may be over-simplifying food choice behaviours (Contento, 2008). Food choice decisions and consequent behaviours are multi-dimensional, and are not based solely on knowledge, but maybe a reaction to the environment, situation, food accessibility and level of self-efficacy of individuals (Sobal & Bisogni, 2009). Many nutrition education programs focus on improving knowledge only, in the hope this will lead to improved attitudes and behaviours. However, as the model by Contento, (2008), acknowledges, factors outside these realms greatly influence food choice. Contento (2008) outlines four factors which are influential in food choice: biologically determined behavioural dispositions; experience with food; person-related determinants and social/environmental determinants. The following diagram illustrates the ways in which each of these factors is related to one another and the following section discusses each of the factors in greater detail.
2.2.1 Biologically determined behavioural predispositions

“Biologically determined behavioural predispositions” are present in infants at birth, and influence food choice throughout the life course (Brown, 2011; Contento, 2008, p. 176). Biological factors which influence food choice include a liking for sweet foods and rejection of bitter foods, a preference for fat, and the number of taste buds an individual is born with (Contento, 2008). As these factors are present from birth or established early, habits may be difficult to change as children grow and develop (Brown, 2011). Therefore familial patterns of food consumption and their attitudes towards food shape those of their children during this critical time (Savage, Fisher, & Birch, 2007).

Familial patterns of food consumption may be influenced by parenting styles, with parenting styles changing child feeding behaviours, and altering issues of control and self-regulation around the consumption of food (Golan & Crow, 2004). Allowing children to make decisions around the kinds of foods, quantities and times at which they are consumed may be problematic for some parents, as parenting styles may influence these expectations (Pettigrew, 2009). For example, parents with an authoritarian parenting style may believe children should finish all food served to them, interfering with children’s natural ability to self-regulate (Pettigrew, 2009). The desire for children to finish all food offered to them may lead to parents not offering new foods for children to try, choosing to only offer foods they know their child is likely to eat (Pettigrew, 2009).
2.2.2 Experience with food

Contento describes the importance of children’s “experience with food”, which refers to social conditioning, such as that which occurs in relation to rewards and modelling of behaviour (2008, p. 176). A child’s partiality toward specific foods may be due to individual taste, however Contento argues this is predominantly a learned behaviour, shaped by frequent exposure to foods (2008). It follows then that parents who expose their children to energy dense, high fat and sugar foods repeatedly, may be teaching their children to prefer them over healthier choices (Golan & Crow, 2004). Likewise, parenting styles may interfere with the ability to self-regulate hunger and satiety, and determine the experiences a child has.

2.2.3 Personal factors

“Personal factors” such as attitudes, beliefs and norms are influential in food choice decisions (Contento, 2008), and modelled by parents in the home environment (Zarnowiecki et al., 2012). The nutritional attitudes and beliefs of parents influence how much nutrition information children are given, with parents who value good nutrition for their family more likely to discuss health and food choice with their children (Zarnowiecki et al., 2012). Parental beliefs, skills and confidence influence children’s food behaviours, with children shown to learn about nutrition in different ways to adults, with exposure, observation of adults and discussion of positive nutrition messages more likely to be influential than negative messages (Zarnowiecki et al., 2012).

Cultural beliefs about weight may be passed down from generation to generation, with “fatness” being valued in some cultures, and a fat child being viewed as healthy (O’Dea, 2008). In others, obesity may be viewed as something a child will grow out of, and energy dense foods given to the child in order to promote growth and development (Raychaudhuri & Sanyal, 2012).

2.2.4 Environmental factors

Environmental factors such as availability of food, food scarcity and food marketing all influence food choice (Contento, 2008). The availability of energy dense food is widely acknowledged as a contributing factor to rising levels of obesity and overweight in Australia, and worldwide (Borra et al., 2003). Energy dense foods are increasingly consumed by Australians, with one third of household food expenditure spent on foods not prepared at home, with these much higher in fat, salt and sugar than home-cooked meals (Stanton, 2006).

The family food environment is also important (Contento, 2008). Parents may play a positive or negative role in the development of food choice, with children taking their cues from them, and both parents and children may be influenced by environmental factors such as food availability, media and advertising and the easy accessibility of energy dense, nutrient poor foods (Zarnowiecki et al., 2012).
2.3 Parental nutritional knowledge

Nutritional knowledge may be defined as an “understanding of the health benefits of food and nutrients” (Zarnowiecki et al., 2012, p. 1284). Individuals with high nutritional knowledge are likely to intend to make healthy choices, however good intentions are different to behaviours (Contento, 2008). Eating is a pleasurable behaviour, which often occurs within a social context, with more than just achieving nutrient balance involved (Contento, 2008). Nutrition knowledge is often predicted by one’s interest in the topic, as well as socio-economic status.

Interest in nutrition is a predictor of nutrition knowledge, as adults with an interest in the topic will try to gather information in this area, with the degree of nutritional knowledge tied not only to health outcomes, but also to health and nutritional literacy (Miller et al., 2010). Parental interest and recognition of the importance of nutrition are related to the amount of nutritional information parents discuss with children, thereby influencing the levels of nutritional knowledge children have (Zarnowiecki et al., 2012).

In a small Australian study, Zarnowiecki and colleagues, (2012), tested the nutritional knowledge of parents and found parental nutritional knowledge was a predictor of the quality of nutrition of children. Parents with high nutritional knowledge in this study were more likely to provide access to fruit and vegetables, to implement rules around eating and to model healthy nutritional behaviours (2012). However, this may be an oversimplification of the relationship between nutritional knowledge and behaviors, as complex food related behaviours encompass a multitude of personal, social and environmental influences (Contento, 2008).

For example, a British qualitative study with over 40 participants found an influence of SES on nutritional knowledge, whilst also recognising differences in attitudes and behaviours across SES groups (Hart, Herriot, Bishop, & Truby, 2003). Higher SES parents were more optimistic about their knowledge, though much of it was outdated and based upon misinformation (Hart et al., 2003). They were also not of the view they may be poor nutritional role models, stating extended family and peers were negative influences on their children’s food choices and intake (Hart et al., 2003). High SES parents felt schools were important for instilling nutritional knowledge in their children, although they acknowledged parents were ultimately responsible for the quality of their children’s diet (Hart et al., 2003).

In contrast, lower SES parents acknowledged they may not be as knowledgeable about nutrition as they would like, and recognised they may be poor role models of nutritional behaviour (Hart et al., 2003). Lower SES parents tended to focus on the more social aspects of their children’s food consumption, concerning themselves more with the amount of food eaten rather than type, and expressed concerns about their children’s weight (Hart et al., 2003).
2.4 Parental behaviours

The nutritional behaviours of parents are influenced by a variety of factors, including culture, education level and socio-economic status, and influence children’s patterns of eating (Stenhammar, Sarkadi, & Edlund, 2007). Food habits of children vary considerably according to maternal level of education, with children whose mothers have university education eating more fruit and vegetables, and diets generally higher in vitamins and minerals than children whose mothers have secondary education qualifications only (Stenhammar et al., 2007). The following section of the literature review examines the influence of family environment, parenting styles and food purchasing behaviours on the diet of children.

2.4.1 Family environment

Family environment and the reciprocal nature of the family relationship means that the family diet is influenced by both children’s and parent’s eating patterns (Gruber & Haldeman, 2009), with family decision making becoming a more democratic process than in the past (Golan & Crow, 2004). This democratisation may encourage parents to provide foods they know are unhealthy for their children in order to avoid conflict, and to allow meal times to be social family time (Noble et al., 2007). Such behaviours demonstrate the disconnection between nutritional knowledge and behaviours, and the many influences which determine provision of a healthy diet for children.

Eating together as a family is a behaviour which influences not only the quantity of food children consume, but also the quality, with children consuming less saturated fats, more fruit and vegetables and less soft drink in families who eat together at most meals (Pettigrew, 2009). As children enter adolescence this positive influence may begin to wane, however, there is evidence to suggest as adolescents become young adults, they will return to the nutritional behaviours they were taught as children (Arcan et al., 2007).

2.4.2 Parenting styles

Parenting styles constitute the manner in which parents interact with their children, and may differ within families, according to perceived threats to the development of each child, as supposed by the parent (Ventura & Birch, 2008). Factors such as age, gender and weight status of the child may affect the style of parenting used, and determine feeding practices, such as use of food as bribery, pressuring a child to eat or restricting certain foods (Ventura & Birch, 2008). Consequently, parenting styles may influence nutritional intake of children, with three styles being identified as most influential in relation to nutritional behaviour (Golan & Crow, 2004).

The “permissive” parent allows children to make their own decisions, with no consequences when things go wrong; the “authoritarian” parent is autocratic in manner, whilst the “authoritative” parent provides firm guidelines, and is open to negotiation (Golan & Crow, 2004, p. 43). The authoritative parent appeared to be the most successful in terms of allowing children to self-regulate their nutritional behaviours, allowing
children independence to make their own choices, whilst still expecting children to conform to social norms (Golan & Crow, 2004). The responsiveness and open communication associated with this style of parenting has been shown to improve fruit and vegetable intake of children, as well as improving their levels of physical activity (Nicklas et al., 2001).

2.4.3 Food purchasing behaviours

The food purchasing behaviours of parents also influence the quality of a child’s diet, with parents likely to purchase foods they like to eat, encouraging children to develop a liking for them also (Golan & Crow, 2004). Purchasing behaviours may not always be positive ones, with some parents stating it was futile to purchase fruits and vegetables as children didn’t like them and wouldn’t eat them (Noble et al., 2007). Parents of young children admitted to purchasing treats and food bribes to overcome guilt about long working hours, or to avoid confrontation (Noble et al., 2007). Such purchasing behaviours may reinforce children’s defiant practices, as well as their poor nutritional behaviours (Noble et al., 2007).

2.5 Parental attitudes

Attitudes may be defined as tendencies to respond to conditions in a positive or negative way (Stenhammar et al., 2007). Parental attitudes to nutrition are intrinsic in development of children’s attitudes toward nutrition, with some researchers claiming attitudes are more predictive of nutrition behaviour than levels of knowledge (Stenhammar et al., 2007). The complexity of nutritional behaviour means attitudes operate in combination with nutritional knowledge and influence the behaviours necessary for a healthy diet (Noble et al., 2007). The following section of this literature review will examine the influence of parental attitudes to dietary guidelines, meal times and social norms, and their impact upon the diet of their children.

2.5.1 Parental attitudes to dietary guidelines

Parents state whilst they are aware of recommendations for healthy eating, such as the Australian Dietary Guidelines (National Health and Medical Research Council, 2013), they believe the guidelines are too restrictive and unrealistic (Hart et al., 2003; Zarnowiecki et al., 2012). An example is the views parents’ describe in regards to food treats and bribery for their children. In a study by Hesketh and colleagues (Hesketh, Waters, Green, Salmon, & Williams, 2005), parents expressed belief that treat foods for children were important, and the majority felt daily treats were acceptable, demonstrating a disregard for the guidelines. Such attitudes mean that children’s nutritional intake may be comprised of higher portions of nutrient poor foods than recommended by dietary guidelines (Hesketh et al., 2005).

Attitudes toward dietary guidelines may also influence children’s intake of fruit and vegetables, as parents believed not only the target for consumption was idealistic, but also that children disliking fruit and vegetables was “normal” (Noble et al., 2007). Since this dislike was felt to be a typical part of childhood,
parents expressed the belief there was little they could do to encourage their children to eat more fruit and vegetables (Noble et al., 2007). Such attitudes normalise low consumption of fruit and vegetables; in Australia only 32% of children aged 8 to 11 years were eating the recommended serves of fruit and vegetables, and only 5% of 12 to 18 year olds were meeting this target (Australian Bureau of Statistics, 2013a).

2.5.2 Parental attitudes to meal times

The perception of meal times as an important setting for social interaction influences the provision of healthy foods for children, with avoidance of confrontation being a key factor in parents not pushing children to try foods they expressed dislike for repeatedly (Noble et al., 2007). However, providing children with foods which may be nutrient poor but acceptable to the child may be harmful in the long term, as children continually exposed to unhealthy foods will prefer them to healthier choices, leading to poor diets over the life course (Tucker et al., 2006). This conflict between parental knowledge of what is healthy and attitudes towards reducing family disharmony led to inconsistent nutritional behaviours (Noble et al., 2007).

A study by Campbell, Crawford and Ball (2006), found parents felt eating together was a time to educate children about food and nutrition, and recognised they were modelling attitudes and behaviours during meals (Campbell et al., 2006). Indeed, several studies have established that children who eat meals with parents are more likely to consume higher quantities of fruit and vegetables than children who eat alone, and will be more likely to try new foods they see their parents eating (Campbell et al., 2006; Pettigrew, 2009). Eating a meal as a cohesive family unit is also positively associated with appropriate nutritional behaviours, and with a higher consumption of dairy foods (Golan & Crow, 2004).

2.5.3 Parental attitudes towards social norms

Some parents claim the social pressures associated with feeding children nutritious food is a factor affecting their food choices for children (Noble et al., 2007), even claiming the social stigma associated with having overweight children was justification for ensuring their children ate a healthy diet (Tucker et al., 2006). In contrast, this need to conform to social norms also caused parents to provide unhealthy foods for their children, with parents saying peer pressure, both from their children’s friends and their own, led to provision of takeaway foods and confectionary (Hesketh et al., 2005). Such attitudes toward the social desirability of food have the capacity to be both restrictive and permissive in relation to the inclusion of foods within children’s diets (Noble et al., 2007).

In summary, parental knowledge, attitudes and behaviours have potential to greatly impact the dietary intake of children, with knowledge in regard to dietary guidelines and normative beliefs impacting the kinds of foods offered to children. If parents aren’t familiar with dietary guidelines, believe guidelines are unrealistic, or that children are naturally averse to different kinds of foods, they are less likely to provide
them. Their attitudes towards family meals may be counter-productive, with parents seeing social cohesion as more important than diet, although others may view mealtimes as a time for educating children and modelling behaviours.

### 2.6 Theoretical framework

Children’s diets are influenced by the knowledge, attitudes and behaviours of their parents; therefore, in recognition of this complexity, development of parental nutrition interventions need to be grounded in robust health behaviour theories (Golley, Hendrie, Slater, & Corsini, 2010). Theories or frameworks may be used to guide mixed methods studies, with theory used to explore associations between variables of interest (Creswell, 2009). Theories should be used not only in an attempt to establish the determinants of a particular health related behaviour, but should also examine how to predict new behaviours, or changes in behaviour (Brug, Oenema, & Ferreira, 2005).

This study examines parental nutrition knowledge, attitudes and behaviours through the theoretical lens provided by the construct of self-efficacy. Self-efficacy is a key construct in this study, because it significantly influences the dietary choices a person makes; therefore, parental self-efficacy influences the kind of diet provided for children (Decker, 2012). By examining parental self-efficacy, and the factors which predict increased self-efficacy, this study has the capacity to inform the design of interventions which are effective in increasing parental confidence to change dietary behaviours in relation to the provision of a healthy diet for their families.

A number of theories describe the importance of self-efficacy as an essential element in changing health behaviour. Theories such as the social cognitive theory, the theory of planned behaviour, the transtheoretical model and the health belief model all recognise that changes in self-efficacy are instrumental not only in predicting health behaviours, but also in the adoption of new health behaviours and the maintenance of changes (Ashford, Edmunds, & French, 2010).

Self-efficacy can be influenced by a range of factors, with social support named as a key precursor for the development of improved nutritional behaviours (Anderson et al., 2007). Providing the opportunity to master new skills, to observe the successes of others, being persuaded that one has the ability to perform a task and a reduction in the stress or fear associated with performing behaviour can all lead to increases in self-efficacy (Hayden, 2009).

#### 2.6.1 The Social Cognitive Theory

The social cognitive theory (SCT) proposes behaviour can be explained by a reciprocal interaction between personal factors, environmental influences and behaviour (Bandura, 1986, cited in Lafave, Lafave, & Nordstrom, 2009). It is a theory frequently used in nutrition education, lending itself to increasing understanding of dietary choices made by individuals (Poddar, Hosig, Anderson, Nickols-Richardson, &
Duncan, 2010), and has shown some potential for changing dietary behaviours (Anderson et al., 2007). Influential constructs of SCT include self-efficacy, observational learning (modelling), expectations, expectancies, reinforcement and locus of control (Hayden, 2009, p. 81).

Observational learning or modelling of nutritional behaviour allows the observer to compare their own ability to others, whilst transmitting knowledge and skills to the individual (Bandura, 1998). Models are most frequently emulated when individuals perceive them to be similar to themselves, and when they tackle barriers that the observers recognise (McAlister, Perry, & Parcel, 2008). In this study, the tendency to use family and friends as sources of nutritional information demonstrates desire to gather information from those perceived to be most like oneself.

Outcome expectancies are the value-laden expectations we have about the outcomes of certain behaviours (Hayden, 2009). Outcome expectancies rely upon the efficacy beliefs of individuals and may influence nutritional behaviours both positively and negatively (Anderson et al., 2007). In relation to this study, an individual’s answer to the survey question which asks about diet, exercise and health may be dependent upon their outcome expectancies in relation to these behaviours. For example, a negative outcome expectancy of diet and exercise influencing their health may lead to the belief that it is unnecessary to change these factors in order to achieve a healthy body weight. Those with positive outcome expectancies may recognise that changes in diet and exercise will lead to a positive health outcome.

2.6.2 The Theory of Planned Behaviour

The theory of planned behaviour posits human behaviour is guided by three considerations: attitudes towards the behaviour; perceived ease or difficulty of the behaviour, and beliefs about the expectations of other people (Ajzen, 2002, p. 665). Such beliefs shape an individual’s attitudes towards health behaviours, and lead to an individual forming a behavioural intention, with intention being the precursor to behaviour (Ajzen, 2002). Self-efficacy and longings are viewed as significant predecessors to the formation of intentions (Abraham & Sheeran, 2000).

