Nutrition and Health:
Exploring New Zealand Children’s Knowledge and Beliefs

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Abstract

**Background:** Improving the health of children within a population benefits individuals, families and communities. A key component of health is a good diet. Nutrition education offers an opportunity to provide children with the skills and knowledge required to make healthy food choices. In the interest of developing effective nutrition education programmes, it is important for educators to understand what children know and believe about health and nutrition. In New Zealand, previous research has explored children’s views about health; however, very few studies have investigated children’s understanding of food’s effect on health.

**Objective:** The aim of this project was to explore what New Zealand children know, understand and believe about health and food’s influence on health.

**Design:** This qualitative, cross-sectional study used semi-structured focus groups to explore the knowledge and beliefs of children between the ages of nine and eleven, in co-educational and state-operated schools in West and South Auckland. Focus groups were audio recorded and children completed forms detailing their demographic information. Audio recordings were transcribed and uploaded into NVivo 12, which was used to conduct a semi-deductive thematic analysis.

**Results:** A total of 74 children from six schools in West and South Auckland participated in the study. Just over half of the participants were female (52.7%) and most identified as New Zealand European/ Other (40%) or New Zealand Māori (27%). Five main themes relating to children’s beliefs about food’s influence on health were revealed: energy, sleep, illness, growth and brain health. Healthy eating and physical activity were thought to be the most important habits for good
health and children primarily understood health to mean physical wellbeing. The importance of a ‘balanced diet’ was frequently discussed, which children interpreted as the consumption of both ‘healthy’ and processed foods in moderation. The predominant area of confusion for children was around the theme of energy and whether ‘healthy’ or processed food provided the most energy. Children were often able to identify sources of micronutrients, particularly vitamin C, vitamin D, calcium and iron. Furthermore, children were occasionally able to explain the role that these micronutrients play in health.

**Conclusions:** This study offered an introductory insight into New Zealand children’s views about health and nutrition, which future researchers can build upon to generate results that are reflective of children’s views throughout New Zealand. This study, in conjunction with subsequent studies, will provide nutrition educators with an insight into children’s beliefs, knowledge and gaps in knowledge, which will help to inform and improve future nutrition education programmes.
Preface

This research project was undertaken by two Masters of Dietetics (MDiet) students under the joint supervision of Dr. Sheila Skeaff and Prof. Murray Skeaff from the Department of Human Nutrition at the University of Otago. Our curiosity regarding children’s nutrition beliefs and our desire for child-centric nutrition education provided an incentive for this research.

The candidate together with the other MDiet student and supervisors were responsible for:

- Designing the study including: recruitment methodology, focus group question design, focus group methodology and data collection methodology;
- Completing the University of Otago Ethics Application, including information forms (parents and participants), consent forms (parents and participants) and a letter to principals;
- Designing the demographic questionnaire;
- School \((n=6)\) and participant \((n=74)\) recruitment;
- Distributing and collecting demographic questionnaires and consent forms;
- Facilitating and recording of focus groups \((n=11)\);
- Transcribing focus group audio recordings;

The candidate was additionally responsible for:

- Coding and analysing data;
- Writing up all thesis components;

This research was conducted from September 2017 until June 2018.
Acknowledgements

Firstly, a special thanks to Amy. This really was a team project and I could not have asked for a better teammate. Thank you for always being so kind and optimistic. To my superb supervisors, Sheila and Murray, thank you for giving me the trust and freedom I needed to make this thesis my own. Your support, humour and wisdom has been invaluable.

A big thank you to all of the school staff and children who volunteered their time to make this research possible. To Lisette Burrows, thank you for meeting with us and sharing your wealth of knowledge about nutrition education and children’s health beliefs. Your research has taught me so much and has helped to shape this research project.

To my parents, thank you for loving and supporting me during this project and throughout my life. Mum you are the best cheerleader in the world. Dad, any resilience or gumption I had during this project came from you.

Priyal, thank you for being my home-away-from-home. Louis, our adventurous escapes and meaningful chats have kept me sane. To my wonderful aunt, thank you for all the support and proof-reading. To my dietetic allies, thank you for the little support community we built in that office. To the Friday night dinner crew, thank you for all of the fun this semester. And last but not least to Ollie, thank you for enduring the distance and for never failing to make me laugh.
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1. Introduction

Investing in child health is of great importance in New Zealand and globally (1,2). Advancements in child health improve economic and social outcomes, as well as benefiting individual wellbeing (3,4). Currently the high rates of childhood obesity are a particular concern, with Ministry of Health initiatives largely focused on childhood obesity prevention (5). An essential part of investing in child health and obesity prevention involves promoting good nutrition (6–8).

In addition, improving child nutrition can result in improvements in growth, oral health, mood, mental health, academic performance and long-term health (9–14).

Education, particularly nutrition education, is essential in order to empower children to make healthy food choices (15,16). Nutrition education can improve food and health literacy and promote beneficial behaviour changes in children, which may also be passed on to parents and other family members (17,18). Furthermore, these healthy behaviours are likely to continue on into adulthood (19). While it is accepted that increasing nutrition knowledge supports behaviour change, some research suggests that beliefs about food are even more important (20). Researchers believe this is due to the fact that when a person’s beliefs and behaviours do not align, there is a strong temptation to alter a belief or behaviour in order to avoid cognitive dissonance (20).

Therefore, in order to develop nutrition education programs that target beliefs as well as knowledge, it is important that children’s current beliefs, motivations and gaps in nutrition knowledge are understood.

At present, very little research has investigated New Zealand children’s beliefs or knowledge about the role of nutrition in improving and maintaining good health (21,22). There is evidence
that children are aware of the link between diet, exercise and weight (23). This is unsurprising, considering that some adults use ‘scare tactics’ to emphasise the negative consequences of obesity, in order to encourage children to adopt a nutritious diet (24). Currently, it is unclear whether children are aware of the other ways that food can influence health. It is important that children understand the causes and consequences of obesity. Nonetheless, emphasising the positive outcomes associated with eating a balanced diet, rather than reinforcing ‘obesity’ as a negative consequence may improve children’s relationship with food (25). If children are motivated to adopt a healthy lifestyle for reasons other than weight loss, behaviour change may seem more appealing and more achievable (25).

The aim of this project is to gather qualitative data using exploratory focus groups to discern what primary school children know and believe about health and how nutrition influences health. The findings from this study will be used in the development of evidence-based nutrition education programs and resources in schools and communities. This will help children to improve their nutrition knowledge and reinforce the numerous positive benefits associated with a balanced diet.
2. Literature review

The aim of this narrative literature review is to discuss the existing research on New Zealand children’s health and nutrition beliefs. Furthermore, this review intends to explore the state of nutrition education in New Zealand, the factors influencing children’s nutrition beliefs and the impact that these views have on society. Finally the use of qualitative research for determining children’s beliefs will be discussed. A literature search was conducted between September 2017 and June 2018. Relevant literature was sourced using the Scopus, Medline and Google Scholar databases. The following keywords were used to search for literature: child, children, adolescent, belief, knowledge, understanding, nutrition, food, health, nutrition education, New Zealand, thematic analysis. Additionally, literature was located using the reference lists of published articles and Google was used to search for relevant grey literature.

2.1 Health

2.1.1 Defining health

Since its establishment, the World Health Organisation has defined health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (26). At the time, this definition was groundbreaking, as it rejected the idea that health is simply the absence of disease (27). However, since then the World Health Organisation definition has received criticism, particularly because ‘complete well-being’ is neither achievable nor measurable. Another objection is that it categorises people with chronic diseases and disabilities as irrevocably ill (27). New Zealand Māori society takes a different approach, outlining four ‘cornerstones’ of health (hauora): te taha wairua (spiritual), te taha hinengaro (psychic), te taha tinana (physical) and te taha whanau (family) (28). An equal priority is placed on each of these
cornerstones’ and when these elements are at equilibrium, optimal health is believed to be achieved (29). This view of health removes any stigma associated with disease and acknowledges that an individual’s environment and beliefs are important to consider when assessing health (29).

2.1.2 How do New Zealand children define health?

To date, research exploring children’s beliefs about health has been undertaken by academics in physical education and psychology (21,30–33). In 1998, the National Education Monitoring Project (NEMP) used a mixed method approach to examine the health knowledge of 2,880 New Zealand children between the ages of eight and thirteen (30,34). Physical health was found to be the primary concern for children between the ages of eight and thirteen. Weight and physical appearance were often believed to signify whether someone was healthy, particularly in older children. Occasionally, children demonstrated a more holistic view of health, advocating for a ‘healthy mind’, ‘being loving and kind’ and ‘being around friends’ (31). Reportedly, Māori children prioritised caring for others more than non-Māori children and were less likely to mention physical appearance or weight as indicators of health. This was believed to reflect the community-centric philosophy of Māori society; however more research is needed to support this claim (31). Physical activity and healthy eating were almost always mentioned as being health promoting behaviours (30). Staying hydrated and maintaining good hygiene were also discussed, along with seeking medical care and avoiding illness (31).

Subsequently, the NEMP investigated the health knowledge of an additional 2,868 children between the ages of eight and thirteen in 2002 (21). Yet again, children primarily focused on ‘physical health’ and the predominant determinants of health were believed to be food, fluids, hygiene and physical activity. Children also recommended avoiding drugs, alcohol, cigarettes and
sun damage for health, which was believed to be related to public health interventions targeting children at the time (21). Mental and emotional health were rarely mentioned and when they were, children usually referred to individual behaviours (‘do some push ups to make you happy’) rather than recommending community engagement. At the time, researchers involved in this study were concerned that health messages directed towards children propagated the ideology that health can be achieved by simple, individually-focused behaviour changes (21).

A 2007 study surveyed 795 children in New Zealand secondary and primary schools, further exploring their beliefs about health (32). Once more, healthy eating and physical activity were thought to be the most important determinants of health. An individual’s size and shape was stated as the most obvious predictor of health, with children cautioning against being overweight or underweight. However, unlike observations made in the NEMP, some secondary school students rejected an individualistic view of health and acknowledged the complexities underlying weight loss or gain (21,30,32,35).

Finally, in an article published in 2018, psychologists used explorative interviews to investigate the health beliefs of nine New Zealand children between the ages of six and seven (33). Despite the younger age of the participants, the findings were similar to those observed in previous studies (21,30,32). Yet again, children exhibited an individualistic view of health. Food and physical activity were often believed to be key influencers of health and physical appearance was thought to the most obvious indicator of an individual’s health. However, there was a disparity between what children perceived to be a healthy physique; some stated that being thin was healthy, while others favoured being ‘big and strong’ (33).
In summary, studies have consistently shown that New Zealand children have a deeply held belief that diet and physical activity influence health. Hygiene, hydration and avoidance of drugs and alcohol were mentioned as influencing health, however this was less common. Generally health was described in a physical sense, although occasionally children discussed mental, emotional and social aspects of health. This research demonstrates that New Zealand children’s view of health has been individualistic and superficial, an observation which has also been noted in other Western countries (36).

2.2 Nutrition and health

2.2.1 Children’s understanding of nutrition and health

Although numerous studies have explored New Zealand children’s health beliefs and knowledge (21,30–33), very few studies have investigated children’s knowledge of nutrition and how it relates to health. In the 2002 NEMP, children appeared to understand that food was necessary for vitamins and minerals – namely vitamin C, calcium and iron (21). Not only could children identify sources of particular vitamins, but they understood why these vitamins were important. Children could also identify which foods were ‘healthy’ or ‘unhealthy’, and discussed the importance of a ‘balanced diet’ (21). In contrast, a later study observed that New Zealand children reported having difficulty determining whether some foods were healthy or unhealthy (33). This may be due to the age difference between participants in the first and second study (8-13 years and 6-7 years, respectively).

In 2009, one qualitative study conducted focus groups to investigate how the media influences the nutrition beliefs of 90 New Zealand children between the ages of ten and twelve (22). Interestingly, children often thought that ‘healthy eaters’ lacked energy and strength. Children
also believed that healthy eating negatively influenced an individual’s popularity and social life. Conversely, ‘unhealthy eaters’ were considered unattractive and vulnerable to bullying. Additionally, children were confident that the consumption of processed food leads to early death, chronic diseases and poor mental health. This is an indication that children associate dietary choices with social, emotional, mental and physical health (22). Overall, the research exploring New Zealand children’s views on nutrition and health is limited and outdated, with the most recent study being published a decade ago (22). Further investigation would be useful to gain a more comprehensive understanding of children’s beliefs, knowledge and gaps in knowledge.

2.2.2 Implications of children’s beliefs about nutrition and health

Although it is important to encourage children to take care of their own health, previous research has highlighted that it can be problematic to view health as an entirely individualistic responsibility. Firstly, it assumes that children have agency over their health behaviours, which is not always the case (37). Secondly, it can lead people to prioritise appearing healthy over being healthy, as physical signs of poor health may be viewed as a ‘failure’ (38). An example of this is children’s perception that obesity is a sign of laziness (23, 39). This stigma can encourage individuals to be hyperaware of their body compared to societal standards and this may diminish the pleasure of eating (40). Additionally, when the appearance of health is prioritised, unhealthy weight loss practices such as smoking or disordered eating may seem more appealing (38). Puhl et al. describe stigma as a ‘known enemy’ of public health and state that the degree of personal responsibility associated with a health condition is related to the stigma that an individual faces (41). Not only is obesity stigma likely to encourage unhealthy methods of weight loss, but it may lead to decreased self-esteem as well as compromised mental, emotional and physical health (41). This research emphasises the power that beliefs have on health and highlights the need for
nutrition education programmes to foster children’s positive relationship with food and physical appearance.

2.2.3 Factors influencing children’s nutrition beliefs and behaviours

There are numerous factors that are known to influence children’s food behaviours (Figure 2.1) (42). While fewer studies have investigated the factors that influence children’s nutrition beliefs, three key influencing factors have been discussed: parents, the media and schools. The nutrition knowledge and behaviours influence the beliefs and behaviours of children from an early age (43–45). Parental income may also affect children’s food consumption (46). This is not surprising, considering that parents educate, act as role models and usually determine the food that children have access to (47). On the other hand, improving the nutrition knowledge of children has been shown to influence parental dietary choices and behaviours (18,48). Consequently, improving child nutrition education may also benefit families (18,48).

Food marketing continues to influence children’s food beliefs, preferences and behaviours despite the fact that New Zealand children are highly aware of the tactics of food advertisers (22,49,50). This is concerning, since the majority of foods advertised to New Zealand children are energy dense and lacking in nutrients (51,52). Often the messages in food advertisements contradict health promotion campaigns, which confuses children and leads them to question the credibility of health promoters (22). Parents have also acknowledged the influence of food advertising on children and can find it difficult to deny children’s requests for advertised foods (48). Currently, public health researchers in New Zealand and around the world are urging governments to improve food advertising regulations, as the current restrictions are ineffective (52). As long as the media has a vested commercial interest in promoting processed foods, the
individualistic view of health is flawed because it ignores the influence that food advertisers have on people’s behaviours (53). Therefore, societal, governmental and educational assistance is necessary to counteract the harmful messages advertised in the media.

**Figure 2.1:** Factors influencing food behaviours

<table>
<thead>
<tr>
<th>Environmental factors</th>
<th>Physical: food availability</th>
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<tbody>
<tr>
<td></td>
<td>Social: Influences, cultural practices, policy</td>
</tr>
<tr>
<td></td>
<td>Economic: Resources, price, time</td>
</tr>
<tr>
<td></td>
<td>Informational: Advertising, education, media</td>
</tr>
<tr>
<td>Intra-personal factors</td>
<td>Perceptions and attitudes</td>
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<td></td>
<td>Beliefs and values</td>
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<tr>
<td></td>
<td>Knowledge and skills</td>
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<tr>
<td></td>
<td>Social and cultural norms</td>
</tr>
<tr>
<td>Preferential factors</td>
<td>Associative conditioning: experience with food</td>
</tr>
<tr>
<td></td>
<td>Physiological conditioning: Familiarity, conditioned food preference, conditioned satiety</td>
</tr>
<tr>
<td></td>
<td>Social conditioning: Models, rewards</td>
</tr>
<tr>
<td>Biological factors</td>
<td>Taste and pleasure</td>
</tr>
<tr>
<td></td>
<td>Hunger and satiety mechanisms</td>
</tr>
<tr>
<td></td>
<td>Sensory specific satiety</td>
</tr>
<tr>
<td></td>
<td>Brain mechanisms</td>
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Schools also influence children’s food behaviours and beliefs in variety of ways. Firstly, research has suggested that children’s peers influence their food preferences and behaviours, particularly as children grow older (48,54). Children often prefer to eat similar food to their peers and peer

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1 Adapted from Contento (42)
pressure can jeopardise children’s desire to consume ‘healthy’ foods (54,55). Secondly, food environments in and around schools often promote and sell energy dense, processed foods, which may negatively affect children’s ability or desire to make ‘healthy’ food choices (56–58). Lastly, schools have the ability to educate children about health and nutrition, which can influence their nutrition knowledge and beliefs (59).

2.3 Health and nutrition education

There is little doubt that education and health are linked, and three broad theories that describe their relationship have been promulgated (60,61). Firstly, poor health may negatively affect the education that a child receives. Secondly, there may be factors that influence both health and education, such as socio-economic status. The last hypothesis, which supports the provision of health and nutrition education, is the theory that education improves health (61).

2.3.1 The evolution of health education in New Zealand

At the beginning of the 20th century, an emphasis was already being placed on health education in New Zealand schools, with the interest of raising healthy civilians in a time of war (62,63). Health was primarily viewed as the absence of disease and health education focused on the importance of posture, hygiene, nutrition and ventilation. Following social and cultural changes that occurred in the late 1950s, ‘healthism’ became a popular way of approaching health (62,63). ‘Healthism’ is the preoccupation with personal wellbeing, which is believed to be achieved through lifestyle changes (35). This belief consequently characterises health as an issue of individual responsibility and blames individual behaviours and attitudes (rather than societal issues) for the majority of health problems (35,64). This trend influenced health education programmes and an emphasis was placed on the promotion of individual health behaviours like
physical activity and healthy eating (62). The 1999 New Zealand health education curriculum marked the move away from ‘healthism’ and towards a more holistic view of health, aligning with the Māori concept of ‘hauora’ (28,31,62). The impact that socio-cultural and economic factors have on health was highlighted in the curriculum and adapting environments to be more supportive of the population’s health was prioritised (63). However, the tendency to place an emphasis on individual health remains; for example when daily physical activity is ‘prescribed’ to children in physical education classes. Currently, there is a call for health education to move away from this individualistic approach and instead describe health as a societal responsibility (62).

2.3.2 Defining nutrition education
Nutrition education has been described as ‘any educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviours conducive to health and well-being’ (42). While this definition leaves the implementation of nutrition education programmes open to interpretation, studies have highlighted the need for programmes to go beyond simply distributing information (42,65). Contento advocates for the perceptions, beliefs, social expectations and food preferences of students to be taken into account (42). Meanwhile, Pérez-Rodrigo takes a more practical approach, urging programmes to develop skills and behaviours related to cultural aspects of food, cooking and the improvement of self-esteem and body image (65).

The transition away from knowledge-based nutrition education programmes and towards behaviour-based programmes reportedly began in the 1980s (66). This arose from the realisation that simply knowing something is ‘necessary but not supportive’ of behaviour change (66–68). A
The 1994 review of nutrition education literature simply describes it as focusing on ‘knowing how’ instead of ‘knowing why’. For example, showing children how to read food labels or how to prepare a balanced meal instead of teaching children why nutrition is important (66). In academic terms, these two types of knowledge are defined as declarative knowledge (facts and information) and procedural knowledge (performing and operating) (67). Worsley states that nutrition education programmes should improve children’s declarative and procedural nutrition knowledge in order to promote behaviour change (67).

Programmes should also consider children’s beliefs. In 2016, a review observed that while children’s declarative nutrition knowledge was not associated with food intake, children’s beliefs and concerns about food did have an influence on their nutrition choices (69). Beliefs also determine the information or knowledge that individual’s are willing to accept, and are therefore likely to influence the effectiveness of nutrition education programmes (67). Consequently, determining children’s knowledge and beliefs will be useful for developing effective nutrition education programmes.

### 2.3.3 Current nutrition education programmes in New Zealand

At present, there are many nutrition education programmes in New Zealand, within individual communities and nation-wide. One particularly well known programme is the ‘5+ a day’ initiative, which has been present since the early 1990s (70). This promotion encourages the population to consume at least five servings of fruit and vegetables each day, and recommends that individuals use their hand in order to determine a serving size. Research by Burrows et al. and Ashfield-Watt suggests that this programme is well understood by children and influences their understanding of nutrition (21,70). The Heart Foundation also provides a range of
community-based programmes. For example, the ‘Food for Thought’ programme involves education from a nutritionist, a shared lunch and a supermarket visit in order to learn how to read nutrition labels (71). In providing both theoretical and practical education, it is hoped that this programme will improve children’s declarative and procedural nutrition knowledge.