Attitudes are shaped by values held by an individual, and parental attitudes have the capacity to shape not only intentions but also behaviour (Andrews, Silk, & Eneli, 2010). Parental attitudes toward the provision of a healthy diet for their families shape their intention to purchase and prepare healthy foods (Andrews et al., 2010). For example, a parent whose attitude towards dietary guidelines for fruit and vegetables is positive will be more likely to engage in behaviour which makes meeting those guidelines possible, such as purchasing adequate fruit and vegetables (Andrews et al., 2010).

In relation to this study, an individual’s attitude regarding the healthfulness of their present diet, may determine their intention to make changes to their families current food consumption. Parents who believe
their family’s diet is of high quality may not have the intention of changing their intake, regardless of their reported levels of self-efficacy to do so.

2.6.3 The Health Belief Model

The health belief model seeks to explain low rates of participation in programs to prevent illness or to screen for disease, and was developed in the 1950s to enhance effectiveness of health education programs (Conner & Norman, 2005). This model comprises six constructs which include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action (LaBrosse & Albrecht, 2013). The health belief model views self-efficacy as a construct which encompasses not only the confidence a person has in their ability to perform a task, but the confidence to also overcome recognised barriers to performing that task (Abraham & Sheeran, 2000).

People who report stronger levels of self-efficacy have ability to plan, set goals and make healthier purchasing decisions than others, and therefore have healthier diets (Anderson et al., 2007). Healthy food choices are widely available in our society, yet the planning for, and preparation of, healthy meals is inconsistently practiced by families (Anderson et al., 2007). Nutritional behaviours are influenced by self-efficacy, with those who report high level of self-efficacy more likely to report eating less foods purchased outside the home, and preparing family meals in advance (Anderson et al., 2007). Such behaviours ensure a higher nutritional quality for families than relying on fast foods, as well as modelling healthy behaviours for children (Morin, Demers, Turcotte, & Mongeau, 2013).

In this study, levels of self-efficacy are likely to influence the ways that barriers are viewed by parents, as well as means by which these barriers are overcome. Whilst some parents may view barriers as threats, others may view them as a cue to action. Such perceptions are likely to influence the kinds of behaviours employed to overcome barriers, and by increasing the self-efficacy of parents, it may be anticipated that more desirable nutritional behaviours may be engaged.

2.6.4 The Transtheoretical Model

The transtheoretical model or stages of change model (TTM) was developed to integrate the processes and principles of change from a number of other theories of intervention (Prochaska & Velicer, 1997, p. 38). The TTM proposes change occurs over a period of time, and that an individual will move between six stages of change before moving into complete self-efficacy over a problematic behaviour (Prochaska & Velicer, 1997). The stages occur along a continuum, and the model suggests that individuals are able to move through the stages in order, but may also regress to earlier stages before achieving the final termination stage (Finnell, 2005, p. 14; West, 2005).

The TTM relates to the current study as it acknowledges that behaviour change is an iterative process, in which parents may cycle through stages. Parents may move through the initial stages, at which they
recognise the need for change but are unsure how to proceed (contemplation), or when they are preparing to take some action (preparation) (Prochaska & Velicer, 1997). Readiness to change health behaviours requires more than just high levels of knowledge; it also requires high levels of self-efficacy to overcome perceived barriers, and the confidence to try again following unsuccessful attempts at behaviour change (Prochaska, Redding, & Evers, 2002).

2.7 Knowledge, attitudes, behaviour and self-efficacy

Self-efficacy is an important construct in behaviour change theories as it determines how much effort an individual will give to a task, and the level of success which the individual will experience (Baranowski et al., 2002). Knowledge, attitudes and behaviours all influence, and are influenced by, self-efficacy, with those demonstrating high levels of nutrition self-efficacy more positive toward making healthy food choices and more able to employ strategies which regulate their diet and lead to adequate nutritional balance (Anderson et al., 2007). Such approaches lead to consumption of more fruit and vegetables, less fat and more fibre (Anderson et al., 2007).

Self-efficacy may be influenced by levels of knowledge, and in turn, affects attitudes and behaviours (Anderson et al., 2007). However, gains in knowledge are not always translated into positive behaviour, due to a range of social, emotional and environmental factors (Decker, 2012), illustrating the need for parental education to focus on how to implement nutritional change, as well as explaining why it is necessary (Hesketh et al., 2005).

Self-efficacy in relation to nutritional behaviours may be improved by observing and participating in the behaviour, with frequent, successful attempts at the same task leading to gains in confidence (Baranowski et al., 2002). An example of improved self-efficacy leading to improved behaviour is the development of skills in relation to reading food labels and grocery shopping; with those with high levels of self-efficacy tending to attempt to use multiple levels of information to inform purchasing behaviours (Miller et al., 2010).

Attitudes toward family nutrition are also influenced by parental self-efficacy, with many parents claiming although they know the dietary recommendations, they don’t have confidence in their ability to apply them for their families (Decker, 2012; Hart et al., 2003). Simply telling parents what constitutes good food choices is not enough; education needs to improve skills around real parenting experiences such as cooking, shopping and mealtimes (Noble et al., 2007). By improving self-efficacy of parents, their belief in their ability to provide sound influences on the nutritional intake of their children may be improved (Decker, 2012).

The focus of this study then is self-efficacy, as this construct is key to improving attitudes and behaviours related to nutrition (Decker, 2012). Higher levels of self-efficacy are associated with more positive outcome expectancies in relation to a healthy diet and lower negative expectations about the association of healthy
 food choice and negative consequences (Anderson et al., 2007). Such outcome expectancies facilitate health behaviours, and provide a basis for action; without positive efficacy beliefs, individuals have little resolve to change health behaviours (Bandura, 1998).

Section 2

2.8 Introduction

Interventions which attempt to improve the nutritional behaviours of parents and families, have, to date, been somewhat ineffective (Summerbell et al., 2005). For educational interventions to successfully change the behaviour of parents, they must not only provide knowledge based health messages, but also provide opportunities for parents to increase their self-efficacy in relation to the provision of a healthy diet (Slusser et al., 2011). Fundamental issues, such as nutritional literacy of parents, parental preferences for delivery of nutritional education and barriers and facilitators to parents acting on education must be addressed in order to improve intervention outcomes. This section of the literature review will examine these aspects of nutrition interventions, and how they might be improved to advance their uptake and effectiveness.

2.9 Sources of nutritional information

The following section of the literature review will look at current sources of nutritional information accessed by parents, the perceived credibility of such information and the preferred mode of delivery of information to parents.

2.9.1 Availability of nutritional information

Information about nutrition and its effects upon health is readily available within Australia and takes a number of forms, with media such as newspapers, television and radio being popular sources amongst the community (Hendrie, Coveney, & Cox, 2008). The public’s avowed interest in nutrition means it is present across a range of mediums, and a myriad of studies and details are reported, sometimes to the detriment of public health (Patterson, Satia, Kristal, Neuhouser, & Drewnowski, 2001). Although it has been demonstrated that basic nutrition messages may be well known by members of the Australian public, more complex information could lead to uncertainty (Hendrie et al., 2008).

Uncertainty may be due to health messages assuming a level of knowledge which is not always present in the general community, therefore the ample availability of information to parents does not translate directly to healthy behaviour (Coveney, 2005). Whilst levels of foundation knowledge about nutrition differ amongst groups within the community, most parents are able to distinguish between healthy and unhealthy foods, yet still make poor choices (Noble et al., 2007). This indicates nutrition education and information which only acts to increase knowledge cannot be effective; it must also improve self-efficacy (Anderson et al., 2007).
2.9.2 Perceived credibility of nutritional information

The source of nutritional information can help to determine its perceived credibility, with "expertise and trustworthiness" said to be the most important factors in deciding whether a source of information is reliable (Wilson, 2007, p. S16). Professional sources were viewed by all age groups as the most credible of sources in a large Australian study by Worsley and Lea (2003), though the sources viewed as professional may be different to different age groups. Provision of face to face information, such as that from a doctor, dietitian or nutritionist is sought more frequently by older consumers (60 years plus), who are less likely to view friends or the mass media as credible sources than younger people (Worsley & Lea, 2003). School is viewed as a credible source of nutrition information by parents and children (Hart et al., 2003), with a belief that everything allowed at school is intrinsically healthy (Hesketh et al., 2005).

Such trust in a source of nutrition information may determine how often it is used, and whether the advice it offers is followed (Worsley & Lea, 2003). Consumers may become skeptical of information and the credibility of sources, and research suggests the rate at which nutritional information becomes obsolete and changes may actually reduce its effectiveness (Patterson et al., 2001; Quagliani, 2007). To improve the likelihood that consumers will trust information they receive, an association between government agencies, health organisations and the media may improve the perceived trustworthiness of messages (Patterson et al., 2001).

2.9.3 Sources of nutritional information

More recently, the internet has been used to deliver nutrition information and education to parents (Brug, Oenema, Kroeze, & Raat, 2005; Jones, Wells, Okely, Lockyer, & Walton, 2011). In fact, provision of nutrition education via the internet was the preferred method of Australian parents, when compared with education classes which required attendance outside the home. Recruitment rates were higher and attrition rates lower comparatively (Jones et al., 2011). The internet is already utilised by parents as a source of health information, and this preference may be due to ability to access information at times which suit parents, without the need for transport or child care associated with accessing such materials (Jones et al., 2011). With this view, development of interventions which may be accessed at parent's convenience in their own home would seem prudent.

2.10 Parental nutrition literacy

Health literacy is an important concept in relation to nutrition, as it is required to follow instructions from health professionals, instructions for preparation and storage of food, and in making informed food choice (Weiss et al., 2005). Nutrition literacy may be defined as the extent to which individuals are able to understand, process and make use of nutritional information (Silk et al., 2008). Those with low levels of nutritional literacy have lower levels of knowledge and understanding of their own health than those with
higher levels, have more hospitalisations, poorer health status and higher health costs (Weiss et al., 2005).

Nutrition literacy appears to be associated with self-efficacy, as those who report high self-efficacy are more likely to attempt to use nutrition labelling to make food choice, and to adhere to a healthy eating plan (Miller et al., 2010). Those with low levels of health literacy are more likely to consume insufficient serves of fruit and vegetables, as well as less likely to read nutrition labels to inform food choice (Spiers, Messina, Munger, & Grutzmacher, 2012).

2.11 Barriers and facilitators of healthy food choices

Many Australian parents believe they are knowledgeable about nutrition and what constitutes a healthy lifestyle (Hesketh et al., 2005). Parents state that barriers such as time, child pressure due to advertising and lifestyle demands make it difficult to provide the kinds of foods for their children that they believe they should (Hesketh et al., 2005). Parents may not have sufficient self-efficacy to overcome barriers to healthy food choice, with barriers viewed as dangers to be evaded rather than challenges to be overcome (Decker, 2012). Parental attitudes, the influence of the media, cost and time are identified as barriers to the provision of a healthy diet, and will be discussed in this section of the literature review.

2.11.1 Parental attitudes as barriers

Parental perceptions of their nutritional knowledge may pose a barrier to the provision of a healthy diet for families. Parents’ supposed knowledge and their actual knowledge are shown to be disparate across SES groups, with a short term focus on the health outcomes of children and the perception of already providing healthy foods leading to sometimes counter-productive feeding behaviours (Hesketh et al., 2005). This confident belief in their own knowledge led parents to believe they did not require nutrition education, meaning their knowledge and skills would not develop or grow (Hart et al., 2003).

Parental attitudes toward specific kinds of foods may influence the kinds of foods offered to children and their availability. Parental attitudes toward vegetables may pose a barrier to the health of children, with those parents who exhibited dislike of healthy foods and preferring to eat “junk foods” not only modelling certain attitudes, but directly influencing the kinds of foods accessible in children’s homes (O’Dea, 2003).

Some parents reported feeling the pressure they had been placed under as children to eat a food they didn’t enjoy made them loathe to pressure their own children to do so (Noble et al., 2007). This pressure to eat abhorrent foods can lead to negative associations, reinforcing a child’s dislike, which may carry on into adulthood (Dwyer, Needham, Simpson, & Heeney, 2008; Noble et al., 2007).
2.11.2 Media influence as a barrier

Media is a powerful environmental influence on the food choices of both parents and children (Hindin, Contento, & Gussow, 2004). Australian children aged between 5 and 17 years of age spend an average of 84 minutes per day watching television, with half of the children in this age group having televisions or computers in their bedrooms (Australian Bureau of Statistics, 2009a). Australian television is reported to have the highest proportion of food advertising per hour in the world, with the majority of these adverts for high kilojoule-low nutrient foods (Neville, Thomas, & Bauman, 2005). This advertising is frequently designed to appeal directly to children (Neville et al., 2005), and is acknowledged by parents as a barrier to providing healthy foods (Hesketh et al., 2005). Children exposed to this kind of advertising are more likely to request these foods from parents, and to prefer them to other foods (Hindin et al., 2004), with parents feeling pressured to provide them in order to avoid confrontation (Noble et al., 2007).

2.11.3 Cost as a barrier

Numerous studies name cost as a perceived barrier to the provision of healthy foods (Noble et al., 2007; Stenhammar et al., 2007), but this may actually demonstrate a lack of nutritional knowledge (Turrell & Kavanagh, 2006). In an Australian study with over 1000 participants, cost was stated as a reason that less healthful choices were made, though in reality, the healthy versions of the same product were a similar or the same price, such as full fat milk compared to Hilo milk (Turrell & Kavanagh, 2006). Turrell and Kavanagh found that parents who did not attain qualifications outside of high school and those in low income households were less likely to purchase high fibre foods and those lower in salt and sugar, and named cost as a significant factor when making purchasing decisions (2006). Such purchasing behaviour has the capacity to influence healthy food choices (Turrell & Kavanagh, 2006).

2.11.4 Time as a barrier

Time constraints are proposed by numerous authors as a barrier to the provision of a healthy diet, with fast food consumption increasing, and home cooked meals decreasing (Hearst et al., 2012). Some parents stated that the time spent to prepare meals likely to be rejected by their children led to them choosing foods they knew their children would eat (Noble et al., 2007). Parents also acknowledged that after school activities and work commitments made preparation of meals difficult, with some, particularly those with higher levels of education, overcoming this barrier by planning meals in advance (Morin & Roy, 2011).

Maternal employment is viewed as a contributing factor to poor childhood nutrition, with children of mothers who work fulltime more likely to be obese due to decreased time spent cooking and eating as a family, and the sedentary lifestyles of the children (Cawley, 2010). A mother who works outside the family home is more likely to purchase fast foods or convenience foods, both of which are associated with higher body weight (Finkelstein, Ruhm, & Kosa, 2005), and which may be consumed in front of the television.
rather than as a family meal (Cawley, 2010). Television viewing whilst eating is related to increased portion size, increased snacking and increased calorific intake, as well as exposure to promotion of “junk foods” such as sugar sweetened cereals and beverages (Finkelstein et al., 2005).

A number of facilitators to the provision of a healthy diet are outlined in the literature, with family meal times, less television watching during meals and parental interest in nutrition all found to improve children’s dietary quality (Cawley, 2010; Zarnowiecki et al., 2012). The ability to prepare meals in advance, plan menus and having sufficient skills to cook meals with few ingredients are also factors which facilitate healthy food choices (Morin et al., 2013).

Nutrition education programs must be developed with recognition of barriers faced by parents. Such programs need to connect the concept of good parenting with the realities of living a fast paced life, in the midst of social and environmental pressures, building skills which incorporate provision of healthy food in limited time frames and at low cost.

2.12 Conclusion

Almost 20% of Western Australian children are overweight or obese, which greatly increases their likelihood of becoming obese adults, and developing health problems associated with being overweight or obese. The family environment greatly influences the weight status, growth and nutritional intake of children, therefore, education which targets parents has potential to greatly impact upon children’s development.

Studies of parental knowledge, attitudes and behavior in relation to nutrition are numerous; however the role of self-efficacy in relation to these factors, and in determining provision of a healthy diet for families is less well understood. Although many parents claim high levels of nutritional knowledge, such information does not always translate into healthy food choices due to low levels of self-efficacy or misperceptions about what constitutes a healthy diet. Drawing from established behaviour change theories, this review has highlighted the need for nutrition education to provide correct information, as well as to develop parental self-efficacy, by allowing the opportunity for parents to master new skills, and changing their outcome expectancies.

This review of current literature indicates parents are interested in seeking knowledge regarding family health and wellbeing, with mass media being the most common source of nutritional information. The internet is a popular and convenient contemporary choice, although this information is not always trusted. Professionals and schools are recognised as credible sources of nutritional information. Given these results, online materials developed by nutrition professionals and promoted through schools show potential as credible and convenient nutrition supports for parents.
CHAPTER 3: METHODOLOGY

This study sought to answer the following five research questions:

1. What are parents’ current knowledge, attitudes and behaviours related to the provision of a healthy diet for their family?
2. What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours towards healthy eating?
3. What are the barriers and facilitators for parents putting nutrition knowledge into action?
4. What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?
5. What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?

This chapter outlines the research methodology used to answer these questions, and specifies the research design, ethics, and instruments used. It also details sample selection, recruitment of participants, and data analysis plan for the study.

3.1 Research design

This study employed a sequential mixed methods design: first gathering quantitative data from an online survey comprising questions concerning the self-efficacy, knowledge, attitudes and behaviour of parents in relation to their ability to provide a healthy diet for their families; and secondly gathering qualitative data from short telephone interviews conducted with 15 parents. Participants were allocated a self-efficacy score from their responses to questions in the survey, and scores allowed participants to be divided into terciles of self-efficacy; low, medium and high. The following diagram illustrates the study’s design:

![Figure 2: Research methodology](image-url)
Mixed methods research designs are used to gather data from several perspectives, and allow researchers to triangulate their findings, leading to more robust conclusions than those which may be drawn from a quantitative or qualitative study alone (Creswell, 2009). The mixed methods design used in this study has enabled the researcher to explore the relationship between influences on healthy eating for families through quantitative data, and to explore these qualitatively with parents who exhibited varying levels of self-efficacy.