Additionally, the Life Education Trust has delivered nutrition education to schools across New Zealand for the past three decades (72). Life Education discusses a range of topics, including nutrition label reading, food as an energy source and the importance of consuming a variety of foods (73). Individual schools and communities have also implemented nutrition programmes. For example, one primary school in Taranaki has a ‘brainfood break’ every morning, where children consume fruits and vegetables in order to help them learn (74). These programmes and other programmes throughout New Zealand are anticipated to influence children’s current nutrition beliefs and knowledge. Exploring children’s beliefs and understanding will help nutrition education programmes to more effectively fill the gaps in children’s nutrition knowledge.

2.4 Methodological literature

Qualitative research is often a suitable research method when a research topic is not well understood or when investigating people’s beliefs (75). Individual interviews and focus groups are recommended methods for qualitative data collection and are often used to explore children’s beliefs about health and nutrition (24,30,76–78). Focus groups can be particularly useful since interactions between participants can provide further insight on the collective viewpoints of children (79,80). A technique often used to analyse focus group discussions is thematic analysis (81).
2.4.1 Thematic analysis

Thematic analysis was initially used as a method of qualitative data analysis in the 1970s (82). Braun et al. broadly describe thematic analysis as a ‘method for identifying, analysing and reporting patterns (themes) within data’ (81). Ultimately, thematic analysis should identify the most salient ideas within a data set. Braun et al. identify several different types of thematic analysis that fall under this definition (81). Firstly, thematic analysis can be deductive or inductive. Deductive thematic analysis is when researchers have a preconceived hypothesis or interest which determines the direction of the analysis (81). Deductive analysis provides an in-depth description of one aspect of the data and is useful if previous research on a topic already exists. In contrast, inductive analysis is driven by the raw data rather than the researcher and thus provides a richer description of the data overall. Inductive analysis is often used in cases where there has been no previous research on a topic (81,83). However, Fereday et al. advocate for the use of a ‘hybrid approach’ or a combination of inductive and deductive analysis (84). This approach is likely to be useful in cases when the previous research exploring a topic has been limited. Secondly, the themes developed during thematic analysis can be ‘semantic’ or ‘latent’. Semantic themes are descriptive and are developed from ideas that have been explicitly discussed by participants. Alternatively, latent themes are ‘interpretive’ and go beyond a participant’s discussion to explore the underlying ideas (81). Due to the interpretive nature of a latent approach, the analysis is likely to focus on a specific area of interest within the data. Meanwhile, a semantic approach is likely to provide a less complex overview of the entire data set. The steps involved in thematic analysis have been summarised in Table 2.1. While these steps provide guidance, Braun et al. emphasise that researchers should adapt these steps to fit the data (81). Furthermore,
Thematic analysis is described as a ‘recursive’ process and it is therefore recommended that these steps should not necessarily be followed linearly.

Qualitative researchers have cautioned analysts to be wary of common errors made when conducting thematic analysis. Braun et al. emphasise the importance of actually ‘analysing’ data, rather than simply paraphrasing data extracts (81). An example of this is the use of interview questions as themes, instead of allowing the data to guide thematic development. Additionally, during thematic analysis researchers may feel obligated to validate their results by quantifying the number of times that a theme was mentioned. However, Pyett argues that quantifying findings defeats the purpose of qualitative research (85). They state that a belief shared by a small study population is not necessarily representative of a wider population, and conversely an insight from a single participant may be salient. Ultimately, Pyett believes ‘it is the quality of the insight that is important, rather than the number of respondents who share it’ (85). Overall, thematic analysis is a flexible and effective method for analysing data in qualitative research. It is relatively easy to learn and the findings can be used by the general population. Finally, it can highlight similarities and differences across a data set and can be used to develop unanticipated insights (81).
### Table 2.1: The stages of thematic analysis

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becoming familiar with the data</td>
<td>Transcribing data, reading data and recording initial ideas.</td>
</tr>
<tr>
<td>Generating codes</td>
<td>Systematically coding salient features of data throughout the entire data set and collating data relevant to each code.</td>
</tr>
<tr>
<td>Exploring potential themes</td>
<td>Collating codes into possible themes and congregating all the data relevant to each theme.</td>
</tr>
<tr>
<td>Developing themes</td>
<td>Determining whether themes work in relation to the coded extracts and to the entire data set. Generating a thematic map of the analysis.</td>
</tr>
<tr>
<td>Defining themes</td>
<td>Continuous analysis to refine the specifics of each theme, before generating clear definitions and names of each theme.</td>
</tr>
<tr>
<td>Reporting of analysis</td>
<td>Selection of salient extract examples, final analysis of extracts and production of report on analysis.</td>
</tr>
</tbody>
</table>

Adapted from ‘Using thematic analysis in psychology’ by Braun et al. (81)

#### 2.5 Relevance to current research study

Nutrition education provides an opportunity to counteract the harmful health messages that children are exposed to by the media or within their community. Currently, there are many nutrition education programmes targeted at New Zealand children, although if children’s nutrition knowledge and beliefs are not understood, the effectiveness of these programmes is difficult to determine. While existing research offers an insight into New Zealand children’s views about health, the research investigating children’s beliefs about food’s influence on health is limited and outdated. Using focus groups and thematic analysis, this study will explore children’s current beliefs and knowledge of health and how food influences health.
3. Objective statement

Although there are many health and nutrition education programmes in New Zealand, there is little evidence to indicate whether these programmes are effectively targeting the gaps in children’s health and nutrition knowledge. While previous studies have investigated children’s views on health, the literature exploring New Zealand children’s understanding of food’s effect on health is limited. This study seeks to offer an insight into New Zealand children’s beliefs about food’s influence on health and contribute to the body of research investigating children’s views about health. Consequently, this study aims to:

1. Conduct exploratory focus groups to:
   i. Further investigate children’s understanding of health and ‘being healthy’;
   ii. Explore children’s beliefs about how food influences health.

2. Use thematic analysis to identify salient themes throughout discussions in order to summarise New Zealand children’s collective beliefs about food and health.
4. Subjects and methods

4.1 Study design

This was a cross-sectional qualitative study of Year six children living in West and South Auckland. In March of 2018, exploratory focus groups were conducted in primary schools to investigate children’s beliefs and knowledge about food’s influence on health. The focus groups were semi-structured and three main questions were used to elicit discussion. This project was approved by the University of Otago Human Ethics committee (Ref# 17/180) and written or verbal consent was obtained from parents and participants (Appendix A-D).

4.2 Recruitment

The study was undertaken in West and South Auckland primary schools. The initial aim was to recruit eight schools overall (four in West and four in South Auckland). In each school, researchers intended to conduct two focus groups, with four to eight participants in each group. In total, the aim was to recruit 60 participants. If more than 60 children were recruited before eight schools agreed to participate, school recruitment would cease. The sample size target ($n=60$) was based on the limited time and resources available for recruitment, the focus group size limit and school availability. Additionally, it is estimated that holding between three and six focus groups reveals 90% of themes related to a topic, so it may have been unproductive or excessive to recruit more schools or participants (86). The focus group size limit was based on literature (80,87), which suggests that groups with four to eight participants is an appropriate size for exploratory research.
4.2.1 Recruitment of schools

Children were recruited through schools, as recruiting children in an educational setting is said to be less complicated than other environments, due to the assistance of school staff (88). In addition, recruiting through schools allows children from a variety of backgrounds to participate. Schools were selected from the 2018 Education Counts School Directory (89). To be included in the selection process, schools had to be co-educational and state-operated. State-integrated or special schools (single-sex or specialised methods of teaching) were excluded. Selected schools were also situated in the Henderson-Massey, Whau, Waitākere, Manurewa, Papakura and Franklin local board areas for logistical reasons (90). The Education Counts School Directory was used to ensure that schools from a variety of deciles and regions were recruited (89). During the recruitment process, researchers contacted ten high decile schools (eight to ten), seven medium decile schools (five to seven) and 17 low decile schools (one to four). Principals or administrative staff from contacted schools received an email during February and March of 2018. These emails contained a letter describing the study and outlined everything required of the school (Appendix E). If school staff replied, their queries were answered and they had the opportunity to meet with researchers to discuss the project. Schools that agreed to participate were provided with information packs to distribute to Year six children. These were either printed out and delivered to school offices to distribute, or schools chose to print and hand the forms out themselves.

4.2.2 Recruitment of children

A convenience sampling method was used to recruit children to participate in the study (91). In each participating school, at least 60 Year six children were provided with an information pack. These packs contained information and consent forms for parents/guardians and participants.
(Appendix C, D, F, G). Children who were in Year 6 (nine to eleven years) and returned signed parental and participant consent forms to their teachers were recruited to participate in the study during February and March of 2018. If more than 16 children returned consent forms, 16 forms were randomly selected and the children whose names were on those selected forms were asked to participate in one of the two focus group discussions held at their school.

4.3 Focus group questions

The focus group questions were developed based on previous literature (23,92,93) and the pre-testing of potential questions on two children and ten adults, to ensure that they were easily understood. Approximately 20 questions were drafted and considered. From these, three primary questions were selected. These were:

1. ‘What is health?’
2. ‘What could you do to be healthy?’
3. ‘Is food important for health? Why or why not?’

These questions were selected because they were open and allowed children to lead the conversation. They were ordered as such to determine whether children immediately associated food with health and healthy behaviours. The following question could then ascertain what children believed about nutrition’s influence on health.

Altering focus group questions is recommended in two scenarios (94). Firstly, if the questions are difficult for participants to comprehend; for example if participant’s are silent or their response fails to answer the question. The second scenario is in cases of ‘saturation’, when questions are not revealing any new ideas (94). Consequently, when focus groups commenced some minor changes were made to the questions, in order to improve comprehension and encourage divergent
thinking. This included changing the first question to ‘what is health or what is being healthy?’ and occasionally including additional questions after the main questions were asked, in cases where participants were quiet or the main questions were not understood. These additional questions were:

1. ‘What is being unhealthy?’
2. ‘What would happen if you didn’t eat food?’
3. ‘Why is food important for people like you?’

4.4 Data collection

Focus groups were conducted in March of 2018. The researchers chose to conduct focus groups rather than individual interviews as the aim of the study was to explore the collective beliefs of children, rather than individual beliefs (76). One to two focus groups were held in each school and four to eight children were present in each group. Therefore, a total of eight to sixteen children from each school participated in the study. Discussions were facilitated by a MDiet student, with another MDiet student present to operate audio recording equipment. The researcher in charge of audio recording also took notes during the focus group. One MDiet student facilitated West Auckland focus groups, while another facilitated South Auckland focus groups. Both MDiet students were female, had experience with facilitating and transcribing focus groups and had undergone a Vulnerable Children Safety vetting check in 2017. During one focus group a school principal was present during the focus group; however in every other group only the researchers and the participants were present. Focus groups took place during school hours in common rooms, empty class rooms, school meeting rooms or staff rooms.
Initially, participants were greeted and asked to complete a demographic questionnaire (Appendix H). During this time, a MDiet student inspected the consent forms to ensure that everyone had permission to participate in discussions. Consent to begin audio recording was also verbally acquired. Two audio recorders (Phillips Voice Tracer Digital Recorder 3000) were subsequently placed on a nearby table and recording commenced. Prior to school visits, audio recorders were checked to ensure that they were operational. At the beginning of discussions, the facilitator was introduced as being a scientist investigating children’s beliefs about health. The facilitator’s nutrition background was not mentioned during the focus group discussions; however this information was available on parent information and consent forms for ethical reasons.

To begin, the facilitator outlined a list of ‘ground rules’ to ensure that focus groups were supportive, constructive and manageable. The focus groups were semi-structured, with scripted questions to guide the discussion and unscripted follow-up questions to confirm statements or encourage in-depth thought. The facilitator was present to ask questions, ensure that the conversation remained relevant, encourage further contemplation and to create a comfortable environment for participants. Focus group discussions lasted between 15 and 45 minutes. Throughout the discussions, children were provided with food (fruit and a savoury snack). When focus groups came to an end, participants received a certificate and a gift bag containing toys and stationery. An overview of the focus group plan and script can be found in Appendix G.

4.5 Demographic collection and analysis

The demographic data collected during focus groups was uploaded into an spreadsheet after each focus group. This included the participants’ names, anonymous ID numbers, ages, dates of birth, genders and ethnicities. This spreadsheet was stored on password-protected computers and only
researchers and supervisors were able to access the spreadsheet, in order to protect participant confidentiality (as per ethical agreement). Demographic questionnaires and consent forms were stored in the research supervisor’s office, which was kept locked.

Each participant’s age was compared to their reported date of birth, to ensure that children had stated their actual age on the day of data collection. In cases where participants identified with multiple ethnicities, a prioritisation method was used to determine which ethnicity was recorded (95). The demographic data was then analysed using Microsoft Excel (version 16.12 for Mac) to determine the average age of participants and the number of participants who identified with each gender and ethnicity. The number of children from West and in South Auckland was also determined.

### 4.6 Transcription

During March and April of 2018, the audio recordings of focus groups were transcribed using Word for Mac (version 16.2). Audio recordings, transcriptions and focus group notes were stored on password protected computers and participants were only identified in transcriptions by an anonymous ID number. Once transcribed, transcriptions were compared to the audio recordings to ensure that they were accurate. One MDiet student transcribed the West Auckland focus groups and the other transcribed South Auckland groups. The students then transcribed one focus group that the other had transcribed. These were then compared to ensure that the transcriptions were consistent. While there were minor differences in grammar, there was no difference that would have an effect on thematic analysis. Transcriptions were not returned to participants for comment due to logistical challenges and time constraints.
4.7 Thematic analysis

A semi-deductive thematic analytic approach was used to analyse transcriptions. By using this approach, researchers allowed for a combination of data and theory to determine the themes produced during thematic analysis (84). For example, while specific themes were not determined before thematic analysis, researchers established certain subjects that they wanted to explore. In particular, researchers did not want focus group discussions to concentrate on obesity or chronic disease, as previous literature indicated that children already associate food with these outcomes (22,33). Instead, outcomes of more immediate concern to children (such as learning and growth) were of interest. However, discussions were ultimately exploratory and researchers allowed for themes to be derived directly from focus group data. A semantic approach was used to develop themes, as the purpose of the research was to simply determine children’s current perspectives (81).

Following the transcription of audio recordings, transcription files were uploaded to NVivo 12.0.0 for Mac to begin thematic analysis (96). NVivo is a text-tagging software program, which codes and categorises data in order to help researchers uncover themes. The coding stage of the research was done by MDiet students individually and the findings were not compared; however, the most important overall themes were discussed. A word query determined the most commonly mentioned words throughout transcriptions, which indicated the common topics discussed during focus groups. Transcriptions were then read to identify potential themes. Subsequently, sections of transcriptions were coded and data from every transcription was collated, relevant to each code. The codes were then sorted into potential themes and these themes were reviewed and refined, to ensure that they represented the overall findings (81).
Later on, salient quotes relevant to each theme were added to a table. This provided an overview of children’s beliefs and knowledge about different themes, which allowed researchers to summarise the findings for each theme. Transcriptions were then studied again and compared to the summaries, to ensure that the results from thematic analysis were an accurate representation of the original data set. Participants were not able to provide feedback on the findings, due to logistical difficulties and time constraints. However, once the project has been completed, researchers intend to present each participating school with a poster detailing the overall findings of the study.

4.8 Reporting qualitative research

The COREQ (Consolidated criteria for Reporting Qualitative research) and SRQR (Standards for Reporting Qualitative Research) checklists were referred to, to ensure important aspects of the qualitative research were effectively reported (97,98).
5. Results

5.1 Characteristics of schools and focus groups

Of the 34 schools contacted by researchers, six agreed to participate in the study (three from West Auckland and three from South Auckland). The school recruitment methodology is outlined in Figure 5.1. Two of the participating schools were low decile (one to four), two were medium decile (five to seven) and two were high decile (eight to ten). Overall 11 focus groups were conducted and four to eight children were involved in each discussion. Both males and females were present in every group.

5.2 Characteristics of participants

A total of 75 children between the ages of nine to eleven years were recruited to participate in discussions. However, one child did not have parental consent and was therefore unable to take part. Consequently, 74 children participated in focus group discussions. Every participant was present for the entire duration of their assigned focus group. The demographic characteristics of study participants are presented in Table 5.1. Just over half (52.7 %) of the participants were female and most identified as New Zealand European/Other (40 %) or New Zealand Māori (27 %). Overall, 35 of the participants were from West Auckland and 39 were from South Auckland.
Figure 5.1: School recruitment methodology in West and South Auckland

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2 Number of schools that met the inclusion criteria.
Table 5.1: Demographic characteristics of participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>9.9 (0.28)(^1)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35 (47.3)</td>
</tr>
<tr>
<td>Female</td>
<td>39 (52.7)</td>
</tr>
<tr>
<td>School region</td>
<td></td>
</tr>
<tr>
<td>West Auckland</td>
<td>35 (47.3)</td>
</tr>
<tr>
<td>South Auckland</td>
<td>39 (52.7)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Māori</td>
<td>20 (27)</td>
</tr>
<tr>
<td>Pasifika(^2)</td>
<td>14 (19)</td>
</tr>
<tr>
<td>Asian(^3)</td>
<td>10 (14)</td>
</tr>
<tr>
<td>New Zealand European or Other(^4)</td>
<td>30 (40)</td>
</tr>
</tbody>
</table>

\(^1\) Mean (Standard Deviation). \(^2\) Samoan, Cook Island Māori, Tongan, Niuean. \(^3\) Chinese, Indian, Sri Lankan, Vietnamese, Filipino, Japanese, Malaysian, Thai. \(^4\) Pākehā, English, Croatian, Irish, Spanish, Australian, French, South African, Yemeni, Dutch, Iraqi, Lebanese, Maldivian.

5.3 Thematic analysis

Five main themes relating to children’s beliefs about food’s influence on health were identified during thematic analysis: energy, sleep, illness, growth and brain health. These themes are a reflection of the entire data set and were considered salient by the participants. Theme and subtheme titles were nominated by researchers to summarise data and are not necessarily representative of participant quotes. A map outlining major themes, sub-themes and theme interrelationships is displayed in Figure 5.2.
Figure 5.2: Themes, subthemes and thematic interrelationships

3 Bold rectangles outline major themes. Arrows indicate direction of relationship identified by children. Brackets outline aspects of food that were believed to influence themes.
5.3.1 Children’s understanding of health

In order to understand children’s views about food’s influence on health, it was important to understand how children defined health or being ‘healthy’. Primarily, children viewed health in terms of physical well-being. However, occasionally mental, emotional and social health were discussed.

‘I think family health is important, because if your parents fight all the time it can lead you to not being happy’

‘Exercising and eating healthy’ were overwhelmingly believed to be the most important habits for health. An emphasis was placed on the importance of having a balance of ‘healthy’ and processed food. Other healthy practices discussed included getting enough sleep, maintaining good hygiene, spending time outdoors, limiting screen time and avoiding alcohol and drugs.

5.3.2 Energy and feeling energetic

A prominent theme that emerged during discussions was the importance of having energy in order to be healthy. Food was considered necessary for feeling energetic, staying awake, concentrating and being physically active. Some children indicated that energy from food was important for maintaining an active social life, claiming that without food they would ‘be curled up in a ball and socially awkward’. Nutrition academics define energy as a component of food, which produces the chemical energy necessary for all life processes (99). Children understood that food provides energy, however they believed that having energy means feeling ‘energetic’ or ‘awake’ and therefore often concluded that sleep and physical activity also provide energy. Children understood the importance of balancing energy and believed that having too much energy was undesirable. However, their perceptions of the consequences of an energy overload
varied. Some children thought that it would result in energy levels crashing quickly, while others speculated that it would be difficult to expend.

‘Fruits and things, they give you energy. Less healthier foods give you a lot more... but it’s hard to burn off.’

There was no consensus regarding which foods provided the most energy. A number of participants believed that water, protein, fruit and vegetables were good energy sources, due to the fact that these foods are ‘healthy’ and will therefore promote wellbeing. In contrast, others thought that sugar, fizzy drinks, caffeine and salt provided the most energy. The value that children placed on having energy appeared to relate to the perceived ‘healthiness’ of the energy source. For example, when children identified ‘healthy foods’ as being good sources of energy, having energy was thought to result in positive outcomes such as being able to concentrate or be physically active. Alternatively, when processed food was referred to as a source of energy, often negative outcomes, such as hyperactivity were discussed.

5.3.3 Prevention and treatment of diseases, illness and starvation

Discussed at length throughout focus groups was the importance of food ‘so you don’t starve to death’. Children often viewed death as the most obvious consequence of a poor nutritional intake. In contrast, while chronic disease was mentioned, it was not a focus for children. Often when disease was mentioned, children referred the experiences of family members who have experienced chronic disease. Processed food and sugar consumption was generally associated with causing or worsening diseases such as heart disease, cancer and diabetes.