3.2 Ethics

The National Health and Medical Research Council of Australia (NHMRC) defines ethics as “the concepts of right and wrong, justice and injustice, virtue and vice, good and bad, and activities to which these concepts apply” (National Health and Medical Research Council, 2007, p. 99). Researchers are responsible for ensuring their work is of an ethically acceptable standard, and by receiving ethics approval from the ECU, this study was deemed to meet the guidelines of the NHMRC (Edith Cowan University, 2007). Ethics approval was granted by ECU’s Human Research and Ethics Committee (Project 9726), along with consent from the Department of Education (DoE), the Catholic Education Office of Western Australia (CEO) and the Association of Independent Schools of Western Australia (AISWA) to allow the researcher to contact schools across each of these education sectors in Western Australia (Appendices 1 to 3).

Participants consented to participate in the survey online, and 33 registered their interest in being contacted for a qualitative interview (Appendix 7 and 9). Fifteen of these interested participants were contacted and all interviews were audio-recorded. Participants were identified by first names only to protect their confidentiality in transcriptions, and all transcriptions were made by the researcher. Only the researcher had access to this material.

The confidentiality of this research was maintained by adhering to the ethical practices outlined by ECU and the CHPRC. All electronic data were maintained in password protected files to be accessed by the researcher only, and paper based data were stored as per ECU guidelines.

3.3 Instruments

Two instruments were developed for this study; a quantitative online survey and a qualitative interview schedule (Appendix 9 -10). The quantitative survey contained items from four validated tools, which were adapted by the researcher, under the guidance of her supervisory team, to ensure they were suitable for Australian parents.
3.3.1 Quantitative survey

A quantitative self-efficacy and nutrition knowledge, behaviour and attitudes survey was developed for this research, and was administered online via Qualtrics (2013) (Appendix 9). This survey comprised self-efficacy questions relating to nutrition from the survey by Decker (2012), questions from the Canadian BANKS Behaviours, Attitudes and Knowledge survey (Lafave et al., 2009), and questions from the General Nutrition Knowledge Questionnaire developed by Parmenter and Wardle (1999). Questions relating to nutritional literacy were also adapted from the Pfizer Newest Vital Sign (Pfizer Incorporated, [n.d.]) questionnaire, and were modified to suit an Australian nutrition information panel by the researcher. As the BANKS questionnaire and the General Knowledge Questionnaire contained items which may not be familiar to an Australian population, some questions were omitted or had responses altered in the final survey (Appendix 9).

Participants were asked to rate their confidence on an 11-point scale from 0-“not confident at all” to 10-“totally confident” (Decker, 2012, p. 149) in 19 items, in order to obtain a self-efficacy score. To derive scores for other variables, participants answered 57 knowledge items, six attitudes items and 18 behaviour items, as well as three health literacy items and five demographics questions. A table containing all questions arranged according to variables may be found in Appendix 8.

Postcodes from respondents were used to determine socio-economic status; with SEIFA deciles (Socio-economic Indexes for Areas deciles) being used to indicate SES. SEIFA was developed by the Australian Bureau of Statistics to order areas according to relative socio-economic advantage and disadvantage. These are defined as “people’s access to material and social resources and their ability to participate in society”, and the index uses a range of economic and social indicators, including education, income and employment status (Australian Bureau of Statistics, 2013c, p. 6). Deciles are determined according to the ranking of SEIFA scores of geographical areas, with areas being ordered from most disadvantaged (SEIFA decile 1) to least disadvantaged (SEIFA decile 10). In this study the lowest decile recorded was 3, and the highest 10.

Comparisons were made between knowledge, behaviour and attitudes scores using three linear regression models in Stata (StataCorp, 2011). In order for age and education to be more easily compared in Stata both were collapsed to become dichotomous variables. Age ranges 31-40 years were re-coded to be equal to a value of 1, age ranges 40-65 being recoded to be equal to a value of 2; education to high school, year 12, TAFE and trade being recoded to give a value of 1 and University being recoded to give a value of 2.

3.3.2 Quantitative data collection

Quantitative data were collated online using Qualtrics (2013) and uploaded to SPSS (IBM Corp, 2012) for further analysis. These data were cleaned using the data cleaning protocol suggested by Van den Broeck,
Cunningham, Eeckels, & Herbst (2005). Data cleaning is the process of identifying, analysing and editing flawed data (Van den Broeck, Cunningham, Eeckels, & Herbst, 2005). The screening phase was carried out by browsing data tables, analysing summary statistics and identifying statistical outliers. Following the identification of errors, responses with more than half of all values missing were deleted (Van den Broeck et al., 2005).

Frequencies of responses were generated for each question, with scores calculated for self-efficacy, behaviour, attitudes and knowledge for each participant, as per the authors' instructions (Decker, 2012; Lafave et al., 2009; Parmenter & Wardle, 1999; Pfizer Incorporated, [n.d.]). Distributions of scores were graphed for each of the variables, with kurtosis and skewness calculated, and normality curves plotted. Frequencies and distributions may be found in chapter 4 of this thesis.

Self-efficacy scores were calculated by summing 19 item responses and participants then categorised into equal terciles of high, medium and low self-efficacy. Knowledge items (n=57) from the General Nutrition Knowledge Questionnaire (Parmenter & Wardle, 1999) were summed to determine a knowledge score ranging from 0 to 10, with higher scores indicating greater knowledge, and health literacy scores were summed to determine a score ranging from 0 (no responses correct) to 3 (all responses correct).

Three separate attitudes scores were determined for participants, with the first being four questions from the BANKS survey (Lafave et al., 2009). This score was derived by summing responses, and deriving a mean for each participant, producing the “AttBanks” score, which ranged from a possible score of 1, indicating disagreement with statements about nutrition and its impact upon health, to 5, indicating strong agreement with these statements.

The next two attitude scores were derived from categorical questions. The first asked the participant’s level of interest in nutrition to give a categorical score (“Attimport”) which ranged from a possible score of 1, indicating nutrition was not important to them, to 7, indicating nutrition was extremely important to them. The next asked participants to rate their interest in nutrition, with scores ranging from 1, extremely disinterested, to 5, extremely interested, giving an “Attint” score. These questions were devised by the researcher, as the literature review indicated that interest and importance of nutrition to participants were likely to impact nutrition knowledge, attitudes and behaviours (Zarnowiecki et al., 2012).

Finally, parent behaviours were calculated using a variety of questions (ordinal variables) from the BANKS survey, with one score being derived from a range of questions asking about influences on food choice, and another from influences on purchasing decisions. Both scores were summed and a mean derived, giving a “Bchoice” and “Bpurchase” score ranging from a possible score of 1 (never) to 5 (always).

A third categorical score was derived from a question which asked how often the participant prepared meals for their family. “Bcook” scores from 1 (rarely or never) to 4 (always I am the main food preparer) were allocated according to responses.
3.3.3 Qualitative interview

Semi-structured telephone interviews were conducted with five participants from each self-efficacy tercile, as identified in the quantitative survey (high, medium and low). Text messages were sent to participants who had given mobile telephone numbers to arrange a suitable interview time, with five from each tercile contacted. Interviews were undertaken over a two week period, and all were audio-recorded and transcribed by the researcher.

Questions explored perceived barriers and facilitators to the provision of healthy food, as well as questions about the kinds of nutritional information currently accessed by parents (Appendix 10). These interviews also included questions relating to how parents would feel about being able to access information which was similar to that their children were being taught in schools, and what form they would like such materials to take. Interviews were recorded, and each transcribed in full by the researcher. These data underwent thematic analysis, using NVivo software, with recurring themes being identified by the researcher. These results are presented in chapter 4.

3.4 Sample selection

A power analysis was performed using G*Power to determine the appropriate sample size capable of detecting a small to medium effect size (i.e. $f^2 = 0.03$) with 80% power, at the 5% level of significance, $\alpha = 0.05$ (Buchner, Erdfelder, Faul, & Lang, 2009). The sample size needed was 200 parents. The actual number of participants who took part in the survey was 123.

Telephone interviews were conducted with fifteen parents, five from each tercile of self-efficacy. This number of participants was sufficient to generate qualitative exploratory responses.

3.5 Recruitment of participants

Participants were recruited from 56 schools, with parents of children in Years 4, 5 or 6 in Western Australia comprising the target population. This age range was chosen as the influence of the family on food choice is greater than during adolescence, and research has shown that education and interventions undertaken just prior to adolescence has the greatest impact upon food choice later (Lytle, Seifert, Greenstein, & McGovern, 2000).

3.5.1 Schools

Schools were selected randomly from each of three sectors of school education in Western Australia: Department of Education (DoE), Catholic (CEO) and Independent (AISWA). School names were entered alphabetically into an Excel spreadsheet, with each sector having its own list. School names were then
randomised, with schools having less than 150 students according to the DoE, CEO, or AISWA websites being excluded.

The Australian Bureau of Statistics reports that approximately 71% of students attend government schools nationally, with Catholic school attendance slightly higher than that of independent schools (18% and 11% respectively) (Australian Bureau of Statistics, 2013b). For the purpose of this study, of schools who participated, 61% were DoE, 16% CEO, and 23% AISWA.

Of Australia’s population, approximately 70% live in metropolitan areas, and 30% reside in rural or regional areas (Australian Bureau of Statistics, 2008a). Of schools recruited to participate in this study, 72% were metropolitan and 28% from regional/rural areas.

The first 34 DoE schools, the first nine CEO schools and the first 13 AISWA schools in the lists which met these criteria were included for contact. The sectors, regions and SEIFA deciles of schools contacted are shown in the table below.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>SEIFA deciles of participating schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>METRO</td>
<td>REGIONAL/RURAL</td>
</tr>
<tr>
<td></td>
<td>SEIFA Decile 1-5</td>
</tr>
<tr>
<td>DoE</td>
<td>5</td>
</tr>
<tr>
<td>CEO</td>
<td>1(2)*</td>
</tr>
<tr>
<td>AISWA</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8</td>
</tr>
</tbody>
</table>

*Department of Education schools; b Catholic Education Schools; c Association of Independent Schools Western Australia
*Denotes total number of schools contacted

The researcher telephoned schools and spoke to the staff member responsible for the school’s newsletter. An email was then sent in order to gain approval from the school’s principal to place a recruitment advert in their school’s newsletter (Appendix 4). Only three schools indicated definitively that they would not advertise the link in their school’s newsletter.

3.52 Parents

Participants were sought via advertisements in school’s newsletters, with one school known to have opted to send flyers home to parents. A link in school newsletters and flyers directed participants to the CHPRC website where a news item dedicated to this study was available, which provided some background information regarding the justification for the study and its purpose (Appendix 5). The link to the study was embedded in this news item, and redirected parents to the information letter (the text of which appeared as question 1 of the survey), and the consent form (which appeared as question 2). Both were based upon the template recommended for use by the DoE (Appendix 7).
Parents completed the online questionnaire and registered their interest, or not, in a further telephone interview in question 46 of the online survey. Those interested supplied their contact details, as well as a preferred contact time and day as part of the Qualtrics survey (Qs 45-49). This led to snowball sampling, with a number of parents in interviews reporting forwarding the survey through their social networks.

3.6 Data analysis plan

The data analysis for this study was undertaken in a number of stages, as illustrated by the following diagram.

- Scores calculated for self-efficacy, knowledge, behaviour, attitudes and health literacy
- Three terciles of self-efficacy calculated
- Frequencies and descriptives of dependent and independent variables explored in SPSS

- Data imported into Stata
- Linear regression performed in Stata to determine predictive nature of independent variables

- Qualitative data from interviews recorded and transcribed in full
- Data entered into NVivo to determine themes

Figure 3: Data analysis plan

The following section outlines the statistical plan for this study, with the data analysis pertaining to each research question being listed.

RQ1. What are parents’ current knowledge, attitudes and behaviours related to the provision of a healthy diet?

Once the data were cleaned, frequencies for each variable were generated and each construct was prepared according to the methods as described in section 3.3.1. These analyses enabled exploration of parents’ knowledge, attitudes and behaviours relating to the provision of a healthy diet.

RQ2. What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours?

This research question was explored using the quantitative data. Frequency tables for each variable, as well as sum scores, were calculated using SPSS (IBM Corp, 2012). The data collected from the quantitative survey were collated and scored according to the Self Efficacy Scale described in Decker, 2012. The distribution of the scores were reviewed for normality and self-efficacy scores were divided into
three even self-efficacy terciles, of low, medium and high, with the table below showing the range of scores in each tercile.

Table 2
Self-efficacy terciles

<table>
<thead>
<tr>
<th>Low self-efficacy tercile</th>
<th>Medium self-efficacy tercile</th>
<th>High self-efficacy tercile</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 145</td>
<td>146-166</td>
<td>&gt;166</td>
</tr>
</tbody>
</table>

Self-efficacy terciles were calculated to allow the researcher to compare self-efficacy against demographic variables, as well as to ensure that interviews were undertaken with participants who demonstrated a range of self-efficacy levels. For all other data analysis, self-efficacy scores were used as a continuous variable to allow more robust linear regression. Self-efficacy, behaviour, attitudes, health literacy and knowledge variables were exported to Stata (StataCorp, 2011) to enable a linear regression model to be estimated.

Linear regression models were estimated in Stata using Ordinary Least Squares to explore the relationship between the dependent and the independent variables measured in this study, given the dependent variable was continuous in nature. First, the relationship between self-efficacy and demographic variables were assessed. Then, controlling for each of these demographic variables, each of the potential independent predictors of knowledge, attitudes and behaviours were compared with self-efficacy in univariate models followed by a final multivariable model comprising only those significant predictors from the univariate models. Table 9 (chapter 4) shows the findings of these models. The standard significance level of 0.5 was used.

**RQ3. What are the barriers and facilitators to parents putting nutrition knowledge into action?**

This question was asked during the interviews, and was analysed using NVivo (QSR International Pty Ltd, 2012), with themes and categories being identified. Responses were compared between low, medium and high self-efficacy groups.

**RQ4. What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make in relation to their family?**

These research questions were addressed using the quantitative survey, and frequency data and sum scores calculated. This question was also explored during interviews.

**RQ5. What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?**

This question was addressed during interviews, and the information gathered was analysed using NVivo (QSR International Pty Ltd, 2012), with themes and categories being identified and coded.
3.7 Summary

This chapter outlined the methodology used to gather both the quantitative and qualitative data in this study. The results from the study are presented in chapter 4, and discussed in detail in chapter 5.
CHAPTER 4: RESULTS

4.1 Introduction

The biphasic nature of this study means that both quantitative and qualitative results will be examined in this chapter. Results will be listed under the research question they sought to answer, with further discussion occurring in chapter 5 of this thesis.

Appendix 8 contains a table of survey questions arranged under the variable they sought to test, and illustrates which questions comprise scores for self-efficacy, knowledge, attitudes, behaviour, and health literacy.

4.2 Demographic characteristics

A total of 123 participants consented to be part of the survey, with 95 of these completing the online survey questions. The following table describes the demographics of participants.

Table 3
Demographic Information of Study Participants.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>89</td>
<td>93.7</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-35</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>36-40</td>
<td>25</td>
<td>26.3</td>
</tr>
<tr>
<td>41-45</td>
<td>43</td>
<td>45.3</td>
</tr>
<tr>
<td>46-55</td>
<td>16</td>
<td>16.8</td>
</tr>
<tr>
<td>56-65</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>Year 12</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Trade</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>TAFE</td>
<td>13</td>
<td>13.7</td>
</tr>
<tr>
<td>University</td>
<td>62</td>
<td>65.3</td>
</tr>
<tr>
<td></td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td>SEIFA decile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>12.6</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>13.7</td>
</tr>
<tr>
<td>8</td>
<td>30</td>
<td>31.6</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>17.9</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Metropolitan or regional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>80</td>
<td>84.2</td>
</tr>
<tr>
<td>Regional</td>
<td>15</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>100</td>
</tr>
</tbody>
</table>
Almost all (94%) participants were female, and 82% were under 45 years of age. The majority of participants had pursued some form of education after completing high school, with 65% having attended university, and 14% having attended TAFE. Those dwelling in metropolitan Perth accounted for 84% of participants, and of regional participants, two thirds came from the south west region of Western Australia.

The postcodes of respondents were used to determine individual participant’s socio-economic status, with SEIFA deciles (Socio-economic Indexes for Areas) being used to determine SES, with a decile of 1 signaling most disadvantage, and 10 least disadvantage. The minimum decile was 3, with two participants from postcodes in this decile, while the maximum decile was 10, with eleven participants from this group. The most frequently occurring decile was 8 (n=30), and 61% of all participants were from deciles 8 to 10, indicating the SES of participants in this study was high.

4.3 Dependent variable: Self-efficacy

In this study, self-efficacy is the dependent variable which will be examined in relation to the independent variables of knowledge, attitudes, behaviour and health literacy. The following section of this thesis outlines the distribution of the self-efficacy scores, as well as how they were determined.

![Distribution of self-efficacy scores](image)

*Figure 4: Distribution of self-efficacy scores*

Self-efficacy scores ranged from a minimum score of 44 (low self-efficacy) to a maximum score of 201 (high self-efficacy), out of a possible 209, with a mean score of 149.8. The scores are negatively skewed (skewness = -1.23), indicating that scores are at the higher end of the scale, and the distribution peaked, with scores clustered in the centre (kurtosis = 1.870).
To explore the relationship between the demographics of the study’s participants and their self-efficacy, Stata was used (StataCorp, 2011). The following table shows the relationship between self-efficacy and the demographic factors of participants, as measured using a linear regression model in Stata.

Table 4
Relationship between Demographics and Self-efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male)</td>
<td>20.18</td>
<td>-5.03, 45.66</td>
</tr>
<tr>
<td>Age (31-40)</td>
<td>-2.16</td>
<td>-15.07, 10.75</td>
</tr>
<tr>
<td>Decile</td>
<td>-0.65</td>
<td>-4.61, 3.32</td>
</tr>
<tr>
<td>Metropolitan or regional (metropolitan)</td>
<td>12.66</td>
<td>-7.11, 32.48</td>
</tr>
<tr>
<td>Education (high school, year 12, trade, TAFE)</td>
<td>0.04</td>
<td>-13.21, 13.29</td>
</tr>
</tbody>
</table>

Note: Referent category in parentheses. * denotes p≤0.01; ** denotes p<0.05 (two tailed test).