‘My grandpa can’t eat too much sugar because he’s got diabetes type 1. And he was addicted to candy before he got diabetes’.
Food was also believed to play a role in preventing and curing colds and flus. Children identified that preventing sickness was necessary in order to attend school and learn. One child stated that if nutritional intake was inadequate, ‘you could get sick because your body needs food to keep it running’. The vitamins in food were thought to be particularly necessary when recovering from illnesses.

‘Sometimes if you feel sick you just feel drowsy and just want to lie there but when you get a vitamin you feel better’

When vitamins were discussed, children recurrently referred to multivitamin tablets. Some children believed that it is ‘hard to get a lot of’ vitamins from food unless a large quantity of food was consumed. Consequently, they thought that it was easier to take a vitamin tablet. However others argued that you could get all the vitamins you need from food.

5.3.4 Growth of bones, muscles and body fat

Children considered growth, flexibility and strength to be a top priority for health and believed that having a balanced diet from an early age was essential for developing these qualities.

‘If you are a baby, you need all the right foods for vitamins and stuff, otherwise your muscles won’t develop well, your teeth won’t develop well, your bones won’t develop well.’

One child thought that your bones ‘would start breaking’ if you did not eat, while another believed that you would ‘grow smaller’. Protein and micronutrients such as calcium, iron and vitamin D, were understood to be necessary for bone health. Furthermore, children often had a confident understanding of where these nutrients are derived from. Dairy was cited as being a good source of calcium, while sunlight was mentioned as being necessary for vitamin D. One group of children also stated that meat and ‘red things’ were high in iron.
‘You need to eat cheese and drink milk for protein and calcium! It makes your bones grow stronger’

While protein was often a topic of conversation, children had diverse opinions regarding which foods are highest in protein. Dairy, vegetables, fruit, fish, meat, beans, water and protein shakes were all mentioned as being good protein sources, suggesting that children believed ‘healthy foods’ have more protein than processed foods. Children also thought that it was necessary to get protein from a variety of foods, stating that ‘food with different colours have different proteins’ and ‘carrots are just carrots so you only have one source of protein and the burger gives you lots’.

5.3.5 Sleep and food: an interconnected relationship

Getting enough sleep was identified as an important factor in health, particularly in order to feel energetic and grow. Children described three different relationships between food and sleep during focus group discussions. Firstly, children recognised that food consumption was necessary to avoid feeling tired. Secondly, some participants believed that food was important, particularly before bed, because food is not consumed again until the following day. One child anecdotally described their sleep being interrupted as a result of feeling hungry:

‘If I don’t have food before bed, while I’m sleeping I will wake up because I am that hungry and then I don’t have enough sleep’.

Thirdly, some children thought that certain foods may provide too much energy, which could lead to difficulties falling asleep. This outcome was generally associated with processed food.
5.3.6 Brain health and mood

Children acknowledged that food plays a role in improving their academic life. There was a widely held understanding that food ‘gives your brain nutrients in order to work’ and children recommended consuming ‘brain food’. Participants recognised that having food and water throughout the day was important to feel energised, which was necessary in order to concentrate and learn.

‘Whenever you eat food, it’s actually good for the brain to like listen, learn and solve problems’

Food was also thought to influence people’s mood. Children associated being hungry with feeling ‘cranky’ or ‘socially awkward’.

‘We need food otherwise we will get upset and we will be hungry and we will go moan at our mums or our dads or our pets’.

These statements suggest that children believe that food has an influence on mental and emotional health, as well as physical health. Children also placed a high importance on having fun and socialising with friends and family. One child placed an emphasis on building relationships with family members in order to create a network of social support for difficult circumstances in the future:

‘Getting along with your siblings [is important for health] because when you’re older you need to get along and if you don’t get along then you’ll be arch-enemies. Then, when you are older and you need help they won’t help you and you need to work together because then if one of you is in trouble then the other one can help you and if you’re in a situation and it’s too hard you might need help’
6. Discussion

At present, the research investigating children’s views about nutrition’s effect on health is limited and outdated (21,22,33). This study used focus groups to expand our understanding of New Zealand children’s beliefs and knowledge about health and food’s influence on health. Thematic analysis of focus group transcripts identified five key themes from the data: energy, sleep, illness, growth and brain health. Children’s understanding of health and ‘being healthy’ was also analysed. During focus group discussions, children usually described health in a physical sense and overwhelmingly the most important habits for health were believed to be physical activity and ‘healthy eating’.

6.1 Children’s understanding of health

In this present study, 74 children from West and South Auckland primary schools were involved in exploratory focus groups. When asked about health and ‘being healthy’, children usually described health as physical well-being. This reiterates observations reported in the literature, where children believed assessing an individual’s health was simply a matter of evaluating their physical appearance and body fat (30–33). Pugmire et al. remarked that children found the concept of being ‘fit and fat’ oxymoronic and were concerned that these views reinforced the stigmatisation of obesity (33). This current study also observed the presence of obesity stigma in focus group discussions, however children advocated for a healthy balance of body fat and believed that being ‘too skinny’ was also undesirable. The emphasis placed on ‘balance’ indicates that children in this study have a more advanced view of health and understand some of the complexities behind weight loss. Nutrition education programmes should further foster this critical thinking to promote ‘being healthy’ over ‘appearing healthy’ (38).
The participants involved in this study also strongly believed that exercise and ‘healthy eating’ were the greatest determinants of health. Yet again, this finding is consistent with previous research (21,30–33). This demonstrates that ‘healthism’ continues to influence children’s views of health, leading children to think that good health can be achieved by simple and individual behaviour changes (35). While ‘healthy eating’ was viewed as being important for health, study participants also emphasised the importance of balancing ‘healthy’ food with processed food. This further demonstrates that children are capable of critically thinking about health and nutrition.

6.2 Children’s understanding of food’s influence on health

In the present study, ‘energy’ was found to be a salient theme, with children declaring that ‘having energy’ and ‘feeling energetic’ was a priority for them. Burrows et al. also observed that energy was important to children, with children stating that energy made them ‘feel good’ and that feeling good was beneficial for health (31). While few studies have explored children’s understanding of energy, focus groups conducted in England by Fielden et al. revealed that children believed vegetables to be ‘energy makers’ (100). A child in another English study claimed that processed foods are advertised as being high in energy, but declared that in reality they were poor energy sources. Meanwhile, a child in a New Zealand study stated that foods such as cereals were ‘too high in energy’, and thought that it was important to consume energy-rich foods in moderation (21). This confusion regarding which foods are high in energy was consistent with the present study’s findings. Some participants believed ‘healthy’ foods were good energy sources, while others thought that processed foods provided the most energy. If energy is believed to be beneficial, nutrition information panels may lead individuals to view high calorie foods as ‘healthy’. Therefore, it is important that nutrition educators address this confusion.
Another theme developed during analysis was the role that food plays in illness. Participants understood that the consumption of processed foods is associated with chronic diseases such as diabetes or heart disease. This is consistent with previous research, which observed that New Zealand children associate processed food with obesity and chronic disease (22,33). The belief that processed food causes these health problems is further indication of the influence that ‘healthism’ has on children’s health and nutrition understanding (35). In the present study, children also claimed that vitamins are important for preventing and treating colds. This may relate to the widely-held belief that vitamin C prevents and reduces the symptoms of colds despite the lack of evidence supporting this (101). In 2009, Burrows et al. also observed that New Zealand children understood vitamins and minerals to be important for health, namely vitamin C, iron and calcium (21). Children in the present study, and in the study by Burrows et al., were able to identify food sources of several vitamins and were occasionally able to describe why particular vitamins were necessary for health (21). These observations suggest that New Zealand children are being educated about the importance of vitamins and minerals.

Participants understood growth to be important and acknowledged that nutrition was essential for bone health. Yet again, children believed that vitamins and minerals – in particular calcium and vitamin D – play an important role in promoting bone health. This may be related to the Fonterra Milk for Schools programme that has been promoting dairy and calcium for bone health since 2011 (102). However, the 2009 study by Burrows et al. also noted that children associated dairy and calcium with bone health (21). To the best of our knowledge, the current study is the first to observe that New Zealand children associate vitamin D with health and identify sunlight as a source of Vitamin D. This may be related to the increase in awareness of Vitamin D within scientific and medical research, which has received a great deal of media attention (103,104).
Additionally, participants in this study believed that being strong and developing muscles was important. In 2018, Pugmire et al. also observed that muscle development was a priority for children, particularly boys (33). In previous research, New Zealand children have rarely mentioned protein as being important for health, however children in the present study overwhelmingly believed protein to be important for muscle growth, which perhaps relates to ‘healthism’ and the growing health and fitness movement (35,105).

Children in this study understood nutrition and sleep to be interrelated in three ways. Some children thought that food was necessary to avoid fatigue, while others stated that certain foods were too high in energy and would cause sleeping difficulties. Additionally, some children believed it was important to consume food before sleeping, in order to prevent hunger from causing sleep disruptions. Following a thorough search of relevant literature, no other studies were found to have explored New Zealand children’s views on food’s influence on sleep. However, previous studies have indicated that children believe that sleep is important for health (21,31). Furthermore, Burrows et al. noticed that children between the ages of 12 and 13 described a causal relationship between sleep and health: sleep increases energy, having energy ‘feels good’ and feeling good is beneficial for health (31).

The final theme that arose from thematic analysis was brain health. Participants in the present study believed that food was important for learning and concentrating at school. Very few studies have observed New Zealand children associating food with learning (21,31). One child in a focus group conducted by Burrows et al. mentioned that iron was necessary for brain health. In another study of New Zealand children, having a ‘big, fat brain’ was thought to be healthy (21,31). An additional aspect of brain health discussed by children in the present study was the effect of food on their mood. One child stated that the influence of hunger on mood could negatively affect
relationships with family and friends, which in the long term may have an impact on social, mental and emotional health. This demonstrates that some children believe food has an influence on health that goes beyond physical well-being.

6.3 Strengths of the study

This study adds to the body of literature examining children’s understanding of health and is one of the first to explore New Zealand children’s understanding of food’s influence on health. The explorative nature of the focus groups provided researchers with a deep understanding of children’s views, which may have been missed by quantitative methods of data collection, such as surveys or questionnaires (76). This open-minded and adaptable inquiry was particularly necessary because the extent of New Zealand children’s nutrition beliefs was largely unknown. An additional strength of this study is that children from a range of ethnicities and socioeconomic backgrounds participated in the focus group discussions, allowing researchers to develop themes based on the collective views of children who had a diverse range of experiences and opinions. This study is also fundamentally child-centric. Firstly, the open-ended questions in focus groups allowed children to prioritise topics of conversation that they believed to be salient; secondly, the semantic themes developed during thematic analysis were derived directly from children’s discussions (81); finally, this study’s findings will allow nutrition educators to take a more ‘bottom-up’ approach to educating children, by allowing them to consider children’s knowledge and beliefs when developing nutrition education programmes.

6.4 Limitations of the study

The use of a convenience sampling method may have influenced the study population; for example, the schools and children who chose to participate in the study may be more interested in
nutrition than the general population. The relatively small sample size and limited geographical area of recruitment also reduced how generalisable the results are to New Zealand children. As with all focus groups, another limitation of the study is the risk of a few participants dominating the conversation while others withhold their opinion (106). This was observed in some of the larger focus groups, although facilitators endeavoured to encourage all children to participate. Additionally, while researchers attempted to keep the nature of the research vague, some children were informed by parents and teachers that the focus groups were being conducted by nutrition academics. This, along with the food provided during focus groups, may have unintentionally directed children’s discussions towards the subject of food, consequently leading researchers to overestimate children’s perceived importance of food for health. Finally, while potential themes were discussed with every researcher involved in the study, only one person conducted the thematic analysis. This was another limitation, as analysis failed to incorporate multiple perspectives (84).

6.5 Opportunities for future research and education

This research has highlighted uncharted strengths and weaknesses of children’s nutrition knowledge and has revealed areas that require further exploration. In the future, researchers could further examine the nutrition beliefs and knowledge of a larger sample of children throughout New Zealand, in order to increase the generalisability of the findings. Additionally, it would be informative to compare the nutrition beliefs of children from various regions, cultures and socioeconomic groups, in order to improve nutrition education programmes that target specific groups of children. As anticipated, the findings from this study can be used to improve the effectiveness of nutrition education programmes in New Zealand. The results indicate that educators should address the confusion around ‘energy’ and emphasise that health is complex and is not always remedied by prescriptive and individualistic measures. Furthermore, nutrition
educators may choose to concentrate on subjects that were not mentioned in focus group discussions, as children may not associate these topics with food or health.

6.6 Conclusion

This study explored New Zealand children’s knowledge and beliefs about health and food’s influence on health. The findings indicate that children often advocate for moderation and a balanced diet. Furthermore, the results suggest that children are capable of critically thinking about food’s effect on health. Children in this study believed that nutrition influenced mood, learning, concentration and sleep, beliefs that have not been observed in previous research. Study participants also displayed some confusion around the concept of ‘energy’ and often held views that appeared to be influenced by ‘healthism’ (35). Ultimately, this study offered an introductory insight into New Zealand children’s beliefs about food’s effect on health that future researchers can expand on to generate more generalisable results. This study, along with future research, will provide nutrition educators with an insight into New Zealand children’s nutrition beliefs, which will help to inform and improve future nutrition education programmes.
7. Application of research to dietetic practice

7.1 Relevance of research to dietetic practice

Dietitians work with individuals and communities to develop evidence-based strategies that promote health and well-being (1). Often, for public health and community-based dietitians this involves implementing nutrition education interventions that improve people’s food behaviours. In order for dietitians to develop effective and community-centric interventions, it is essential that people’s beliefs, knowledge and knowledge gaps are understood. Furthermore, understanding the views of the public may be useful for dietitians involved in developing nutrition-related policies.

The findings from this study provide dietitians with an insight into the health and nutrition knowledge of New Zealand children. Participants in this study showed an understanding of the importance of micronutrients and recognised the role that food plays in sleep, growth, mood and learning. These findings may act as a positive reinforcement for dietitians by indicating that the current public health interventions and education programmes targeting these areas are productive. However, it is important to note that further research is required to determine whether the results are reflective of the views of New Zealand children as a whole.

This research also indicates that there is confusion around the concept of ‘energy’ and that ‘healthism’ continues to influence children’s beliefs about health and nutrition, which may provide dietitians with an idea of the areas to focus on when creating interventions. This study provides dietitians with a preliminary understanding of children’s beliefs, which may be useful when developing programmes intended to improve children’s nutrition knowledge. Additionally, this study emphasises that dietitian’s should endeavour to understand a population’s existing
views before designing interventions, particularly if they wish to adopt a community-centric and ‘bottom-up’ approach that caters to the specific needs of a population.

7.2 Reflecting on this research experience

Before commencing this research project, I had limited experience with children; most of what I knew was from my own experience as a child. Reviewing the literature on qualitative research with children increased my confidence, however I was still unsure of what to expect. In the first focus group, the children were reserved, perhaps because they were shy or did not understand the questions. I quickly developed a plan to elicit discussions in future groups. The following focus group surprised me even more; the children were so enthusiastic that keeping the conversation ‘on topic’ was difficult. Consequently, I developed a plan to manage talkative groups.

Every subsequent group continued to surprise me and each challenge motivated me to develop a solution. This drastically improved my adaptability and I learned to alter discussions to meet the needs of individuals. I learned to communicate and phrase questions in a way that children could easily comprehend. This skill is likely to be useful, as dietitians often have to explain complex ideas to the general public – something that does not come naturally after being surrounded by academics for five years. As this project came to an end, I learned to ‘expect the unexpected’ and embrace the unknown, as challenge is the pathway to progress. Along with my new found experience in study design, participant recruitment, focus group facilitation, thematic analysis and literature reviewal, this study has improved my resilience and ability to solve problems, which will be valuable throughout my career as a dietitian and in other areas of my life.
8. References


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9. Appendices

9.1 Appendix A: University of Otago ethics application

[Application Form for ethical consideration of research and teaching proposals involving human participants]

UNIVERSITY OF OTAGO HUMAN ETHICS COMMITTEE APPLICATION FORM: CATEGORY A

Form updated: July 2016

1. University of Otago staff member responsible for project:
   Prof. Murray Skeaff

2. Department/School:
   Human Nutrition

3. Contact details of staff member responsible:
   Department of Human Nutrition
   University of Otago
   Science 2 Building, Rm 7c3

   Phone: 479 7688
   email: murray.skeaff@otago.ac.nz

4. Title of project:
   Nutrition and Health: what do Year 6 children know, understand, or believe? A pilot study.

5. Indicate project type and names of other investigators and students:

<table>
<thead>
<tr>
<th>Staff Co-investigators</th>
<th>1 Names:</th>
<th>Assoc Prof Sheila Skeaff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Researchers</td>
<td>2 Names:</td>
<td>Isabel Carlisle, MDiet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amy McLachlan, MDiet</td>
</tr>
<tr>
<td>Level of Study (PhD, Masters, Hons):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   External Researcher Names:  

   Institute/Company:  

   [Form fields for additional details]
6. Is this a repeated class teaching activity?
   NO

7. Fast-Track procedure
   Do you request fast-track consideration?
   NO
   If YES, provide a robust justification on the need for urgency:
   N/A

8. When will recruitment and data collection commence?
   Recruitment of schools will begin in November before the school year finishes, once ethical approval is granted. Data collection will commence in February 2018 once Term 1 begins in schools.

   What is the planned conclusion date of the study?
   June 30th 2018

9. Funding of project
   Is the project to be funded by an external grant?
   NO

10. Brief description in lay terms of the purpose of the project (approx. 75 words):
    There is a call for improvement in the nutrition education that children receive, particularly in primary schools. Currently there is limited information about New Zealand children’s knowledge and understanding of the health benefits that food can provide. In order to develop effective nutrition education programs, we need to explore what children believe about how food influences health.

11. Aim and description of project
    The aim of our study is to conduct focus groups to investigate what children know, understand and believe about how diet and food influences our health.
    Previous research\(^1\) has indicated that New Zealand children are aware of the link between food and weight, so this is not a focus of the questions. Researchers have investigated factors that influence children’s knowledge of nutrition and health, such as marketing, parental influence and schools. However, while we are aware of what influences children’s beliefs, we do not know New Zealand children believe.

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Application Form for ethical consideration of research and teaching proposals involving human participants

In the interest of developing successful nutrition education interventions for children, it is important for public health professionals to have an understanding of children what children believe. Therefore, the results of this study will be useful when implementing effective nutrition education programmes in primary schools, which target the knowledge gaps of this age group.

The methods, questions and observations from this pilot study may be used when assessing the knowledge and beliefs of children in future research projects. These projects may focus on particular regions or cultural groups in New Zealand.

12. **Researcher/instructor experience and qualifications in this research area**

Murray Skeaff has been a principal investigator on numerous regional and national surveys of the nutritional status of New Zealanders and has conducted community and clinical based research for more than 25 years.

Sheila Skeaff has been the principal investigator on numerous regional and national surveys of the nutritional status of school age children in New Zealand and has conducted research involving human participants for more than 20 years.

Isabel Carlisle and Amy McLachlan are currently enrolled in the Masters of Dietetics and the Diet and Health pilot will be part of their thesis work. The Masters of Dietetics is a postgraduate training programme in which student dietitians receive professional training to work with all ages of people in the community and in health care institutions. Both students have undergone the Vulnerable Children Act Safety Checks and have had experience facilitating focus groups.

13. **Participants**

13(a) **Population from which participants are drawn:**

The population we will be recruiting are Year 6 children from West and South Auckland public primary schools

13(b) **Inclusion and exclusion criteria:**

Inclusion criteria: Year 6 children attending participating co-ed schools in West and South Auckland who receive parental consent and wish to participate in the project.

Exclusion criteria: Students who are not nine to eleven years, those who do not receive parental consent and those attend a private or special school.
13(c) Estimated number of participants:
A minimum of 60 participants, approximately half from West and half from South Auckland. We believe this number will give us a good insight into the perspectives of children from a range of genders, ethnicities and socioeconomic backgrounds. We would not want to recruit much more than 100 participants, as it is a 6 month project and so there is limited time for facilitating focus groups and transcribing recordings.

13(d) Age range of participants:
The age range of students enrolled in Year 6, nine to eleven years.

13(e) Method of recruitment:
Schools, from a range of deciles (low 1-3, medium 4-7, and high 8-10) will be selected from West and South Auckland. Selected schools will be emailed and/or handed a letter (see Appendix) in person, inviting them to participate in the study. Schools may also be recruited through personal contacts that the researchers have within Auckland primary schools.