In this model, none of the demographic factors showed statistical significance (p≤0.05), therefore, age, level of education and SEIFA deciles were not predictive of levels of self-efficacy in this sample.

4.4 Quantitative results

This section of chapter 4 will outline the quantitative results of this study, arranged under each research question. Research questions 1, 2, and quantitative data for question 4 will be presented here, with research questions 3, qualitative data for question 4, and question 5 being presented in section 4.5 of this chapter.

4.4.1 Research question 1: What are parents’ current knowledge, attitudes and behaviours related to the provision of a healthy diet for their family?

Knowledge

Knowledge scores ranged from 6.14 to 9.65 out of a possible 10, with the distribution between these two scores relatively normal. A skewness value of -0.385 indicated that scores were clustered at the high end of the graph, and a kurtosis value of -0.462 indicated scores occurred at extremities of the range. Knowledge scores were generally high, with more than half of participants (54%) achieving knowledge scores above eight out of ten, and the mean (±SD) knowledge score being 7.86 (± 0.77).

Figure 5 shows the distribution of knowledge scores for this sample (n=86).
Attitudes questions for this study were derived from a number of sources, and therefore, are scored in different ways. For this reason, three attitudes scores have been calculated for each participant, and will be examined individually in this section.

a) The Banks Attitude score was derived from the mean of answers given to four questions which relate to participants’ attitudes (Appendix 8), and table 5 shows the frequencies of responses to each of the four BANKS attitude questions.

Figure 5: Distribution of knowledge scores
Table 5
Frequency of Responses to BANKS Attitudes Questions

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>A healthy body weight can be achieved through diet and exercise</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Recommendations on healthy ways to eat change so often it’s hard to know what to believe</td>
<td>10</td>
<td>10.5</td>
<td>41</td>
<td>43.2</td>
<td>15</td>
<td>15.8</td>
</tr>
<tr>
<td>What you eat can make a big difference to your chances of being healthy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>The things my family eat now are healthy</td>
<td>1</td>
<td>1.1</td>
<td>19</td>
<td>20</td>
<td>25</td>
<td>26.3</td>
</tr>
</tbody>
</table>

Figure 6 shows the mean distribution of BANKS attitude scores on a scale of 1-5.

Figure 6: Mean distribution of BANKS attitude scores

These scores appear to be normally distributed, with the mean (±SD) being 3.92 (±0.43) out of a possible score of 5, and scores ranging from 3 to 5. Scores are slightly positively skewed (skewness = 0.268), with
a negative kurtosis (-0.34) indicating distribution is relatively flat, with respondents having primarily supportive attitudes towards healthy eating.

b) The next attitude score rates the importance of family nutrition to the participant, with 95% of participants stating it was somewhat or extremely important, as shown Table 6 below.

Table 6

<table>
<thead>
<tr>
<th>Frequencies of Responses to Question, “How Important is your Family’s Nutrition to you?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely important</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>49</td>
</tr>
<tr>
<td>50.5</td>
</tr>
</tbody>
</table>

C) The final attitude score is the self-reported interest in nutrition of participants, with 99% of participants claiming to be interested, very interested or extremely interested, as shown in Table 7 below.

Table 7

<table>
<thead>
<tr>
<th>Frequencies of Responses to Question, “How Interested are you in Nutrition?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>Extremely interested</td>
</tr>
<tr>
<td>Very interested</td>
</tr>
<tr>
<td>Interested</td>
</tr>
<tr>
<td>Not very interested</td>
</tr>
<tr>
<td>Extremely disinterested</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Behaviours

The behavioural questions used in the online survey were taken from a range of sources, and therefore have a range of scales and scores. In this section of the results, three behaviours scores will be presented, with figures and a table illustrating scores for purchasing behaviours, food choice, and frequency of meal preparation for their family shown here.

a) Purchasing behaviours of participants was calculated by taking the mean of responses to five questions (Appendix 8).

Figure 7 shows the distribution of purchasing behaviours scores of the participants (n=95) where a higher score indicates that participants use food labelling information to help them make a purchasing decision more frequently than those with a lower score. These scores are slightly negatively skewed (skewness = -0.16) indicating scores at the higher end of the range, and kurtosis indicates that scores occur at the
extremes of the range (kurtosis = -0.368). Scores ranged from 1.6 to 4.2 out of a possible 5, with a mean (±SD) score of 3.0 (±0.554).

Figure 7: The distribution of purchasing behaviour scores

b) Choice scores were calculated by asking participants (n=95) to rate how often they made certain food choices for their families and taking a mean of their responses (Appendix 8).

The minimum choice score calculated was 3.0, with almost half (49%) of respondents scoring 4 out of a possible 5 or above, indicating they make food choices according to the factors listed in questions “most of the time”.

Figure 8 shows that the distribution of scores for these questions was approximately normal (skewness = -0.91, kurtosis = -0.55), with a mean (±SD) score of 4.08 (±0.45).
c) The final behavioural question asked participants how often they prepared food for their families (Appendix 8). Approximately 92% of participants (n=95) stated that they were always or mostly the main food preparers for their families (Table 8).

<table>
<thead>
<tr>
<th>How often do you Prepare Food for your Family?</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main food preparer</td>
<td>62</td>
<td>65.3</td>
</tr>
<tr>
<td>Most of the time</td>
<td>25</td>
<td>26.3</td>
</tr>
<tr>
<td>Some of the time</td>
<td>8</td>
<td>8.4</td>
</tr>
<tr>
<td>Rarely or never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>95</td>
<td>100</td>
</tr>
</tbody>
</table>

**Health literacy**

Health literacy was calculated using three questions pertaining to finding and being able to use information from a food label (Appendix 8).

Responses to the three questions were summed, giving participants a possible score from 0 (none correct) to 3 (all correct). Of the 94 participants who answered these questions, 65% were able to answer all questions correctly indicating a high level of health literacy. Scores were notably negatively skewed (skewness = -1.56) indicating that scores were in the higher range.
Figure 9 shows the distribution of health literacy scores.

![Distribution of health literacy scores](image)

**Figure 9:** The distribution of health literacy scores

4.4.2 **Research question 2: What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours towards healthy eating?**

To determine the relationship between the dependent variable (self-efficacy) and the independent variables in this study (knowledge, attitudes, behaviours and health literacy), Stata (StataCorp, 2011) was used to generate three linear regression models (Table 9).

The first model explored the relationship between the demographics of the sample and self-efficacy (Model 1). In this model, none of the demographic characteristics appear to be predictive of self-efficacy scores, with all variables having p values above 0.05.

The second model comprised a series of univariate models testing self-efficacy and the predictive ability of each individual variable separately. In these univariate models, the BANKS attitude score (p=0.01) and the choice behaviour score (p=0.00) were significant predictors of self-efficacy.

The third and final model included only the two significant predictors from the earlier univariate models (BANKS and Bchoice) and controlling for the demographic variables, only choice remained a significant predictor of self-efficacy. In this model only the choice behaviour score was significant (p=0.004), indicating that choice behaviours can be used to reliably predict self-efficacy in this sample.
Table 9

Knowledge, Attitudes, Behaviours and Health Literacy as Predictors of Self-Efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 Multivariate</th>
<th></th>
<th>Model 2 Univariate</th>
<th></th>
<th>Model 3 Multivariate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
<td>95% Confidence interval</td>
<td>β</td>
<td>t</td>
<td>95% Confidence interval</td>
</tr>
<tr>
<td>Constant</td>
<td>135.06</td>
<td>0.00</td>
<td>92.44,177.68</td>
<td>1.68</td>
<td>0.97</td>
<td>-78.20,81.56</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>20.18</td>
<td>0.12</td>
<td>-5.31,45.66</td>
<td>20.18</td>
<td>0.12</td>
<td>-13.24,15.97</td>
</tr>
<tr>
<td>Age (31-40)</td>
<td>-2.16</td>
<td>0.74</td>
<td>-15.06,10.75</td>
<td>-2.16</td>
<td>0.74</td>
<td>-13.24,15.97</td>
</tr>
<tr>
<td>Decile</td>
<td>-0.65</td>
<td>0.75</td>
<td>-4.61,3.32</td>
<td>-0.65</td>
<td>0.75</td>
<td>-6.38,2.34</td>
</tr>
<tr>
<td>Metropolitan or regional (metropolitan)</td>
<td>12.66</td>
<td>0.21</td>
<td>-7.10,32.47</td>
<td>12.66</td>
<td>0.21</td>
<td>-30.22,22.02</td>
</tr>
<tr>
<td>Education (high school, year 12, trade, TAFE)</td>
<td>0.04</td>
<td>0.99</td>
<td>-13.21,13.29</td>
<td>0.04</td>
<td>0.99</td>
<td>-11.81,15.70</td>
</tr>
<tr>
<td>BANKS Attitude Score</td>
<td>18.67</td>
<td>0.01*</td>
<td>3.73,33.60</td>
<td>16.63</td>
<td>0.061</td>
<td>-0.81,34.08</td>
</tr>
<tr>
<td>Importance of nutrition (extremely important)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very important</td>
<td>-2.89</td>
<td>0.66</td>
<td>-15.82,10.03</td>
<td>-2.89</td>
<td>0.66</td>
<td>-15.82,10.03</td>
</tr>
<tr>
<td>Somewhat important</td>
<td>-26.88</td>
<td>0.06</td>
<td>-55.10,1.35</td>
<td>-26.88</td>
<td>0.06</td>
<td>-55.10,1.35</td>
</tr>
<tr>
<td>Interest in nutrition (extremely interested)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very interested</td>
<td>-7.87</td>
<td>0.28</td>
<td>-22.17,6.43</td>
<td>-7.87</td>
<td>0.28</td>
<td>-22.17,6.43</td>
</tr>
<tr>
<td>Interested</td>
<td>-9.24</td>
<td>0.30</td>
<td>-26.92,8.44</td>
<td>-9.24</td>
<td>0.30</td>
<td>-26.92,8.44</td>
</tr>
<tr>
<td>Not very interested</td>
<td>-49.29</td>
<td>0.12</td>
<td>-111.76,13.16</td>
<td>-49.29</td>
<td>0.12</td>
<td>-111.76,13.16</td>
</tr>
<tr>
<td>Knowledge</td>
<td>2.09</td>
<td>0.64</td>
<td>-6.78,10.97</td>
<td>2.09</td>
<td>0.64</td>
<td>-6.78,10.97</td>
</tr>
<tr>
<td>Health literacy score</td>
<td>4.43</td>
<td>0.31</td>
<td>-4.19,13.05</td>
<td>4.43</td>
<td>0.31</td>
<td>-4.19,13.05</td>
</tr>
<tr>
<td>Purchasing behaviour</td>
<td>6.05</td>
<td>0.29</td>
<td>-5.25,17.35</td>
<td>6.05</td>
<td>0.29</td>
<td>-5.25,17.35</td>
</tr>
<tr>
<td>Choice behaviour</td>
<td>21.97</td>
<td>0.002**</td>
<td>8.42,35.51</td>
<td>26.49</td>
<td>0.004**</td>
<td>8.73,44.25</td>
</tr>
<tr>
<td>Cook (some of the time)</td>
<td>10.22</td>
<td>0.43</td>
<td>-15.43,35.87</td>
<td>10.22</td>
<td>0.43</td>
<td>-15.43,35.87</td>
</tr>
<tr>
<td>Most of the time</td>
<td>0.97</td>
<td>0.94</td>
<td>-24.35,26.30</td>
<td>0.97</td>
<td>0.94</td>
<td>-24.35,26.30</td>
</tr>
</tbody>
</table>

Note: Referent category in parentheses. * denotes p<0.01; ** denotes p<0.05 (two tailed test).
4.4.3 Research question 4: What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?

This research question was explored using both quantitative and qualitative data.

Participants were asked to indicate which sources of nutrition information they currently made use of, and were able to choose as many responses as applied. The following graph shows the sources of nutrition information, and the number of participants who made use of each source.

![Graph showing sources of nutrition information](image)

*Figure 10: Sources of nutrition information*

In this sample (n=95), the most popular sources of information were family and/or friends (57%), internet sites (54%), and newspaper articles (48%). However, combined newspaper and radio or television scores (77%) show that media sources were the most popular resource used by parents in this sample.

The qualitative results of this question will be explored further in section 4.5 of this chapter.

### 4.5 Qualitative results

Of the 95 participants who completed the survey, 33 agreed to take part in short telephone interviews; 11 from the low self-efficacy tercile, 9 from the medium self-efficacy tercile and 13 from the high self-efficacy tercile.

High level themes which emerged in the qualitative data will be outlined here, and more detailed results and discussion will be further explored in chapter 5 of this thesis.
4.5.1 Research question 3: What are the barriers and facilitators for parents putting nutrition knowledge into action?

This question was explored in the qualitative phase of this research, with five parents from each self-efficacy tercile identifying barriers and facilitators to applying their nutrition knowledge to the provision of a healthy diet for their families.

A number of themes were identified across all terciles, although their identification as barriers or facilitators differed across terciles. Time, weight concerns, vegetables, knowledge, rules, fussy eaters, pressure and modelling were themes which emerged, with pressure, knowledge and rules viewed more positively by parents in the medium and high self-efficacy terciles. Each of these themes will be discussed in detail in chapter 5 of this thesis.

4.5.2 Research question 4: What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?

This research question was explored using both quantitative and qualitative data. In the qualitative phase, participants from the high, medium and low self-efficacy terciles identified differing sources of nutritional information. In the highest tercile, participants seemed to be less inclined to actively seek information than those in the lower terciles, whilst those in the medium tercile used media sources such as lifestyle programs on television or in magazines. Of those in the lowest tercile, whilst also using media sources, some participants had some tertiary education in the health area, and stated they were able to draw on this knowledge, as well as access nutrition textbooks.

4.5.3 Research question 5: What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?

This question was explored during the qualitative phase of this study, with parents from different terciles of self-efficacy having differing views on the likelihood of such materials being used, and how they should be provided.

Parents in the higher self-efficacy tercile felt most parents would be unlikely to make use of such resources, whilst those in the medium and low self-efficacy terciles felt that resources would be well utilised, especially if they provided new or novel information, recipes, and were available online.

4.6 Summary of results

This chapter details the results of the quantitative and qualitative phases of this study. The knowledge, attitudes, behaviours and self-efficacy scores of this sample were high. It would appear that demographic factors are not predictive of self-efficacy scores in this sample, and when all predictors were placed in one multinomial regression model to determine the strength of the predictors of self-efficacy relative to each other only “choice behaviour” remained significant.
The qualitative results of this study have been briefly outlined in this chapter, with barriers and facilitators to applying knowledge identified, current sources of nutrition information identified, and interest in nutrition resources and the form they should take explored. Discussion of these themes will occur in more detail in chapter 5 of this thesis.
CHAPTER 5: DISCUSSION

5.1 Introduction

The purpose of this research was to explore the relationship between self-efficacy, nutrition knowledge, attitudes and behaviours of parents, and how these impact upon their ability to provide a healthy diet for their children. This project sought to answer the following research questions:

1. What are parents' current knowledge, attitudes and behaviours related to the provision of a healthy diet for their family?
2. What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours towards healthy eating?
3. What are the barriers and facilitators for parents putting nutrition knowledge into action?
4. What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?
5. What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?

In this chapter, the findings of the study will be discussed according to the phase of the study (quantitative and qualitative), and according to the research question they pertain to. Limitations of the study will be outlined, and implications for future study will also be discussed.

5.2 Research question 1

What are parents’ current knowledge, attitudes and behaviours related to the provision of a healthy diet for their family?

The results of this study show that the nutrition knowledge of participants was high, as it is within the broader Australian community, with studies stating that nutrition knowledge increases as the SES of participants increase (Hart et al., 2003; Hendrie et al., 2008). As almost two-thirds of the present study’s participants were from areas with a SEIFA decile of more than 8, it may be assumed that SES may have played a role. Nutritional knowledge is also said to increase with age, and with levels of education (Hendrie et al., 2008). Participants in this study were between the ages of 31 and 45, and predominantly university educated, confirming the findings by Hendrie and colleagues (2008).

High levels of nutritional knowledge are also related to high levels of nutritional literacy (Miller et al., 2010), meaning that participants are able to use nutritional information to make informed food choices. Very high levels of nutritional literacy were found in this sample, which is contrary to that which may be expected in the broader Australian community (Australian Bureau of Statistics, 2008b). The Australian Bureau of Statistics found that only 50% of Australians surveyed had adequate levels of health literacy, though this
figure increased proportionately according to level of education, and higher income. This sample was well educated and generally higher SES, which may account for this discrepancy in findings.

Attitude scores in this study were high; and indicated high levels of interest and importance attached to family nutrition, as well as positive attitudes toward participants’ present diet, the likelihood that nutrition can impact future health, and their attitudes toward the credibility of nutrition information. Such positive attitudes toward nutrition expressed by participants in this survey are key to influencing nutritional behavior, and may be of more importance in signaling positive behaviours than knowledge (Miller et al., 2010; Stenhammar et al., 2007).

An interest in nutrition is a factor which leads to increased knowledge, as it may increase the likelihood that individuals will seek out information (Miller et al., 2010). High levels of interest in nutrition were expressed by participants in this study, and such interest has been demonstrated not only to increase the likelihood of seeking out nutrition knowledge, but also to be a motivating factor in the consumption of a healthy diet (Miller et al., 2010; Stenhammar et al., 2007). Such high levels of interest in nutrition may be expected in a study in which participants are not randomly selected, and reflect the high levels of interest in nutrition apparent in the broader community (Contesto, 2008).

More than half of the participants in this study felt that nutrition information was reliable and not subject to change, which is interesting given the proposed “backlash” against inconsistent nutrition information observed some 10 years ago (Patterson et al., 2001). Misinformation from unreliable sources, urban myths spread via the internet and misinterpretation of nutrition studies by the media and general public are all thought to contribute to the misperceptions of the community (Quagliani, 2007), however, the majority of this sample of participants felt confident that their sources of information were credible.