Eight schools will be recruited from those who consent (four in West and four in South Auckland). Consenting schools will be sent an information for participants form, information for parents or guardians form, consent forms for children, and consent forms for parents or guardians. Consenting schools will be asked to distribute the information sheets and consent forms to all Year 6 students, with a disclaimer that only 8-16 children are required to participate.

Children with completed participant and parent/guardian consent forms will be recruited into the study. The aim is to recruit eight students from each school. This number may be higher depending on participant interest in the study (we will accept up to 16 students per school). If more students volunteer, we will randomly recruit eight students from those who volunteer to participate in each focus group.

13(f) Specify and justify any payment or reward to be offered
Participants will be rewarded with a certificate and a gift pack for participating. Gift packs will contain things like stationery and stickers. Food will also be provided at focus groups. Parents and guardians will notify researchers of any allergies their children have when they complete the consent forms.

14. Methods and Procedures:
Two 30 minute exploratory focus groups will be held at each school, one with female participants and one with male participants. The focus groups will have one facilitator and one recorder present to audio record focus groups.
At the beginning of focus groups, the participants will fill in a short demographic questionnaire (see Appendix), detailing their name, age, date of birth and ethnicity. Participants will receive clear verbal details on what will take place in the focus group and how long it will last. Participants will also be informed that they do not have to answer any questions and they may stop or leave at any time. After this is complete, the focus group questions will be asked and researchers will facilitate discussion.

Some examples of questions that will be asked in the focus group include:
- What is health?
- What could you do to be healthy?
- Is food important for health? Why/why not?

At the end of the focus group, participants will be offered food and will receive a gift pack.

15. Compliance with The Privacy Act 1993 and the Health Information Privacy Code 1994 imposes strict requirements concerning the collection, use and disclosure of personal information. The questions below allow the Committee to assess compliance.

15(a) Are you collecting and storing personal information (e.g., name, contact details, designation, position etc) directly from the individual concerned that could identify the individual?

YES

15(b) Are you collecting information about individuals from another source?

NO

15(c) Collecting Personal Information

- Will you be collecting personal information (e.g., name, contact details, position, company, anything that could identify the individual)?
  YES
- Will you inform participants of the purpose for which you are collecting the information and the uses you propose to make of it?
  YES
- Will you inform participants of who will receive the information?
  YES
- Will you inform participants of the consequences, if any, of not supplying the information?
  YES
Application Form for ethical consideration of research and teaching proposals involving human participants

- Will you inform participants of their rights of access to and correction of personal information?
  YES

If you are NOT informing them of the points above, please explain why: N/A

15(d) Outline your data storage, security procedures and length of time data will be kept

Participants who provide informed consent will be assigned unique ID numbers. Focus groups will be fully transcribed and participant names will be replaced by unique ID numbers during transcription. Audio recordings of the focus groups will be stored on the password-protected computers of researchers (Murray Skeaff, Sheila Skeaff, Isabel Carlisle and Amy McLachlan). These audio recordings will be destroyed after the focus groups have been transcribed.

The ID numbers and participant names will be recorded in a separate file that will be kept on a password-protected computer in Professor Murray Skeaff’s locked office in the Department of Human Nutrition (Science 2 Building, Room 7c3). This information will be deleted from this computer as soon as possible following the completion of the project. Professor Murray Skeaff will be responsible for this.

The researchers (Murray Skeaff, Sheila Skeaff, Isabel Carlisle and Amy McLachlan) will only work with the files containing the anonymous ID numbers. These files will be kept on the password-protected devices of researchers. These transcriptions will be kept for at least 5 years and possibly indefinitely. Any publication or presentation of the results of the survey will be made in a way that participants cannot be identified. Information that can identify participants will be confidential and will not be disclosed to anyone unless legally required.

15(e) Who will have access to personal information, under what conditions, and subject to what safeguards? If you are obtaining information from another source, include details of how this will be accessed and include written permission if appropriate. Will participants have access to the information they have provided?

Amy McLachlan and Isabel Carlisle will have access to personal information during the period when the focus groups are taking place in the schools. They will have access to the personal information because they will be responsible for facilitating and transcribing the focus groups. When the transcriptions have been completed, the results will only be available to all researchers by ID number. Personal information can only be identified by reference to the master file of names and ID numbers. This file will be stored on a password-protected computer in Professor Murray Skeaff’s office.
Participants can request their transcribed dialogue but they will not have access to anyone else’s details or transcriptions.

15(f) Do you intend to publish any personal information they have provided?  
YES

If YES, specify in what form you intend to do this:

Only small segments of transcribed material will be published and participants will remain anonymous.

15(g) Do you propose to collect demographic questionnaire to describe your sample? For example: gender, age, ethnicity, education level, etc. 
YES (see Appendix)

15 (h) Have you, or will you, undertake Māori consultation? Choose one of the options below, and delete the option that does not apply:  

YES We have yet to undertake consultation.

16. Does the research or teaching project involve any form of deception?  
NO
If yes, explain all debriefing procedures:

17. Disclose and discuss any potential problems or ethical considerations:  
As with all focus groups, discussions may involve sensitive topics. For example, the topic of health, weight or food security may come up, which may be uncomfortable for some children. Facilitators will undergo training detailing how to handle these situations. This will include brainstorming possible scenarios that may be problematic and coming up with methods to making sure participants feel at ease. Participants will also be informed at the start of the focus group that they do not have to answer any questions and they may stop or leave at any time. Other than this, we believe that our research is ethical and does not create potential problems for or involve risk to the participants.
Application Form for ethical consideration of research and teaching proposals involving human participants

18.  *Applicant's Signature:  __________________________________________
    Name (please print):  __________________________________________
    Date:  ____________________
    *The signatory should be the staff member detailed at Question 1.

19.  Departmental approval:  I have read this application and believe it to be valid research and ethically sound. I approve the research design. The Research proposed in this application is compatible with the University of Otago policies and I give my consent for the application to be forwarded to the University of Otago Human Ethics Committee with my recommendation that it be approved.
    Signature of **Head of Department:  ________________________________
    Name of HOD (please print):  __________________________________
    Date:  ____________________
9.2 Appendix B: Ethical approval

Dear Professor Skeaff,

I am writing to let you know that, at its recent meeting, the Ethics Committee considered your proposal entitled "Nutrition and Health: What do Year 6 children know, understand, and believe? A pilot study."

As a result of that consideration, the current status of your proposal is: **Approved**

For your future reference, the Ethics Committee’s reference code for this project is: **17/180**.

The comments and views expressed by the Ethics Committee concerning your proposal are as follows:

While approving the application, the Committee would be grateful if you would respond to the following:

**Focus groups for children**

The Committee noted that the Information Sheet for Parents and the Information Sheet for Children indicates a different number of participants for the Focus Groups. Please clarify the number of participants to be included in the focus groups.

**Consent Form for Parents/Guardians**

Item 3 indicates that data “may” be destroyed at the conclusion of the project. Please could you clarify whether there is an intention to potentially retain the information after the conclusion of the research?

**Maori Consultation**

This research is of interest to Maori. Please supply the Committee with evidence that consultation is underway with the Ngāi Tahu Research Consultation Committee (Te Komiti Rakahau ki Kāi Tahu). If you wish to discuss this please contact Mark Brunton (479 8738, research.maori@otago.ac.nz) or visit:

http://www.otago.ac.nz/research/maoriconsultation/
Please provide the Committee with copies of the updated documents, if changes have been necessary.

Approval is for up to three years from the date of this letter. If this project has not been completed within three years from the date of this letter, re-approval must be requested. If the nature, consent, location, procedures or personnel of your approved application change, please advise me in writing.

Upon approval, it is expected that all members of the research team are made aware of what the standard conditions of ethical approval covers. This includes the date ethical approval expires, as well as the process regarding applying for amendments to the research.

The Human Ethics Committee asks for a Final Report to be provided upon completion of the study. The Final Report template can be found on the Human Ethics Web Page
http://www.otago.ac.nz/council/committees/committees/HumanEthicsCommittees.html

Yours sincerely,

[Signature]

Mr Gary Witte
Manager, Academic Committees
Tel: 479 8256
Email: gary.witte@otago.ac.nz

[CC: Professor S Samman Department of Human Nutrition]
9.3 Appendix C: Parental consent form

[Reference Number as allocated upon approval by the Human Ethics Committee] [Date]

[University of Otago logo]

FOOD AND HEALTH: YEAR 6 CHILDREN
CONSENT FORM FOR PARENTS/GUARDIANS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

1. My child's participation in the project is entirely voluntary;

2. I am free to withdraw my child from the project at any time without any disadvantage;

3. Personal identifying information [e.g. name, age, date of birth and ethnicity] may be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years;

4. This project involves an open-questioning technique. The general line of questioning focuses on children’s views about food and being healthy. The precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the discussion develops and that in the event that the line of questioning develops in such a way that my child feels uncomfortable he/she may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind;

5. My child will receive a certificate and a gift pack for participating. Food will also be provided at the group discussion;

6. The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my child's anonymity.

I agree for my child to take part in this project.
(Signature of parent/guardian)  (Date)

(Name of child)

(Name of person taking consent)

Child’s food allergies or intolerances: ...........................................................................................................

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph +643 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
9.4 Appendix D: Participant consent form

[Reference Number as allocated upon approval by the Human Ethics Committee]

[Date]

UNIVERSITY OF OTAGO
St. lifting Wellington, Otago
New Zealand

FOOD AND HEALTH: YEAR 6 CHILDREN
Consent Form for Participants

I have read and understood the information sheet about this study. I have talked
about the study with my parents and understand what it is about. Any questions I have
about the study have been answered in a way that makes sense.

I know that:

1. Participation in this study is voluntary, which means that I do not have to
take part if I don’t want to and nothing will happen to me. I can also stop
taking part at any time and don’t have to give a reason;

2. Anytime I want to stop, that’s okay;

3. If I have any worries or other questions, then I can talk about these with
the researchers that comes to my school;

4. The researchers will audio record me so that they can remember what I say,
but the recording will be erased after the study has ended.

5. The voice recording with my answers will only be listened to by the
researchers and the people they are working with. They will keep whatever I
say private;

6. My name and birthdate will only be seen by the researchers and the people
they are working with. They will keep this information private;
7. Taking part in this study is private. Results of the study may be written up for the researcher's university work but my name will not be on anything;

8. I will receive a small gift of thanks for helping with this study;

Child:

I __________________________ (print your full name), agree to take part in this study.

I go to __________________________ School.