Just over half of participants believed their family’s diet was adequate so there was no need for them to make changes. This response indicates high levels of confidence in participants’ belief in their ability to provide a healthy diet for their families, or as expressed by the health belief model, no perception of a threat to their health, and therefore no reason to change behavior, however self-efficacy scores did not necessarily reflect this belief.

In the present study, nutritional behavior was scored according to behaviours pertaining to purchasing decisions, food choice, and the frequency with which meals were prepared by the participant. Almost all participants stated they prepared food for their families regularly, meaning they were in a strong position to answer questions regarding food choices and behaviours of their families. This is consistent with a high percentage of female participants, as the majority of food purchasing and preparation is undertaken by women in Australia (Australian Bureau of Statistics, 2009b).

High levels of nutritional knowledge are said to be predictive of the provision of healthy diets, high in fruit and vegetables (Zarnowiecki et al., 2012), and in this study, the choice behaviours scores would support
this claim. Choice behaviours scores related to healthy food choice were high, with fats and sugars limited, adequate dairy intake and a variety and high quantity of fruit and vegetables being provided according to the survey responses. It may be that this sample’s interest in nutrition and high levels of knowledge led to a very high quality diet, or it may be that the sample chose to give socially desirable answers to the researcher, and used their high levels of knowledge to give answers consistent with apparent social norms, as happens in self-reported nutritional intake studies (Miller, Abdel-Maksoud, Crane, Marcus, & Byers, 2008). However, as the choice behaviour score is predictive of high self-efficacy scores, as will be explained further in the next section of the discussion, it may be assumed that a high quality diet was provided by participants in this study.

Purchasing behaviours of the study sample indicated most participants used some forms of nutritional labelling to inform their packaged food choice. Whilst health claims, nutritional content claims and serving size were not often used to help with purchasing decisions, the ingredients list and nutrition facts label were both used by the majority of participants to help make food choices. A small New Zealand study with a sample of 15 parents found these were used in relation to specific nutrients targeted by the individual, such as fat or sugar, or in relation to food colours or additives (Maubach, Hoek, & McCreanor, 2009). The same study also found that whilst consumers professed to use this information when shopping, an audit of their shopping trolleys found that due to difficulties understanding the information, poor nutritional choices were often made.

The knowledge, attitudes and behaviours of the sample in this study were consistent with research literature in this area, with high levels of knowledge and keen interest in nutrition being reported, as well as desirable behaviours. Nutritional literacy however, was higher than might be expected in a broad sample of the Australian community, and may be due to the high levels of education and SES of the study’s sample and their self-selection to participate. Credibility of nutritional sources of information was another area in which this sample differed from the expectations of the literature, with this sample feeling that nutritional information was trustworthy.

5.3 Research question 2

What is the self-efficacy of parents and how does this relate to their knowledge, attitudes and behaviours towards healthy eating?

The self-efficacy scores in this study were distributed over a wide range, with some parents exhibiting very low levels of confidence, and others appearing to have very high levels. High levels of self-efficacy have been associated with the maintenance of healthy dietary patterns (Poddar et al., 2010). Increasing age, a higher level of education and higher SES were predictive of higher levels of self-efficacy in a study of the parents of primary school children by Hart and colleagues (2003). In the present study however, these factors were not found to be predictive, which may be due to the high levels of education, higher age
groups and high SES of this sample generally. The predictive power of the independent variables knowledge, attitudes and behavior were tested in relation to self-efficacy, and will be discussed in this section.

Though knowledge scores across this sample were generally high, linear regression showed knowledge to be a poor indicator of self-efficacy. The findings of this study concur with others, as high levels of knowledge do not always mean that participants have the confidence required to overcome barriers and provide a healthy diet for their families (Worsley & Lea, 2003). Knowledge is only one facet in the complex pattern of nutritional behavior, with food choice influenced by a variety of other factors, including biologically determined factors, social conditioning and environmental factors (Contento, 2008).

The social cognitive theory states that knowledge is a prerequisite to behaviour change as knowledge allows people to see how their lifestyle may affect their health (Bandura, 1998). Having the efficacy to believe that one is capable of making changes to behaviour is more important than the knowledge that behaviour needs to change. These self-efficacy beliefs are fundamental to the use of knowledge and skills in health behaviours, and strong levels of self-efficacy are required to be able to use this knowledge on a regular basis (Bandura, 1998).

Attitudes are said to be predictive of the intent to change health behaviours, with the belief in one’s ability to overcome barriers being central to change, and to maintaining healthy behaviours (Ajzen, 2002). Attitudes of parents about the importance of family nutrition and their interest were measured in this study, and both measures found to be high, though neither was predictive of self-efficacy in this study.

The “BANKS attitude” scores of participants in this study were significant when demographics and the BANKS attitudes score were examined in model 2 (table 9), though not significantly predictive of self-efficacy in the linear regression models when all variables were explored simultaneously. This demonstrates the relationship between demographic factors, such as age, gender, education and SES, and attitudes with self-efficacy scores, when BANKS attitudes are viewed in isolation. Increasingly positive attitudes towards nutrition have been found to be related to increasing age, being female, increasing levels of education, and higher SES groups in other studies also (Hart et al., 2003; Stenhammar et al., 2007; Zamowiecki et al., 2012)

Of the four BANKS questions, two were answered almost unanimously positively, with participants believing that healthy body weight and future health is influenced directly by diet. These attitudes demonstrate the outcome expectancies associated with the provision of a healthy diet expressed by the participants in this study (Anderson et al., 2007). Positive associations between health and diet make it more likely that individuals will engage in healthy nutritional behaviours, such as the provision of a high quality diet for their families (Andrews et al., 2010).
Three behaviour scores were generated in this study, and while purchasing and cooking behaviours were not found to be predictors of self-efficacy, “choice behaviours” was the strongest predictor of self-efficacy accounting for all other variables.

“Choice behaviours” included the provision of a varied diet, as well as making healthy choices regarding fats, salt and sugar (Appendix 8). The relationship between high levels of self-efficacy and nutritional behaviours found in this study is supported by the social cognitive theory, that suggested high levels of self-efficacy are consistently predictive of health behaviours (Bandura, 1998). Those who scored highly in this area were likely to have higher levels of self-efficacy, demonstrating a relationship between repeatedly making healthy choices, and successfully providing a healthy diet, higher self-efficacy (Baranowski et al., 2002).

The purchasing behaviour score of participants was not predictive of levels of self-efficacy. This is contrary to the findings of Miller and colleagues (2010), who claim that those with high levels of self-efficacy make greater use of the kinds of information examined by the purchasing behaviours questions (Appendix 8). A small study by Maubach and colleagues (2009), stated that disregard for the use of this information may be due to lack of understanding which comes with low levels of nutritional literacy. In this study however, nutritional literacy scores were high, though these were also found not to be predictive of self-efficacy.

5.4 Results and discussion: Qualitative

Qualitative interviews with participants from each self-efficacy tercile were undertaken, with notable differences between the terciles in relation to the length of time of interviews, the availability of participants, and the kinds of responses given in each tercile.

Those in the highest self-efficacy tercile were readily contactable, responsive to questioning, and very willing to share information. This may have been due to their desire for social approval of their good nutritional choices and abilities (Miller et al., 2008), whilst those in the lower tercile, whose confidence was low, were also very responsive to questioning. This may be because they sought help and advice throughout the interview process, and were more willing to admit to gaps in their knowledge, as found by others (Hart et al., 2003).

However, those in the medium self-efficacy tercile were less responsive and available than others. This group required several preliminary messages to arrange interviews, and some didn’t answer telephone calls at pre-arranged call times. This may have been due to the fact that they were not confident enough in their abilities to provide the informed views of the high tercile participants, but more confident in their knowledge and abilities than those in the lower tercile.

Results and discussion of the qualitative phase of the research will be presented here, with direct quotes from telephone interviews being written in italics, and first names only being used to identify participants.
5.5 Research question 3

What are the barriers and facilitators for parents putting nutrition knowledge into action?

Barriers and facilitators were identified in qualitative interviews across all terciles, with consistent themes emerging. Time, weight concerns, vegetables, knowledge, rules, fussy eaters, pressure and modelling were themes which emerged, and each will be dealt with in answer to this research question.

Whilst a study by Stenhammar and colleagues (2007) found that parents with higher levels of self-efficacy reported more obstacles to the provision of a healthy diet than those with lower self-efficacy, in this current study, parents from all terciles reported a similar number of barriers. However, those in higher self-efficacy terciles were more likely to suggest means of overcoming their barriers, as well as reporting a greater number of facilitators to healthy choice.

Qualitative interviews identified facilitators which allowed parents to put their knowledge into action in the provision of healthy food choices for their families. These differed across self-efficacy terciles, with those in the lowest tercile being less likely to identify facilitators to food choice. Other themes were identified both as barriers and facilitators, depending on the participants’ self-efficacy tercile, with factors such as knowledge viewed as both a barrier and a facilitator to healthy food choice. The following pages outline both the results and discussion which relate to this research question.

Vegetables

A common theme that emerged in both the low and medium terciles was the difficulty of ensuring children ate enough vegetables, with those in the lower self-efficacy terciles disguising vegetables in meals in order for children to eat them.

“…where we managed to sneak in a zucchini or whatever”, Steve, low self-efficacy tercile.

This response may be indicative of a method of avoiding confrontation with the children by disguising foods they may be loathed to eat, and may be a method of meeting dietary guidelines for vegetable intake (Noble et al., 2007). Feeling that the dietary guidelines were difficult to meet was spontaneously mentioned by one participant in this tercile, who felt that the guidelines were unrealistic due to the sheer volume of food children were required to consume.

“.. if they actually ate the total amount of servings recommended, it’s far too much food... I don't think they ate the recommended amount for any of them” Trish, low self-efficacy tercile.

This belief that dietary guidelines were unrealistic is apparent in other studies also (Hesketh et al., 2005; Noble et al., 2007), and it is estimated that as many as two-thirds of Americans do not know the dietary guidelines, or believe they have the ability to follow them (Decker, 2012). Those in the high self-efficacy...
tercile did not mention vegetable intake as an issue, with only one participant commenting that variety of vegetables was an issue rather than quantity.

"We have three days per week where we only eat vegetable based foods…and on those days we vary it as we can…", Anthony, high self-efficacy tercile.

Limiting the variety of foods a child is exposed to may impact their future preferences and choices, as outlined in Contento’s model (2008). Repeated exposures to a variety of foods are important in developing a liking for them, and such preferences may be learnt, if given the opportunity to develop.

Rules around food

Implementation of rules around food was mentioned by parents from all terciles, but their approach was quite different.

Shannon, in the medium self-efficacy tercile, stated she had decided not to ban foods, and to allow them to be eaten along with a healthier choice.

"I actually have gone the route of not banning, you know chocolate, and all of that, because I actually find that children recognise when they’re hungry for healthy things ….", Shannon, medium self-efficacy tercile.

This may be an example of an authoritative parenting style, where Shannon allowed her children to exert self-control and independence around food choice (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008). This style of parenting weighs children’s preferences with parental concerns for health, unlike the authoritarian style of parenting, which would be more likely to advocate restrictive food practices, which may prove counter-productive in the longer term (Hubbs-Tait et al., 2008).

Others parents stated that not having “junk foods” in the house or having rules around the times those foods could be eaten helped to limit their children’s consumption of less desirable foods. This limiting of the availability of, or access to, unhealthy foods is an environmental factor which may increase the likelihood of children having a healthy diet (Contento, 2008). Such rules may be associated with high SES (Hart et al., 2003), with the majority of parents in this study being from higher SEIFA decile areas.

“…like Friday is chip night, so they know on Friday night they have chips, so that’s fine, they don’t ask for the rest of the week, so that’s easy…", Kirrily, high self-efficacy tercile.

“I say, “well they’re treat foods and you can’t have them every day, and don’t ask me because you will never get them in your lunch box, because if you get them in your lunch box, you won't get them at any other time of the day.” Trish, low self-efficacy tercile.
Rules around the provision of foods may be due to a perceived sense of responsibility to provide a healthy diet for children, or may be due to the social pressure to conform (Noble et al., 2007). Rules were discussed in relation to junk food and school lunches by many parents in this sample, with the need for healthy foods at lunchtime being stated repeatedly, across terciles. This finding is congruent with the findings of a study conducted with Perth parents (Bathgate & Begley, 2011), and though healthy foods were the preferred option, some parents opted for convenience, as illustrated by the following quote:

“I've resorted to using... the squeezy yoghurt, ...like packaged foods is probably the easiest... I just get them and whack them in there...””, Donna medium self-efficacy tercile.

This participant stated that time was a barrier to the preparation of a healthy lunchbox, and that for convenience, packaged foods were utilised. She also remarked that convenience foods fitted into the lunchbox more easily than other foods, a claim also made by participants in the lunchbox study by Bathgate and Begley (2011).

Knowledge

Knowledge is an intrapersonal determinant of food choice, which plays a role in determining what individuals eat (Contento, 2008). Knowledge and food preparation skills were viewed as a facilitator to healthy food choice by those in the high self-efficacy tercile, with participants drawing on life experiences to facilitate food choice.

“I've had a weight problem my whole life... So I'm pretty aware of what they should and shouldn't have"... Petra, high self-efficacy tercile.

“...because I have a thermomix, I can whip up a nutritional meal in twenty minutes”, Kirrilly, high self-efficacy tercile.

These statements demonstrate an internal locus of control: that is, both participants felt that their own knowledge and skills would determine their success in the provision of a healthy diet (Ajzen, 2002). The following quote describes a more external locus of control, and highlighted the impact of cultural factors on food choice, with the participant feeling that their cultural background improved the knowledge and skills of him and his wife in relation to food choice and food preparation.

“I think possibly we are fortunate that we have a fortunate background... I have an Italian heritage and my wife has an Asian heritage so we are very familiar with the understanding of something called ‘fresh’”, Anthony, high self-efficacy tercile.
It is worth noting however, that such high levels of confidence in one’s knowledge and abilities does not always accurately signify high levels of knowledge, as dependence on obsolete information or that from unreliable sources may give parents a false belief in their levels of knowledge or skill (Hart et al., 2003).

In the low self-efficacy tercile however, a lack of knowledge was clearly felt by participants, with several asking questions during the interview on how to improve food choice.

“It’s just overwhelming going down food aisles, you know? Not knowing what’s actually healthy for them. Like is the tick actually healthy or do they buy the tick?” Kelli, low self-efficacy tercile.

“I’m wondering if I’m giving them enough of the right kinds of foods at the right time of day?” Jo, low self-efficacy tercile.

Such expressions of self doubt are indicative of low self-efficacy, and such levels of confidence have the capacity to override existing skills and abilities (Bandura, 1998). The social cognitive theory posits that by allowing individuals the chance to master tasks through persistence (mastery experience) and by providing social support, confidence may be increased (Bandura, 1998).

**Time**

Time was a barrier mentioned by participants from all terciles, with after school activities and work commitments being the most commonly mentioned issues which interfered with food choice and preparation. Once again, the method by which this obstacle was overcome differed according to the level of self-efficacy of the participant. Those in the medium and high terciles stated that pre-planning and preparation were most commonly used on busy days.

“Well the timing one is probably just some forward planning...I do prepare meals in bulk and freeze them, and get children involved as well so I can educate them as well”, Kirrilly, high self-efficacy tercile.

This strategy was found to be one employed by working parents particularly, in a study by Morin and colleagues (2013) who reported that working parents generally had higher levels of self-efficacy in relation to food preparation, with many menu planning for the week ahead, and preparing food in advance.

Those in the lower self-efficacy terciles also stated that pre-planning helped, but mentioned the use of convenience foods rather than home-cooked frozen meals. This strategy leads to poorer quality choices (Morin et al., 2013), as noted by participants themselves.

“And when you work full time it’s hard to always cook...so you know things might be a little bit higher in fat, or lower in fibre.”, Jo, low self-efficacy tercile.
“Yeah well on afternoons where I work later and have less time to prepare I’ll pick something easier like tacos or chicken burgers or something like that at home you know”, Shannon, medium self-efficacy tercile.

Morin and colleagues (2013) also found that those with low self-efficacy in relation to meal planning often resorted to pre-packaged or take-away foods when time was scarce, whilst those with higher levels of self-efficacy felt more confident to be able to prepare a meal with a few available ingredients, in a short time frame.

**Cost**

Cost was mentioned as a factor by only two participants, with a participant from the high self-efficacy group who stated that buying seasonal produce and planning ahead were her preferred methods of overcoming this barrier to healthy food choice.

In the low self-efficacy group however, cost was mentioned in relation to buying foods that children like to eat, rather than introducing variety and new foods.

“…finding things that they will eat, so you’re not wasting your money…”, Jo, low self-efficacy tercile.

This statement was supported by research undertaken by Noble and colleagues (2007), who noted that whilst parents acknowledged that having children eat the recommended servings of fruit and vegetables was desirable, they were loathed to spend money on foods children were unlikely to eat.

**Modelling**

Contento (2008) states the social conditioning of children influences not only their food preferences, but also how often they eat and the amount they eat. Modelling of healthy behaviours is a theme supported by the social cognitive model, the health belief model and the TTM, which feature self-efficacy as a key construct and credit observational learning as a means of improving health behaviour. The following quotes demonstrate the importance some parents placed upon setting a good example.

“My niece is a dietitian, and that’s their cousin, so they see what she’s doing, and think, “Well, I want to be like [name]” so by setting an example to start with”, Trish, low self-efficacy tercile.

“We model, you know, my husband and I eat pretty healthily, we exercise regularly, the kids do as well, so I mean we show them what it is you need to be healthy” Carmen, medium self-efficacy tercile.

Other parents were less specific, but frequently mentioned educating children about food choice and sources.
“I feel like I want to educate them so they know what’s good for them when they get older”, Lisa, high self-efficacy tercile.

“We actually grow a lot of the foods that we use...so a lot of it is like a family activity I guess... and gives them a bit more knowledge about where it’s all coming from”, Belinda, medium self-efficacy tercile.

Knowledge is recognised as a prerequisite for change by parents as well as by theorists, with the social cognitive theory stating that without knowledge about health behaviours individuals have no motivation to change (Bandura, 1998), and the health belief model asserting that individuals need to be able to identify perceived threats in order the shape health behaviours (Conner & Norman, 2005). By repeated exposures to, and practice of, healthy nutritional behaviours, self-efficacy can be increased and healthy behaviour maintained (Baranowski et al., 2002).

**Pressure**

Pressure from children was named as a barrier in all self-efficacy terciles. Many parents stated that snacks and lunchboxes were an issue which caused friction in their homes. The comparison by children with others’ meals and snacks was a common theme, which parents from all self-efficacy terciles said lead to discussions with their children about the appropriateness of foods as everyday foods versus sometimes foods.

“...they come home from school and tell you that so and so had all these different foods, and why don’t I get to have it in my lunch box?”. Trish, low self-efficacy tercile.

“The challenges.... Probably the kids’ snacks I think....yeah, lots of snack type foods out there and the kids always talk about what their friends have and why don’t we have that...I always say to the kids that it’s ok to eat junk food as long as you eat healthy fruit and vegetables most of the time... it’s ok”, Lisa, high self-efficacy tercile.

These findings confirm those of Bathgate and Begley (2011), who also found that parents from low SES schools in Perth expressed difficulty providing healthy school snacks. Parents in this study however, were predominantly from high SEIFA decile areas, highlighting this problem as one which is not tied implicitly to SES.

Another parent in this study recognised that children had some existing knowledge about what constituted healthy food choice, but persisted in asking for less healthy options.

“You know I think kids are pretty switched on these days... you know they know what’s healthy... it doesn’t stop them from asking for MacDonald’s...” Belinda, medium self-efficacy tercile.
It may be that children’s view of the perceived threat to health posed by these foods wasn’t enough to encourage them to modify behaviour (Conner & Norman, 2005), or that healthy foods are viewed as “adult” foods by children (Hart et al., 2003). It may also be that children are biologically hardwired to prefer sugars, fats and salts, a preference carried over from when energy dense foods were less abundant (Contento, 2008). This natural liking can be modified, by offering these kinds of foods less frequently than fruits, vegetables and grains (Contento, 2008).

This quote may also demonstrate the pressures children exert on their parents due to advertising, with fast food restaurants and confectionary being several times more likely to be advertised during children’s television programs than at other times (Hindin et al., 2004). In a study by Hesketh and colleagues (2005), children reported that advertising and packaging influenced their food choice, with healthy foods looking less appealing than convenience, confectionary and fast foods.

Other parents were also named as an influence on food choice by parents, with some finding it positive:

“I had a really great supportive mothers group….if we found something that worked, that was a healthy or a good option, then we’d talk about it, we’d share healthy recipes, you know, that kind of stuff”, Shannon, medium self-efficacy tercile.

This may be indicative of vicarious experiences and social persuasion improving levels of self-efficacy, as explained by the social cognitive theory, whereby parents recognise that others in a similar situation to themselves are able to overcome obstacles (Bandura, 1998).

Whereas others in this sample found their influence demoralising:

“Or they’ll say, “We’re mincing our own meat tonight, to make this recipe”… I find it quite annoying. Like they’re doing a lot better job than me!” Kelli, low self-efficacy tercile.

Whilst those from the highest self-efficacy group recognised that parents were doing what they could with the skills, knowledge and time available to them.

“Cause parents are in such different situations about how much time they’ve got, how much stuff they can make from scratch, all those sort of things ..”, Petra, high self-efficacy tercile.

This recognition that knowledge and skills differ throughout the community is in accord with the findings of Morin and colleagues (2013), who noted that parents with low levels of self-efficacy admitted to limiting the kinds and variety of foods they prepared for their families, due to poor cooking skills and limited knowledge. Contento, (2008), also noted that misperceptions and lack of skill may have lead to a less than optimal consumption of fruits and vegetables, and higher intakes of fat and sugar.
**Fussy eaters**

Fussy eaters are conditioned behaviours, with fussy eating patterns developed early in childhood (Conte, 2008). Fussy children and their preferences were mentioned by participants in all three terciles, but this barrier was viewed differently by participants according to terciles. The low self-efficacy tercile felt that some parents used fussy children as an excuse for making poor food choices:

“Sometimes some parents find it easier to say my child just won’t eat that, or make excuses, for why the child isn’t eating healthily”, Marie, low self-efficacy tercile.

Whilst others expressed a level of frustration at having to give in to their children’s demands:

“If they would just eat what I put in front of them...that would be lovely.... I’d love to find a simple cookbook that would please the whole family, not just the adults or the kids...so we could all eat... they probably are out there… I just haven’t bothered to look for them...” Kelli, low self-efficacy tercile.

This parent appeared to be in the early stages of the transtheoretical model; she recognises there is a problem with the acceptability of foods to both children and adults, is aware that change is required, but as yet, is unable to make that change. She may be between the contemplation and preparation stages of change, where an individual recognises change is needed, and begins to take steps toward changing behaviour (Prochaska & Velicer, 1997).

Those in the medium self-efficacy tercile stated that getting children to try new foods was challenging, whilst parents in the high self-efficacy tercile talked about ways to overcome fussy eating habits:

“Well with my son I’m introducing new foods slowly but surely, and that’s helping, but he also knows now that you can’t just have what you want because you’re being difficult, you eat what you’re given”, Petra, high self-efficacy tercile.

This response showed high self-efficacy in relation to the provision of a healthy diet, as this parent is willing to challenge difficult behaviours. Those with lower levels of confidence may have reacted to fussy behaviours by preparing foods children are known to like, or by offering children other foods, without the expectation that they will eat them (Noble et al., 2007).

**Weight concerns**

Concerns about weight were verbalised by three participants, one from each self-efficacy tercile. The participant from the low tercile was concerned that her underweight children couldn’t be expected to eat as much food as that which is recommended:
“..if my children ate that amount they would be overweight, and it’s not that I’m replacing with other inappropriate food, it’s if they actually ate the total amount of servings recommended, it’s far too much food…”, Trish, low self-efficacy tercile.

This fear of children becoming overweight was given in other research as justification for watching children’s consumption of food, with fears of social stigma being cited, rather than poor future health (Tucker et al., 2006). This may be an example of normative beliefs, or the social pressure parents feel, dictating the manner in which they feed their children (Ajzen, 2002). These personal factors may be a compelling determinant of food choice, and their interactions with the social environment are demonstrated in the model by Contento (Figure 1).

The parent from the medium self-efficacy tercile however, was unconvinced by Body Mass Index as a measurement of her son’s weight:

“.. my son has always been big, you know? We got information coming home saying he was obese, but you know that’s absolutely ridiculous… He can swim , he’s 8, he can swim 2 kilometres, he’s a great footballer, I just think some of those older methods, that they’re looking at might be outdated, for how we live today…”, Carmen, medium self-efficacy tercile.

This may be an example of changing societal norms in relation to the weight of children. With approximately 20% of Australian children being overweight or obese, perceptions of the average size for children are changing (Australian Bureau of Statistics, 2009a). This statement is also compatible with findings that parents tend to focus on short term health outcomes (in this case sporting achievements), rather than on the long term impacts of being overweight (Hart et al., 2003).

### 5.6 Research question 4

*What are the current sources of nutritional information accessed by Western Australian parents to inform food choices they make for their family?*

This research question was addressed in the quantitative phase of this study as well as the qualitative phase, with results presented in chapter 4 of this thesis, and discussed in the quantitative section of this chapter.

During interviews, parents from different terciles acknowledged the use of different sources of nutrition information, though the kinds of information sought differed markedly. Participants from the highest self-efficacy group stated while they didn’t seek out nutritional information, they were interested if they came across it.
“I probably won’t seek it out, but I come across it... I enjoy reading online publications....while reading online publications I’ll read the food section. If it mentions about nutrition it’s something I will take time to read and understand...”, Anthony, high self-efficacy tercile.

Those with high levels of confidence may not believe they need to improve their knowledge, though as discussed previously, their knowledge may not be based on factual evidence. The quote below, however, shows how such implicit confidence in one’s knowledge, can allow individuals’ to trust their own judgment rather than being persuaded by other factors.

“I don’t really go for fad advertising… just have a look around and see what nutritional value is on things, and then I tend to stick to those products... I don’t get sucked in to the “new beaut thing” “cause half the time they say it’s healthy, and then the sugar and that just doesn’t back it up...”, Petra, high self-efficacy tercile.

Participants in the medium self-efficacy tercile stated that media sources were used to gain nutrition information, with magazine and television being popular sources, and these used to provide recipes more frequently than nutrition information as such.

“I wouldn’t say I go out of my way.... but just through reading the newspaper...and you know there’s a couple of regular....chefs or TV shows that we like to watch... whether it’s Better Homes and Gardens or checking out the Donna Hay recipes in the weekend paper”, Carmen, medium self-efficacy tercile.

“I get the super foods ideas magazine, and like Woollies have the magazines with ideas, like the recipes in them...” Donna, medium self-efficacy tercile.

“I don’t go to find information but I’ll go to places like taste.com to find new recipe ideas”, Jo, low self-efficacy tercile.

The media is an environmental determinant of food choice and dietary behaviours, and a commonly used source of nutrition information (Contento, 2008). The desire expressed for information from popular culture shows that those in the lower self-efficacy terciles recognise the need to improve their skills in this area. This is consistent with the views of Contento (2008), who described the public’s fascination with nutrition and its foray into contemporary society.

Two interview participants in the lowest tercile were employed in health services, and both named their education and textbooks as sources of information.

“..my job is in diabetes education, so I work with a dietitian and a diabetes nurse as well .... and I’m involved in part of the food education, so I have access to information”, Trish, low self-efficacy tercile.
“I get some books. I have the additive alert book, I sort of read a bit, and I have a background of a bit of knowledge, like a sports science degree”, Marie, low self-efficacy tercile.

It may be assumed that both of these participants have high levels of nutrition knowledge gained through their tertiary education. It is interesting to note however, that such high levels of knowledge do not appear to have improved their levels of confidence, but rather to have reduced it. This finding contrasts with that of Stenhammar and associates (2007), who found in their study that higher levels of education equated with higher self-efficacy.

5.7 Research question 5

What is the level of parental interest in home-based nutrition support materials aligned with school curriculum materials and how should these supports be provided?

Parental interest in nutrition education materials differed across self-efficacy terciles, as did the preferred methods of delivery. Some parents in the high self-efficacy terciles stated that they felt most parents would be unlikely to access them, no matter how they were delivered.

“I think most people either have an interest or, they don’t have any interest. They either think it’s too hard or they follow that with whole lifestyle”, Kirilly, high self-efficacy tercile.

“There are always going to be a certain percentage of parents who will, but it will be that same percentage all the time .. it’s hard to get new ones in”, Petra, high self-efficacy tercile.

Those in the high self-efficacy tercile, were more confident in their own knowledge, were less likely to see education programs as something which would be accessed by parents (Hart et al., 2003).

Others felt that a brochure sent home to parents with a link to online materials might be the most successful method of gaining parents’ interest, whilst the viability of seminars run at school was discussed in all three terciles:

“I’d like to say seminars and information sessions, but you don’t generally get a lot of interest”, Jen, high self-efficacy tercile.

“Maybe a presentation at school... or like something attached to a school newsletter.... but... most mums I know are working mums so it’s not like we have lots of time to come to... presentations that are just on the one thing”, Shannon, medium self-efficacy tercile.

“At [primary school] I was talking to the principal, and she’s actually implemented ... program... because a lot of those kids don’t bring a proper lunch, if they bring lunch, and they offered a whole school seminar...
and only 3 parents said they would come. And they had to cancel….. Such a shame”, Kelli, low self-efficacy tercile.

Parents in all three terciles felt that links to a website through the school newsletter would be a viable option, whilst others felt that links from the school website could also have potential to reach parents at home, with online resources deemed popular as parents could access them at their convenience.

“Everyone’s pretty busy, but most people I know would be interested in, you know, if it was something new and different”, Carmen, medium self-efficacy tercile.

The popularity of web based materials has been reported in the literature also, with convenience and cost-effectiveness being named as reasons for low rates of attrition from such courses (Jones et al., 2011). Other parents noted the importance of children being taught the same things at home and school:

“…we get told at the kids’ school, you know, “we want the message to be consistent at home and school”… Belinda, medium self-efficacy tercile.

A belief in the trustworthiness of information from school, as well as the capacity to be privy to the same information as the children was a popular idea, and Hart and colleagues (2003) found that parents in high SES groups tended to believe that schools had a social responsibility to improve the diet and physical activity levels of children.

5.8 Conclusions

This study aimed to explore the parental self-efficacy of parents to provide a healthy diet for their children, and to explore the relationship between self-efficacy, knowledge, attitudes and behaviours of parents. It also aimed to determine the sources of nutritional information currently accessed by parents as well as their preference and interest in new nutrition resources.

This study used a sequential mixed methods design, with research questions being examined using both quantitative and qualitative data. Self-efficacy was scored, with a wide range being apparent, indicating the variance in this construct across the study’s sample. Self-efficacy was prominent in the literature around this topic as a construct which had greater impact on the quality of nutrition than knowledge, as those with high levels of self-efficacy have the ability to overcome barriers to healthy food choice. Qualitative data showed that those in the highest self-efficacy tercile were able to name more facilitators to healthy food choice, as well as demonstrating confidence to overcome barriers within their families.

Quantitative data showed that the nutritional knowledge of this sample was high, with nutritional literacy scores also high. Such findings were anticipated, as the general community has high levels of nutritional knowledge, as well as an interest in nutrition, as embodied by the burgeoning media attention in this area.
Knowledge was acquired using a variety of sources, with media sources being the most prominent. The knowledge levels of participants in this study however, were not found to be predictive of self-efficacy.

Attitude and behaviour scores were also high, confirming previous studies that had reported that attitudes were more predictive of healthy behaviours than knowledge. In this study, attitudes were not shown to be predictive of self-efficacy, though choice behaviours were.

Qualitative interviews asked participants to identify barriers and facilitators to healthy food choice, which varied according to the level of self-efficacy of the participant. The most frequently identified themes included vegetables, rules, knowledge, time, cost, modelling, pressure, fussy eaters and weight concerns. Although these themes re-occurred, the manner in which they were overcome or employed differed markedly, illustrating the need for self-efficacy to be improved in order for parents to make healthy food choices for their families in spite of barriers.

Therefore, the results of this study show that whilst knowledge, attitudes and behaviours are important in the provision of a healthy diet for families, the self-efficacy of parents is a key element in the transition of good intentions into healthy behaviours. The findings of this study may be used to inform the development of parental nutrition resources which aim not only to deliver credible information, but also offer opportunities to improve self-efficacy.

5.9 Limitations

This study had several limitations. Participation in both phases of this research was self-selected, and only those with a high level of interest in nutrition participated. This means that results may not be representative of the general population whose interest in nutrition is less marked, and responses may have an element of social desirability or social approval bias (Miller et al., 2008).

The sample demographics are not widely representative of the Western Australian population, with tertiary educated women of higher SES groups being disproportionately represented in this study. This may be due to the fact that women had greater access to school newsletters, or that women are twice as likely to purchase and prepare foods, than men, therefore express a greater interest in family nutrition (Australian Bureau of Statistics, 2009b). Higher education and SES levels influence nutrition behaviours, attitudes towards family nutrition and nutritional literacy, suggesting results from this study may not be representative of a less educated and lower SES sample.

Due to delays in ethics approvals, the quantitative survey was only open to participants for four weeks, leading to fewer participants than the power analysis recommended. Results may not have the same power and ability to detect statistical significance as a larger sample would have provided.
5.10 Recommendations

A number of recommendations about the importance of nutrition education for parents may be made, based on the findings of this research:

1. **Attitudes and food choice behaviours are important in education programs.**

Parental education programs need to focus on more than just knowledge, as attitudes and food choice behaviours were demonstrated to be predictive of levels of self-efficacy in this sample.

2. **Education programs should be aimed at differing levels of self-efficacy.**

Although self-efficacy terciles identified similar themes when discussing facilitators and barriers to healthy food choices, the means they described for overcoming them varied considerably. With this view, it may be prudent for education programs to be developed which are targeted at different levels of self-efficacy. This would allow each tercile to have their particular stated needs met, and for the confidence of those in the lower terciles to be built.

3. **To develop and test a tool for the measurement of nutritional self-efficacy.**

Due to the limited number of tools available to measure parental self-efficacy, it would be appropriate to develop and evaluate a tool for use with parents in Australia.

4. **More detailed investigation of nutritional literacy required.**

A more detailed inquiry into the ability of the current study’s sample to make sense of the information in relation to food choice would be valuable.

5.11 Implications for future research

As an Honours project is dictated by time and resources, there are many aspects of this study which were not explored as fully as the researcher may have wished. Both the quantitative and qualitative phases of the study left questions unanswered, due in part to the homogeneity of the sample, with areas such as nutritional literacy, the SES and education levels of participants being areas in which further study would be warranted.

Other areas which may be explored more fully include the impact of work commitments and commitments to after-school activities on parental self-efficacy to provide a healthy diet for families. These were areas which were repeatedly mentioned by parents in the qualitative interviews, and whilst some were able to overcome these barriers successfully, others struggled to fulfill these commitments as well as maintaining a healthy family diet on busy days.
References


QSR International Pty Ltd. (2012). NVivo qualitative data analysis software.


StataCorp. (2011). Stata statistical software: Release 13. College Station, TX.: StataCorp LP.


Appendix A: ECU ethics approval

FACULTY HUMAN ETHICS SUBCOMMITTEE

MEMO

TO: ANGELA HAMAND
FROM: ANGUS STEWART, CHAIR, FACULTY HUMAN ETHICS SUBCOMMITTEE
CC: AMANDA DEVINE
DATE: 16TH JULY, 2013
RE: ETHICS APPLICATION

The following ethics application for:

9726 LOMBARDI Karen Hons Nutrition Self efficacy and nutrition knowledge of parents in Western Australia

Is approved category 1.