Date: ________________ Signature: __________________________


9.5 Appendix E: Letter to principals

```
Principal «Selected School Name»

Date

Dear Principal,

We are writing to ask if «Selected School Name» would allow us to invite Year 6 students to take part in a focus group assessing children’s beliefs about how food influences our health. We hope to recruit at least four boys and four girls from your school. This study has been approved by the University of Otago Human Ethics Committee (No. XX/XXX).

There has been a lot of research investigating the factors that influence children’s knowledge about food and being healthy. However, there is limited research that has looked at what Kiwi children actually believe. We think that in order to improve New Zealand children’s nutrition understanding, we need to know where the gaps in knowledge are. Therefore, our aim is to conduct focus groups to find out what children know, understand and believe about how food influences our health. The information we gather will be used to improve nutrition education programmes in schools and communities.

In order to do this, we would like to conduct two focus groups in your school. The focus groups may be held during or after school hours, and we would like these focus groups to take place at your school, as it is convenient for parents and is a comfortable and safe environment.

The research is being conducted by two Masters students (Isabel Carlisle and Amy McLachlan) under the supervision of Associate Professor Sheila Skeaff and Professor Murray Skeaff in the Department of Human Nutrition at the University of Otago.

Participation of your school would involve the following:
```
- Distributing information packs to all Year 6 students enrolled in 2018. As a token of our appreciation, all children who participate will receive a certificate and a gift pack.
- Allow us to hold two focus groups in an empty space at your school (i.e. class room, library, office, or gym). The focus groups will take children approximately 30 minutes to complete, with some additional time at the start and end for an introduction and some refreshments. Overall each session should not take more than one hour.
- The time that the focus groups take place is optional, and may occur during class, in-between class or outside of school hours.
- The study will not require any additional resources from the school.
- If you agree, we will need you or your secretary to tell us the best time in term one that we could meet with the children who have agreed to take part.

We realise that schools are always busy but ask that you consider allowing children from your school to participate; they enjoy the experience. We will contact you by phone or in person in the next week to see if you and your school will take part, otherwise please feel free to email us.

Yours sincerely

Isabel Carlisle and Amy McLachlan on behalf of the research group: Professor Murray Skeaff and Associate Professor Sheila Skeaff.

Email:
Tel:

Department of Human Nutrition

PO Box 56, Dunedin, New Zealand.
Tel 64 3 479 7959 • Fax 64 3 479 7958
Email human-nutrition@otago.ac.nz • Web http://www.otago.ac.nz/humannutrition/

DUNEDIN • CHRISTCHURCH • WELLINGTON • HAMILTON • AUCKLAND
9.6 Appendix F: Parental information form

[Reference Number: as allocated upon approval by the Human Ethics Committee]

[Date]

Food and Health: Year 6 Children

INFORMATION SHEET FOR
PARENTS / GUARDIANS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate, we thank you. If you decide not to take part there will be no disadvantage to you and we appreciate you considering our request.

What is the Aim of the Project?
A lot of people have been trying to find ways to help children be healthier. They have studied what affects children’s thoughts about food and being healthy. However, surprisingly little is known about what Kiwi children actually know. We think it is important to find this out, so that we can help teachers come up with better ways to teach children about food and health. Therefore, we are holding group discussions to find out what children think about food and being healthy.

This project is part of Amy McLachlan and Isabel Carlisle’s Masters of Dietetics research project.

What Type of Participants are being sought?

We are looking for 60 boys and girls attending Year 6 primary schools in Auckland. Your child’s school has accepted our invitation to participate so we are approaching you to ask if your child would like to be involved. As a token of appreciation, children who take part in the survey will be given a certificate and a gift pack.

What will Participants be Asked to Do?

Should you agree for your child to take part in this project, your child will be asked to participate in a group discussion with questions focused on food and health. The discussion will take place during term one, at a time chosen by your child’s school.
Groups will usually take about 30 minutes to complete. Two researchers will be present, one leading the group and the other recording. Your child’s individual results will not be shared with anyone and will remain confidential.

We will also provide food during the focus group so please notify us of any special dietary requirements for your child on the consent form.

Participation in the project is optional and there is no disadvantage to you or your child if you decide not to take part.

What Data or Information will be Collected and What Use will be Made of it?
The discussions will audio recorded and then typed out to give us an idea about the current knowledge of Year 6 school children. Your child’s name, age, birthdate, and ethnicity will be collected. Only the researchers involved with this project will have access to your child’s information.

Information that can identify your child is confidential and will not be given to anyone unless legally required. Children’s names will be replaced by study ID numbers. Information that identifies your child will be kept in a separate, secure location from the discussion results and will only be available to Isabel Carlisle and Amy McLachlan (students undertaking the study) and their supervisors Professor Murray Skeaff and Associate Professor Sheila Skeaff. The data collected will be securely stored in such a way that only those mentioned above will be able to gain access to it. Data obtained as a result of the research will be retained for at least 5 years in secure storage. All personal information including name and birthdate of participants will be destroyed at the completion of the research, even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve your child’s anonymity.

This project involves open questions. The general line of questioning focuses on children’s views about food and being healthy. The questions which will be asked have not been determined in advance, but will depend on the way in which the group discussion develops. The University of Otago Human Ethics Committee is aware of the topics to be explored in the discussion, however they have not been able to review the precise questions that are being used.

In the event that the line of questioning does develop in such a way that your child feels uncomfortable, they will be reminded of their right to decline to answer any particular question and that they may withdraw from the project at any stage without any disadvantage to themselves of any kind.

Can Participants Change their Mind and Withdraw from the Project?
You may withdraw your child from participation in the project at any time and without any disadvantage to yourself or your child.

What if Participants have any Questions?
If you have any questions about our project, either now or in the future, please feel free to contact either:

Amy McLachlan or Isabel Carlisle  and  Professor Murray Skeaff
Department of Human Nutrition  
Work phone: to be provided  
caris189@student.otago.ac.nz  
mclam696@student.otago.ac.nz

Professor Murray Skeaff  
Department of Human Nutrition  
Work phone: (03) 479 7688  
murray.skeaff@otago.ac.nz

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph +643 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
FOOD AND HEALTH: YEAR 6 CHILDREN
Information sheet for children

Thank you for showing interest in this study. Please read this sheet carefully before choosing if you want to take part in the study. If you want to take part, we thank you. If you don’t want to take part, that is okay.

Why are we doing the study?

A lot of people have been trying to find ways to help children be healthier. They have been coming up with classes, posters and activities that can teach children about food and how important it is. Now, our research team wants to know what you think about food and being healthy!

Who can take part in the study?

Your school has been chosen to take part in our study. Your principal has agreed for 8-16 children in Year 6 from your school to be included and we are inviting you to take part.

What will you be asked to do?

While you are at school you will join 3-7 other children from your year to join in with a 30 minute talk. Two researchers will be there to ask you some questions and hear what you all have to say. This talk will be
recorded. It is not a test, and there are no right or wrong answers. Your teacher and classmates will not be told what you have said. As a thank you for joining in, you will be offered some snacks and will be given a small gift pack and a certificate.

Can I change my mind if I don’t want to take part anymore?

Yes, you can change your mind at any time. You can choose not to answer questions and can leave the discussion at any time if you want. That is fine, it is your choice. You will not get into trouble if you decide to not take part.

What happens with the information from the questionnaire?

We will keep all the recordings and information we get safe in a computer that needs a password. We will not tell anybody about what you have said and nobody other than the researchers will be able to find them out. The information we find out will help us to improve classes and projects that teach children about food. A bit of what you have said may be written up at the end of the study and might be published, but your name will not be used.

What if I have questions?

If you have any questions about the study, either now or later, you or your parents can contact either:

- Isabel Carlisle of the Department of Human Nutrition

  Work number TBC

  caris189@student.otago.ac.nz

- Amy McLachlan of the Department of Human Nutrition
Work number TBC

mclam696@student.otago.ac.nz

- Professor Murray Skeaff of the Department of Human Nutrition

(03) 479 7688

murray.skeaff@otago.ac.nz

This study has been approved by the University of Otago Human Ethics Committee (Ref No: ). If you or your parents have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Appendix H: Participant demographic questionnaire

The following questions are all about you. Please ask for help if you have any questions.

1. What is your full name?
   First Name: 
   Last Name: 

2. How old are you? (Please circle one)
   8 / 9 / 10 / 11

3. What is your date of birth?
   Day: Month: Year:

4. Are you a boy or a girl? (please circle one)
   Boy / Girl

5. What school do you go to?

6. What ethnicity do you identify with? Please tick all of the boxes that apply to you.
   Please ask the researchers if you need help with this question.
☐ New Zealand European
☐ Maori
☐ Samoan
☐ Cook Island Maori
☐ Tongan
☐ Niuean
☐ Chinese
☐ Indian
☐ Other (please write here...)

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9.9 Appendix G: Focus group plan and script

**Introduction:** Kia ora everyone and thank you for taking part in this talk. It is good that you are here because your opinions are very important. This chat will help us figure out what children of your age think about health. The talk will take around 30 minutes. Is everyone okay if I start recording our conversation?

**Anonymity:** Even though this cool device is recording you, everything you say will be anonymous and only Amy/Isabel and I will know that you are part of this chat. The tapes will be locked up until our conversation is written down, and after it is written down it will be destroyed. Your names won’t be written down on any of the notes we take either. If you have any ideas or things you want to say, feel free to share at any time. However, if you don’t feel comfortable being part of the chat, you don’t have to answer our questions and you can leave at any time.

**Ground rules**

- The most important rule is that only one person speaks at a time. You may want to talk when someone else is talking but please wait until they have finished.
- There are no right or wrong answers and you do not have to agree with the views of other people in the group.
- Does anyone have any questions? (answers)
- OK, let’s begin

**Get children to fill in demographics in demographic questionnaire and name tags**

**Warm up & Icebreaker**

First, I’d like everyone to introduce themselves, so if we would go around the circle and everyone tell us their name and what they want to do for a job when they are older. Okay, we
will start. So we are scientists from Dunedin, does anyone know where that is? (answers)…

Yeah, so we have come all the way from the bottom of New Zealand to talk to you!

[Ice breaker]

Thank you for sharing that, you all have exciting futures ahead of you! Now we will move on to the questions, is everyone happy for us to begin?

**Guiding questions**

- What is health?
- What could you do to be healthy?
- Is food important for health? Why? Why not?

**Extra questions**

- What is being unhealthy?
- What would happen if you didn’t eat food?
- Why is food important for people like you?

**Conclusion**

Thank you for telling us your thoughts, it has been really helpful. We hope you have found this fun and if there is anything you are unhappy with, please come and talk to us or one of your teachers afterwards.

[Hand out gift packs]