Data collection and analysis can commence immediately.

Best Wishes

[Signature]

Angus Stewart
Appendix B: Department of Education ethics approval

Government of Western Australia
Department of Education

Ms Karen Lombardi
4 Wester Crescent
QUINNS ROCKS  WA  6030

Dear Ms Lombardi

Thank you for your application received 19 July 2013 to conduct research on Department of Education sites.

The focus and outcomes of your research project, *Self-efficacy and nutrition knowledge of parents in Western Australia*, are of interest to the Department. I give permission for you to approach site managers to invite their participation in the project as outlined in your application. It is a condition of approval, however, that upon conclusion the results of this study are forwarded to the Department at the email address below.

Consistent with Department policy, participation in your research project will be the decision of the schools invited to participate and the parents of students at those schools. A copy of this letter must be provided to site managers when requesting their participation in the research.

Responsibility for quality control of ethics and methodology of the proposed research resides with the institution supervising the research. The Department notes a copy of a letter confirming that you have received ethical approval of your research protocol from the Edith Cowan University Faculty of Computing Health and Science Human Ethics Subcommittee.

Any proposed changes to the research project will need to be submitted for Department approval prior to implementation.

Please contact Ms Joanna Devereux, Research and Evaluation Officer, on (08) 9264 5512 or researchandpolicy@education.wa.edu.au if you have further enquiries.

Very best wishes for the successful completion of your project.

Yours sincerely

ALAN DODSON
DIRECTOR
EVALUATION AND ACCOUNTABILITY

7 August 2013

151 Royal Street, East Perth Western Australia 6004
Appendix C: Catholic Education Office ethics approval

23 July 2013

Mrs Karen Lombardi
4 Wester Crescent
QUINNS ROCK WA 6030

Dear Mrs Lombardi

RE: SELF-EFFICACY AND NUTRITION KNOWLEDGE OF PARENTS IN WESTERN AUSTRALIA

Thank you for your completed application received 22 July 2013, whereby this study aims to explore parental self-efficacy to provide a healthy diet for their children and how this is related to their knowledge and behaviours, with the aim of developing recommendations for future nutrition education interventions for families.

I give in principle support for the selected primary Catholic schools in Western Australia to participate in this valuable study. However, consistent with CEOWA policy, participation in your research project will be the decision of the individual principal and staff members.

Responsibility for quality control of ethics and methodology of the proposed research resides with the institution supervising the research. The CEOWA notes that Edith Cowan University Human Research Ethics Committee has granted permission for the duration of this research project (Reference Number: 9726).

Any changes to the proposed methodology will need to be submitted for CEOWA approval prior to implementation. The focus and outcomes of your research project are of interest to the CEOWA. It is therefore a condition of approval that the research findings of this study are forwarded to the CEOWA.

Further enquiries may be directed to Tanya Davies at davies.tanya@ceo.wa.edu.au or (08) 6380 5379.

I wish you all the best with your research.

Yours sincerely

Dr Tim McDonald

59 Ruapip Street, Leederville WA 6007 PO Box 19B, Leederville WA 6903 T (08) 6380 5210 F (08) 6380 5110
E mcdonald.tim@ceo.wa.edu.au W ceo.wa.edu.au
Appendix D: Recruitment email to school principals.

Dear

My name is Karen Lombardi and I am an Honours student at Edith Cowan University (ECU). I am undertaking a project which aims to explore the nutritional knowledge, attitudes and behaviours of parents. This project hopes to inform the development of online nutritional resources aimed at parents, and to align itself with the Australian Curriculum, as well as with the Nutrition Curriculum resources being developed for use in schools by the Child Health Promotion Research Centre at ECU.

I would like to invite the parents of children in Grades 4, 5 or 6 to complete a short online survey. I have attached an item which could be placed in your newsletter, and contains a web link which will take parents directly to the survey. This survey will be open until 2 September, 2013 so if it could appear in your newsletter until this date, it would be greatly appreciated.

This research has been approved by ECU Human Research Ethics Committee (Reference number 9276), and by the Education Department of WA (see attached).

Should you wish to discuss this matter further, please do not hesitate to call on [redacted] or email kllombar@our.ecu.edu.au

Thank you very much for your help.
Karen Lombardi

Edith Cowan University
Appendix E: Flyers for newsletters

Would you like to contribute to nutrition research?
Parents of Year 4, 5 and 6 students are invited to take part in a short online survey on nutrition knowledge, attitudes and behaviours. This survey is the first step in the development of nutrition resources for parents, and your response will help to make sure that these resources are relevant and useful. The survey will take around 20 minutes to complete, and all responses will remain strictly confidential.
You can also register your interest to take part in a short telephone interview, should you wish to do so. To take part in the survey, go to http://www.chprc.ecu.edu.au and click on the link to the Nutrition survey for parents with children in Year 4, 5 and 6 under news and events.
Edith Cowan University Ethics Committee and the Western Australian Department of Education have approved the survey. Before deciding to participate in this research you should inform yourself of its appropriateness and suitability for you. Should you have any questions, please call Karen Lombardi on [redacted] or email to kllombar@our.ecu.edu.au.

Thanks for your help.
Karen Lombardi,
Edith Cowan University.
Appendix F: News item from CHPRC website

Participants needed for research into family nutrition

Parents of children in years 4-6 required for nutrition survey.

Health Science Honours student Karen Lombardi from the School of Exercise and Health Sciences is currently recruiting participants for her study exploring the confidence parents feel to provide a healthy diet for their families.

In an environment with increasing access to fast food, convenience foods and pressures from media aimed at children, providing a healthy diet can be a difficult exercise. Parents heavily influence the eating habits and behaviour patterns of their children, and as such, have the capacity to change the food choices of their families. With this in mind, it is recognised that to improve the diets of children, parents must have access to accurate nutrition information, positive attitudes towards nutrition and the confidence to put knowledge into practice.

This study aims to explore how parents’ knowledge and attitudes about nutrition relate to their nutrition confidence and behaviours. It also asks where parents currently get their nutrition information, and how this might be improved. It is being undertaken in the hope that it will lead to the development of nutrition education resources for parents, which align with the Nutrition Curriculum resources for teachers currently being developed by the Child Health Promotion Research Centre at Edith Cowan University.

To participate:

Parents and carers of children in Years 4, 5 or 6 who currently attend Western Australian schools are asked to take part in this study, by completing an online survey which will take approximately 20 minutes. Participants can also indicate if they would like to participate in a telephone interview, which will take around 10 minutes.

To take part in this survey, please visit the Nutrition survey for parents web page.

This research has been approved by the Edith Cowan University Human Research Ethics Committee, as well as from each of the relevant education sectors.

If you would like any further information about this study, please contact Karen Lombardi at klombar@our.ecu.edu.au
Appendix G: Consent letter as it appeared in the online survey.

The following appeared as question 1 in the online survey:
My name is Karen Lombardi and I am conducting a research project that aims to explore the confidence parents have in their ability to make healthy food choices for their children, as well as kinds of nutrition information used by parents, and how this information can be improved. The project is being conducted as part of an Honours degree in Health Science I am undertaking at ECU. This study will gather the information required to develop nutrition education materials for parents, which will be aligned to the school curriculum, and help to make sure these materials are relevant and useful.

This research would like to talk to parents of children in years 4, 5 and 6. Your school is one of fifteen schools in Western Australia approached to take part.

You are invited to participate in an online survey which will take approximately 20 minutes, and will be asked if you would like to be interviewed over the phone for approximately 10 minutes. Interviews will be audio-recorded, for use only by the research team.

Participating in this research project is entirely voluntary. This decision should always be made completely freely. All decisions made will be respected by members of the research team without question.

There will be no consequences relating to any decision you make regarding participation. These decisions will not affect your relationship with your child’s teacher, the school or the research team.

Information that identifies anyone will be removed from the data collected. This data will only be used for research purposes. The data is then stored securely at ECU and can only be accessed with the use of a password, by the research team. The data will be stored for a minimum period of 5 years, after which it will be destroyed. This will be achieved by following ECU’s protocol regarding the destruction of research data.

Participant privacy and the confidentiality of information disclosed by participants, is assured at all times. This survey is completely anonymous, and as such the researcher is unable to identify participants in order to withdraw their responses. Incomplete surveys will not be included in the final analysis of the survey data.

It is intended that the findings of this study will be used in the writing of a report to be marked by ECU, with the information being available to read by staff and students. The Department of Education, Western Australia, will also receive a copy of findings, as will all participating schools. A summary of the
research findings will also be made available upon completion of the project. You can access this by contacting me via email (kllombar@our.ecu.edu.au) and requesting results, and may expect it to become available in November, 2013.

The research has been approved by ECU Human Research Ethics Committee and has met the policy requirements of the Department of Education.

If you would like to discuss any aspect of this study with a member of the research team, please contact me at kllombar@our.ecu.edu.au or phone [redacted]

If you wish to speak with an independent person about how the project is being conducted or was conducted, please contact ECU Ethics Research Officer contact Kim Gifkins on 6304 2170 or research.ethics@ecu.edu.au

The following appeared as question 2 in the online survey:

If you consent to participate in this survey, please click "Yes"

If you do not consent to participate in this survey, please click "No"
### Appendix H: Table of survey questions arranged according to variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Question number</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>6</td>
<td>Please rate how confident you are that your child:</td>
</tr>
<tr>
<td></td>
<td>6.1</td>
<td>• Eats at least 5 servings of grain (i.e., bread, cereals, rice, pasta) every day?</td>
</tr>
<tr>
<td></td>
<td>6.2</td>
<td>• Eats whole grains for at least half of their total grain servings each day? (i.e., porridge, wholemeal bread or pasta)</td>
</tr>
<tr>
<td></td>
<td>6.3</td>
<td>• Eats only unsweetened cereals?</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>How confident are you that your child:</td>
</tr>
<tr>
<td></td>
<td>7.1</td>
<td>• Eats at least 5 serves of vegetables every day?</td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>• Eats a variety of vegetables (i.e., green, yellow, orange or red)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>How confident are you that your child:</td>
</tr>
<tr>
<td></td>
<td>8.1</td>
<td>• Eats 2 servings of whole fruit or 100% fruit juice every day?</td>
</tr>
<tr>
<td></td>
<td>8.2</td>
<td>• Drinks only 100% fruit juice?</td>
</tr>
<tr>
<td></td>
<td>8.3</td>
<td>• Drinks only 1 small glass (125ml) of fruit juice per day?</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>How confident are you that your child:</td>
</tr>
<tr>
<td></td>
<td>9.1</td>
<td>• Drinks at least 2 servings of milk, soy milk or other (250mls) or an equivalent of dairy products?</td>
</tr>
<tr>
<td></td>
<td>9.2</td>
<td>• Eats dairy products which are fat free (skim) or low fat (Hilo)?</td>
</tr>
<tr>
<td></td>
<td>9.3</td>
<td>• Drinks mostly water or fat free milk, and not fruit juice, soft drink or sports drinks?</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>How confident are you that:</td>
</tr>
<tr>
<td></td>
<td>10.1</td>
<td>• There are limited unhealthy snacks (i.e., lollies, biscuits, cakes, chips) in your home for snacks or meals?</td>
</tr>
<tr>
<td></td>
<td>10.2</td>
<td>• Your child chooses healthy meals at a fast food restaurant?</td>
</tr>
<tr>
<td></td>
<td>10.3</td>
<td>• Your child chooses healthy foods when eating with friends?</td>
</tr>
<tr>
<td></td>
<td>10.4</td>
<td>• Your child chooses healthy foods at the school canteen?</td>
</tr>
<tr>
<td></td>
<td>10.5</td>
<td>• Your child drinks very few drinks with added sugar? (i.e., soft drinks, juice)</td>
</tr>
<tr>
<td></td>
<td>10.6</td>
<td>• Your child eats foods with low sodium (salt) content or added sodium?</td>
</tr>
<tr>
<td></td>
<td>10.7</td>
<td>• Your child eats very few solid fats and foods that contain these? (i.e., butter, margarine, shortening, lard)</td>
</tr>
<tr>
<td></td>
<td>10.8</td>
<td>• Your child eats low fat meats or poultry (chicken, duck or turkey)?</td>
</tr>
</tbody>
</table>
Knowledge

12.1 According to the Australian Dietary Guidelines, one cup of tinned fruit provides how many servings from the "fruit" group:
- 0 serves
- 1 serves
- 2 serves
- 3 serves
- I don’t know

12.2 According to the Australian Dietary Guidelines, one cup of pasta provides how many servings from the "grains" group?
- 0 serves
- 1 serves
- 2 serves
- 3 serves
- I don’t know

13 How many servings of fruit a day do you think experts are advising school aged children to eat?
- 1 serve
- 2 serves
- 3 serves
- 4 serves
- 5 serves
- 6 serves

14 How many servings of vegetables a day do you think experts are advising school aged children to eat?
- 1 serve
- 2 serves
- 3 serves
- 4 serves
- 5 serves
- 6 serves

15 Which of the following kinds of dairy foods do experts say school aged children should eat? (please pick one)
- full fat
- lower fat
- mixture of full fat and lower fat
- neither, dairy foods should be cut out
- not sure

16 Do you think these are high or low in added sugar? (Choose one option per food – high, low, not sure)
16.1 bananas
16.2 flavoured yoghurt
16.3 ice cream
16.4 orange cordial
16.5 • tomato sauce
16.6 • muesli bars
16.7 • lemonade
16.8 • chocolate spread

17 Do you think these foods are high or low in fat? (Choose one option per food – high, low, not sure)
17.1 • instant noodles
17.2 • baked beans
17.3 • cold meats such as ham or salami
17.4 • eggs
17.5 • nuts
17.6 • bread
17.7 • cheese
17.8 • polyunsaturated margarine
17.9 • bananas
17.10 • peanut butter

18 Do you think these foods are high or low in salt? (Choose one option per food – high, low, not sure)
18.1 • sausages
18.2 • instant noodles
18.3 • red meat
18.4 • frozen vegetables
18.5 • cheese
18.6 • peanut butter
18.7 • bread

19 Do you think these foods are high or low in protein? (Choose one option per food – high, low, not sure)
19.1 • chicken
19.2 • cheese
19.3 • fruit
19.4 • baked beans
19.5 • yoghurt
19.6 • sausages
19.7 • spaghetti

20 Do you think these foods are high or low in fibre? (Choose one option per food – high, low, not sure)
20.1 • cornflakes
20.2 • apples
20.3 • eggs
20.4 • red meat
20.5 • broccoli
20.6 • nuts
20.7 • fish
20.8 • baked potatoes
20.9 • chicken
20.10 • baked beans
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Do you think these fatty foods are high or low in saturated fat? (Choose one option per food - high, low, not sure)</td>
</tr>
<tr>
<td>21.1</td>
<td>salmon</td>
</tr>
<tr>
<td>21.2</td>
<td>whole milk</td>
</tr>
<tr>
<td>21.3</td>
<td>olive oil</td>
</tr>
<tr>
<td>21.4</td>
<td>red meat</td>
</tr>
<tr>
<td>21.5</td>
<td>margarine</td>
</tr>
<tr>
<td>21.6</td>
<td>chocolate</td>
</tr>
<tr>
<td>23</td>
<td>Which would be the best choice for a low fat, high fibre snack for children? (choose one)</td>
</tr>
<tr>
<td></td>
<td>strawberry yoghurt</td>
</tr>
<tr>
<td></td>
<td>an orange</td>
</tr>
<tr>
<td></td>
<td>muesli bar</td>
</tr>
<tr>
<td></td>
<td>wholemeal crackers and cheese</td>
</tr>
<tr>
<td>24</td>
<td>Which would be the best choice for a low fat, high fibre light meal for children? (choose one)</td>
</tr>
<tr>
<td></td>
<td>ham and pineapple pizza</td>
</tr>
<tr>
<td></td>
<td>cheese on wholemeal toast</td>
</tr>
<tr>
<td></td>
<td>baked beans on wholemeal toast</td>
</tr>
<tr>
<td></td>
<td>quiche</td>
</tr>
<tr>
<td>25</td>
<td>If a child felt like something sweet, but you were trying to cut down on sugar in their diet, which would be the best choice? (choose one)</td>
</tr>
<tr>
<td></td>
<td>honey on toast</td>
</tr>
<tr>
<td></td>
<td>a cereal snack bar</td>
</tr>
<tr>
<td></td>
<td>a plain sweet biscuit</td>
</tr>
<tr>
<td></td>
<td>banana with plain yoghurt</td>
</tr>
<tr>
<td>26</td>
<td>Which of these would be the healthiest dessert for a child? (choose one)</td>
</tr>
<tr>
<td></td>
<td>baked apple</td>
</tr>
<tr>
<td></td>
<td>strawberry yoghurt</td>
</tr>
<tr>
<td></td>
<td>wholemeal crackers and cheddar cheese</td>
</tr>
<tr>
<td></td>
<td>carrot cake with cream cheese topping</td>
</tr>
<tr>
<td>Bchoice</td>
<td>When making food choices for your family, how often do you :</td>
</tr>
<tr>
<td>29.1</td>
<td>limit foods high in salt</td>
</tr>
<tr>
<td>29.2</td>
<td>limit butter, hard margarine lard and shortening</td>
</tr>
<tr>
<td>29.3</td>
<td>choose a diet with plenty of fruit and vegetables</td>
</tr>
<tr>
<td>29.4</td>
<td>limit food high in sugar</td>
</tr>
<tr>
<td>29.5</td>
<td>choose wholegrain products( e.g., wholemeal bread)</td>
</tr>
<tr>
<td>29.6</td>
<td>eat a variety of foods from each of the five food groups daily</td>
</tr>
<tr>
<td>29.7</td>
<td>choose foods low in saturated fat</td>
</tr>
</tbody>
</table>
choose brightly coloured (dark green and orange) vegetables
choose foods low in trans fats
consume sources of unsaturated fat each day (e.g., canola oil, olive oil, flax seed oil)
drink at least 2 cups of milk or fortified milk alternative every day

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Bpurchase</th>
<th>30</th>
<th>When purchasing foods, which of the following help you to make a decision:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.1</td>
<td></td>
<td></td>
<td>the ingredient list</td>
</tr>
<tr>
<td>30.2</td>
<td></td>
<td></td>
<td>the nutrition facts label</td>
</tr>
<tr>
<td>30.3</td>
<td></td>
<td></td>
<td>nutrition content claims (such as ‘low fat” or “good source of fibre”)</td>
</tr>
<tr>
<td>30.4</td>
<td></td>
<td></td>
<td>health claims (statements on the food label that describe the health benefits of the food or nutrients in the food)</td>
</tr>
<tr>
<td>30.5</td>
<td></td>
<td></td>
<td>the serving size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>Attbanks</th>
<th>28</th>
<th>Please read the following statements and indicate to what extent you agree or disagree with this statement: (strongly agree, agree, neither agree nor disagree, disagree, strongly agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.1</td>
<td></td>
<td></td>
<td>A healthy body weight can be achieved through diet and exercise</td>
</tr>
<tr>
<td>28.2</td>
<td></td>
<td></td>
<td>Recommendations on healthy ways to eat change so often, it's hard to know what to believe</td>
</tr>
<tr>
<td>28.3</td>
<td></td>
<td></td>
<td>What you eat can make a big difference to your chances of being healthy</td>
</tr>
<tr>
<td>28.4</td>
<td></td>
<td></td>
<td>The things my family eat now are healthy, so there is no reason to make a change to our diet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attimport</th>
<th>4</th>
<th>How important is your family’s nutrition to you?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Extremely Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Somewhat Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neither Important nor Unimportant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Somewhat Unimportant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very Unimportant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not at all Important</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Atinterest</th>
<th>5</th>
<th>How interested are you in nutrition?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Extremely interested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very interested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not very interested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extremely disinterested</td>
</tr>
</tbody>
</table>
### Health Literacy

**32** If you ate one serving of this product, how much saturated fat would you be consuming?
- 12.1g
- 17.4g
- 7.8g
- 27.8g
- Unsure

**33** Looking at the Nutrition Information Panel above, if you ate the entire serving of this product, how many kilojoules would you consume?
- 2180kJ
- 980kJ
- 100g
- 45g
- Unsure

**34** Looking at the ingredients on the Nutrition Information Panel, the ingredient which makes up the biggest proportion of this product is....
- Chocolate
- Carbohydrate
- Sugar
- Fat
- Unsure

### Resources

**35** What resources do you usually use to update your nutrition knowledge? (please choose as many as apply)
- Internet sites
- Government materials
- Health associations
- Popular health magazines
- Newspaper articles
- Books
- Nutrition textbooks
- Research journals
- Radio and/or television programs
- Family doctor
- Nurses
- Registered dietitian or public health nutritionist
- Other nutritionist
- Fitness trainers
- Family and/or friends
- Other health professionals
- Other ____________________
Appendix I: Online Survey
(Qualtrics, 2013)

Nutrition survey for parents with children in Yr 4, 5 & 6

Q1 My name is Karen Lombardi and I am conducting a research project that aims to explore the confidence parents have in their ability to make healthy food choices for their children, as well as kinds of nutrition information used by parents, and how this information can be improved.

The project is being conducted as part of an Honours degree in Health Science I am undertaking at ECU. This study will gather the information required developing nutrition education materials for parents, which will be aligned to the school curriculum, and help to make sure these materials are relevant and useful. This research would like to talk to parents of children in years 4, 5 and 6. Your school is one of 56 schools in Western Australia approached to take part.

You are invited to participate in an online survey which will take approximately 20 minutes, and will be asked if you would like to be interviewed over the phone for approximately 10 minutes. Interviews will be audio-recorded, for use only by the research team. Participating in this research project is entirely voluntary. This decision should always be made completely freely. All decisions made will be respected by members of the research team without question. There will be no consequences relating to any decision you make regarding participation. These decisions will not affect your relationship with your child’s teacher, the school or the research team. Information that identifies anyone will be removed from the data collected. This data will only be used for research purposes. The data is then stored securely at ECU and can only be accessed with the use of a password, by the research team. The data will be stored for a minimum period of 5 years, after which it will be destroyed. This will be achieved by following ECU’s protocol regarding the destruction of research data. Participant privacy and the confidentiality of information disclosed by participants, is assured at all times.

It is intended that the findings of this study will be used in the writing of a report to be marked by ECU, with the information being available to read by staff and students. The Department of Education, Western Australia, will also receive a copy of findings, as will all participating schools. A summary of the research findings will also be made available upon completion of the project. You can access this by contacting me via email (kllombar@our.ecu.edu.au) and requesting results, and may expect it to become available in November, 2013.

The research has been approved by ECU Human Research Ethics Committee and has met the policy requirements of the Department of Education. If you would like to discuss any aspect of this study with a member of the research team, please contact me at kllombar@our.ecu.edu.au or phone 0423 774 349. If you wish to speak with an independent person about how the project is being conducted or was conducted, please contact ECU Ethics Research Officer contact Kim Gifkins on 6304 2170 or research.ethics@ecu.edu.au
Q2. To move forward through the survey, please click on the arrows at the bottom of each page. If you consent to participate in this survey, please click “yes”.

If you do not consent to participate in this survey, please click “no”.

☐ Yes (1)
☐ No (2)
Q3. The following questions ask your attitudes towards nutrition for your family.

Q4. How important is your family’s nutrition to you?

- Extremely Important (1)
- Very Important (2)
- Somewhat Important (3)
- Neither Important nor Unimportant (4)
- Somewhat Unimportant (5)
- Very Unimportant (6)
- Not at all Important (7)

Q5. How interested are you in nutrition?

- Extremely interested (1)
- Very interested (2)
- Interested (3)
- Not very interested (4)
- Extremely disinterested (5)
Q6. The following picture shows the size of a serve of grains according to Australian Dietary Guidelines:

![Image of grain serves]

Please rate how confident you are that your child:

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all confident (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>Totally confident (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eats at least 5 servings of grain (i.e., bread, cereals, rice, pasta) every day? (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Eats whole grains for at least half of their total grain servings each day? (i.e., porridge, wholemeal bread or pasta) (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Eats only unsweetened cereals? (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q7. The following picture shows the size of a serve of vegetables according to Australian Dietary Guidelines:

How confident are you that your child:

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>Totally confident (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eats at least 5 serves of vegetables every day? (1)</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Eats a variety of vegetables (i.e., green, yellow, orange or red)? (2)</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q8. The following picture shows the size of a serve of fruit according to Australian Dietary Guidelines:

How confident are you that your child:

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>Totally confident (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eats 2 servings of whole fruit or 100% fruit juice every day? (1)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Drinks only 100% fruit juice? (2)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Drinks only 1 small glass (125ml) of fruit juice per day? (3)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
</tbody>
</table>
Q9. The following picture shows the size of a serve of dairy according to Australian Dietary Guidelines:

How confident are you that your child:

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>Totally confident (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinks at least 2 servings of milk, soy milk or other (250mls) or an equivalent of dairy products? (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Eats dairy products which are fat free (skim) or low fat (hilo)? (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Drinks mostly water or fat free milk, and not fruit juice, soft drink or sports drinks? (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q10. How confident are you that:

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>Totally confident (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are limited unhealthy snacks (i.e., lollies, biscuits, cakes, chips) in your home for snacks or meals? (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Your child chooses healthy meals at a fast food restaurant? (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Your child chooses healthy foods when eating with friends? (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Your child chooses healthy foods at the school canteen? (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Your child drinks very few drinks with added sugar? (i.e., Soft drinks, juice) (5)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

93
<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your child eats foods with low sodium (salt) content or added sodium?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your child eats very few solid fats and foods that contain these? (i.e.,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>butter, margarine, shortening, lard) (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your child eats low fat meats or poultry (chicken, duck or turkey)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q11. The following questions seek your opinion on expert advice relating to your children’s diet.

Q12. According to the Australian Dietary Guidelines:

<table>
<thead>
<tr>
<th></th>
<th>0 serves (1)</th>
<th>1 serve (2)</th>
<th>2 serves (3)</th>
<th>3 serves (4)</th>
<th>I don’t know (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One cup of tinned fruit</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>provides how many servings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from the &quot;fruit&quot; group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One cup of pasta provides</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>how many servings from the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;grains&quot; group? (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q13. How many servings of fruit a day do you think experts are advising school aged children to eat?

- 1 serve (1)
- 2 serves (2)
- 3 serves (3)
- 4 serves (4)
- 5 serves (5)
- 6 serves (6)
Q14. How many servings of vegetables a day do you think experts are advising school aged children to eat?

- 1 serve (1)
- 2 serves (2)
- 3 serves (3)
- 4 serves (4)
- 5 serves (5)
- 6 serves (6)

Q15. Which of the following kinds of dairy foods do experts say school aged children should eat? (Please pick one)

- full fat (1)
- lower fat (2)
- mixture of full fat and lower fat (3)
- neither, dairy foods should be cut out (4)
- not sure (5)
Q16. Do you think these are high or low in added sugar? (Choose one option per food)

<table>
<thead>
<tr>
<th>Food</th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bananas (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>flavoured yoghurt (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ice cream (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>orange cordial (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tomato sauce (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>muesli bars (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lemonade (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chocolate spread (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q17. Do you think these foods are high or low in fat? (Choose one option per food)

<table>
<thead>
<tr>
<th>Food</th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>instant noodles (1)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>baked beans (2)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cold meats such as ham or salami (3)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eggs (4)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nuts (5)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bread (6)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cheese (7)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>polyunsaturated margarine (8)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bananas (9)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>peanut butter (10)</td>
<td>o</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q18. Do you think these foods are high or low in salt? (Choose one option per food)

<table>
<thead>
<tr>
<th></th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>sausages (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>instant noodles (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>red meat (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>frozen vegetables (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cheese (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>peanut butter (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bread (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q19. Do you think these foods are high or low in protein? (Choose one option per food)

<table>
<thead>
<tr>
<th></th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>chicken (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cheese (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fruit (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>baked beans (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yoghurt (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sausages (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>spaghetti (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q20. Do you think these foods are high or low in fibre? (Choose one option per food)

<table>
<thead>
<tr>
<th>Food</th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cornflakes (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>apples (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eggs (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>red meat (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>broccoli (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nuts (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fish (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>baked potatoes (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chicken (9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>baked beans (10)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q21. Do you think these fatty foods are high or low in saturated fat? (Choose one option per food)

<table>
<thead>
<tr>
<th>Food</th>
<th>High (1)</th>
<th>Low (2)</th>
<th>Not sure (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>salmon (1)</td>
<td></td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>whole milk (2)</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>olive oil (3)</td>
<td></td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>red meat (4)</td>
<td></td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>margarine (5)</td>
<td></td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>chocolate (6)</td>
<td></td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q22. The next few items are about choosing foods for your children. Please answer what is being asked and not whether your children like or dislike the foods!

Q23. Which would be the best choice for a low fat, high fibre snack for children? (Choose one)

- ☐ strawberry yoghurt (1)
- ☐ an orange (2)
- ☐ muesli bar (3)
- ☐ wholemeal crackers and cheese (4)

Q24. Which would be the best choice for a low fat, high fibre light meal for children? (Choose one)

- ☐ ham and pineapple pizza (1)
- ☐ cheese on wholemeal toast (2)
- ☐ baked beans on wholemeal toast (3)
- ☐ quiche (4)
Q25. If a child felt like something sweet, but you were trying to cut down on sugar in their diet, which would be the best choice? (Choose one)

- honey on toast (1)
- a cereal snack bar (2)
- a plain sweet biscuit (3)
- banana with plain yoghurt (4)

Q26. Which of these would be the healthiest dessert for a child? (Choose one)

- baked apple (1)
- strawberry yoghurt (2)
- wholemeal crackers and cheddar cheese (3)
- carrot cake with cream cheese topping (4)
Q27. How confident do you feel estimating serving sizes of foods that your children eat?

- Very confident (1)
- Somewhat confident (2)
- Confident (3)
- Not confident (4)
- Not at all confident (5)

Q28. Please read the following statements and indicate to what extent you agree or disagree with this statement:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Neither Agree nor Disagree (3)</th>
<th>Agree (4)</th>
<th>Strongly Agree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A healthy body weight can be achieved through diet and exercise (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendations on healthy ways to eat change so often, it’s hard to know what to believe (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What you eat can make a big difference to your chances of being healthy (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The things my family eat now are healthy, so there is no reason to make a change to our diet (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q29. When making food choices for your family, how often do you:

<table>
<thead>
<tr>
<th></th>
<th>Always (24)</th>
<th>Most of the Time (2)</th>
<th>Sometimes (25)</th>
<th>Rarely (28)</th>
<th>Never (29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit foods high in salt (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit butter, hard margarine, lard and shortening (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose a diet with plenty of fruit and vegetables (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit food high in sugar (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose whole grain products (e.g., wholemeal bread) (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat a variety of foods from each of the food groups daily (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose foods low in saturated fat (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose brightly coloured (dark green and orange) vegetables each day (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose foods low in trans fat (9)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Consume sources of unsaturated fat each day (e.g., canola oil, olive oil, flax seed oil) (10)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drink at least two cups of milk or fortified milk alternative every day (11)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Q30. When purchasing foods, which of the following help you to make a decision:

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Most of the Time (4)</th>
<th>Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ingredient list (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Nutrition facts label (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition content claims (such as &quot;low fat&quot; or &quot;good source of fibre&quot;) (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health claims (statements on the food label that describe the health benefits of the food or nutrients in the food) (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The serving size (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q31. The next 3 questions refer to the Nutrition Information Panel from a chocolate bar which is shown here.

Q32. If you ate one serving of this product, how much saturated fat would you be consuming?

- 12.1g (1)
- 17.4g (2)
- 7.8g (3)
- 27.8g (4)
- Unsure (5)

Q33. Looking at the Nutrition Information Panel above, if you ate the entire serving of this product, how many kilojoules would you consume?

- 2180kJ (1)
- 980kJ (2)
- 100g (3)
- 45g (4)
- Unsure (5)

Q34. Looking at the ingredients on the Nutrition Information Panel, the ingredient which makes up the biggest proportion of this product is....

- Chocolate (1)
- Carbohydrate (2)
- Sugar (3)
- Fat (4)
- Unsure (5)
Q35. What resources do you usually use to update your nutrition knowledge? (Please choose as many as apply)

- Internet sites (1)
- Government materials (2)
- Health associations (3)
- Popular health magazines (4)
- Newspaper articles (5)
- Books (6)
- Nutrition textbooks (7)
- Research journals (8)
- Radio and/or television programs (9)
- Family doctor (10)
- Nurses (11)
- Registered dietitian or public health nutritionist (12)
- Other nutritionist (13)
- Fitness trainers (14)
- Family and/or friends (15)
- Other health professionals (16)
- Other (17) ____________________

Q36. Finally, we would like to know a little bit more about you.

Q37. Which of the following age ranges best describes your current age

- 25-30 (1)
- 31-35 (2)
- 36-40 (3)
- 41-45 (4)
- 46 to 55 (5)
- 56-65 (6)
- over 65 (7)

Q38. Are you male or female?

- Male (1)
- Female (2)
Q39. For all of your children, who are currently at school, please indicate what year level they are currently in.

- Kindergarten (1)
- Pre-primary (2)
- Year 1 (3)
- Year 2 (4)
- Year 3 (5)
- Year 4 (6)
- Year 5 (7)
- Year 6 (8)
- Year 7 (9)
- High School (10)

Q40. What is your relationship to these children?

- Mother (1)
- Father (2)
- Step-father (3)
- Grandparent (4)
- Carer/Guardian (5)
- Step-mother (8)

Q41. What is the highest level of education you have completed?

- High school (1)
- Finished year 12 (2)
- Trade qualification (3)
- TAFE (4)
- University degree (5)
- Not applicable (6)

Q42. How often do you purchase food for your family?

- Always, I am the main shopper (1)
- Most of the time (2)
- Some of the time (3)
- Rarely or never (4)
Q43. How often do you prepare food for your family?

☐ Always, I am the main food preparer (1)
☐ Most of the time (2)
☐ Some of the time (3)
☐ Rarely or never (4)

Q44. Finally, please indicate whether you would be interested in participating in a short interview over the phone. This interview will take around 10 minutes of your time, and will ask questions about where you currently get nutrition information, and what kinds of nutrition information would be helpful, for you and your family.

Q45. Please indicate if you would be interested in participating in a short telephone interview, at a time convenient to you.

☐ Yes I would be interested (1)
☐ No I would not be interested (2)

If “No I would not be interested” is selected, then skip to end of survey

Q46. Thank you. Please type your first name and the most convenient phone number for you to be contacted in the box below:


Q47. Please indicate which day/days are the most convenient for you to be contacted. (Choose as many as apply)

☐ Monday (1)
☐ Tuesday (2)
☐ Wednesday (3)
☐ Thursday (4)
☐ Friday (5)
☐ Saturday (6)
☐ Sunday (7)
Q48. Please indicate the times most suitable for you to be telephoned. (Choose as many as apply).

- Between 9 and 11am (1)
- 11am until 1pm (2)
- 1pm until 3pm (3)
- 3pm until 5 pm (4)
- 5pm until 7 pm (5)
- 7pm until 9pm (6)

Q49. Should you have any details you would like to add in relation to the telephone interview, please do so here.
Appendix J: Qualitative interview schedule

1. How confident are you that you have enough nutrition knowledge to make good food choices for your family?

2. Sometimes parents find it difficult to make good food choices every day. What are some of the challenges you face?

3. How do you think these difficulties could be overcome?

4. What are some of the things you think make it easier to make good food choices for your family?

5. Do you think there are ways that parents share these tips? Does it happen already?

6. In what ways do you try to keep up to date about nutrition?

7. Where do you currently get your nutrition information?

8. Children will be taught some new content in schools relating to nutrition. If nutrition information related to what children are being taught was available to parents, do you think parents would use it?

9. If you could access nutrition information with content related to that being taught in schools, what format would you like it to be in? For example, would you prefer printed materials like brochures, presentations and activities at the school or online materials through a website?